As filed with the Securities and Exchange Commission on March 3, 2015

Registration No. 333-

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM S-1
REGISTRATION STATEMENT

Under
The Securities Act of 1933

OPGEN, INC.
(Exact name of registrant as specified in its charter)

Delaware	**8071**	**06-1614015**
(State or other jurisdiction of incorporation or organization)	(Primary Standard Industrial Classification Code Number)	(I.R.S. Employer Identification Number)

708 Quince Orchard Road, Suite 160
Gaithersburg, MD 20878
(240) 813-1260
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Evan Jones
President and Chief Executive Officer
708 Quince Orchard Road, Suite 160
Gaithersburg, MD 20878
(301) 869-9683
(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

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Philadelphia, PA 19103	New York, NY 10105
(215) 665-8500	(212) 370-1300

Approximate date of commencement of proposed sale to the public: As soon as practicable after the effective date of this registration statement.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, as amended, check the following box. ☐

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large Accelerated Filer ☐	Accelerated Filer ☐
Non-Accelerated Filer ☐	Smaller Reporting Company ☒

CALCULATION OF REGISTRATION FEE

Title of each Class of Securities to be Registered	Proposed Maximum Aggregate Offering Price (1) (2)	Amount of Registration Fee
Common Stock, par value $0.01 per share (3) (4)	$ 34,500,000	$ 4,009.00
Underwriters' warrants (3) (4)	$ 1,380,000	$ 160.00
Shares of common stock underlying underwriters' warrants (3) (4)	$ 1,518,000	$ 176.00
Total	$ 37,398,000	$ 4,345.00

(1) Estimated solely for the purpose of computing the amount of the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended.
(2) Includes the aggregate offering price of additional shares and/or underwriters' warrants which the underwriters have the option to purchase to cover over-allotments, if any.
(3) Pursuant to Rule 416 under the Securities Act, the securities being registered hereunder include such indeterminate number of additional shares of common stock as may be issued after the date hereof as a result of stock splits, stock dividends or similar transactions.
(4) Assumes the underwriters' over-allotment option is fully exercised.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until this registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

The information in this preliminary prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell nor does it seek an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

Subject to completion. Dated March 3, 2015.

Prospectus

Shares

Common Stock

OpGen, Inc. is offering shares of its common stock. This is our initial public offering and no public market currently exists for our shares.

We are in the process of applying to list our common stock on The NASDAQ Capital Market. We have reserved the symbol "OPGN" for such listing.

We are an "emerging growth company" under applicable Securities and Exchange Commission rules and will be subject to reduced public company reporting requirements.

Investing in our common stock involves risks. See "Risk Factors" beginning on page 13.

PRICE $ TO $ PER SHARE

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

	Per Share	Total
Public offering price	$	$
Underwriting discount and commissions[1]	$	$
Proceeds, before expenses, to OpGen, Inc.[2]	$	$

(1) See "Underwriting" for additional information regarding underwriter compensation.

(2) We estimate our total expenses for this offering to be approximately $.

We have granted the underwriters an option to purchase up to an additional shares of common stock, at the public offering price less the underwriting discount and commissions, solely to cover over-allotments. See "Underwriting."

The underwriters expect to deliver the shares of common stock to purchasers against payment on or about , 2015.

Sole Book-Running Manager

Maxim Group LLC

Prospectus dated , 2015

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We have not authorized anyone to provide you with any information or to make any representation, other than those contained in this prospectus, any free writing prospectus we have prepared or any document incorporated by reference herein. We take no responsibility for, and provide no assurance as to the reliability of, any other information that others may give you. This prospectus is an offer to sell only the shares offered hereby, but only in circumstances and in jurisdictions where it is lawful to so do. The information contained in this prospectus, any free writing prospectus we have prepared or any document incorporated by reference herein, is accurate only as of its date, regardless of the time of delivery of this prospectus or of any sale of our common stock. To the extent there is a conflict between the information contained in this prospectus and the information contained in any document incorporated by reference herein filed prior to the date of this prospectus, you should rely on the information in this prospectus; provided that if any statement in one of these documents is inconsistent with a statement in another document having a later date—for example, a document incorporated by reference in the prospectus—the statement in the document having the later date modifies or supersedes the earlier statement.

We have not, and the underwriters have not, done anything that would permit this offering or possession or distribution of this prospectus or any free writing prospectus we may provide to you in connection with this offering in any jurisdiction where action for that purpose is required, other than in the United States. You are required to inform yourselves about and to observe any restrictions relating to this offering and the distribution of this prospectus and any such free writing prospectus, including, if applicable to you, outside of the United States.

PROSPECTUS SUMMARY

This summary highlights information contained in greater detail elsewhere in this prospectus. This summary is not complete and does not contain all of the information you should consider in making your investment decision. You should read the entire prospectus carefully before making an investment in our common stock. You should carefully consider, among other things, our financial statements and the related notes and the sections entitled "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" included elsewhere in this prospectus. When we refer to OpGen, Inc. we use the terms "OpGen," "the Company," "us," "we" and "our."

Please refer to the Glossary on page 76 of this prospectus for definitions or descriptions of scientific, health care, regulatory and OpGen-specific terms used in this prospectus.

Overview

We are an early commercial stage company using molecular testing and bioinformatics to assist healthcare providers to combat multi-drug-resistant bacterial infections. Our products and services are designed to enable healthcare providers to rapidly identify hospital patients who are colonized or infected with life threatening, multi-drug-resistant organisms, or MDROs. Our products and products in development are:

- Our Acuitas™ MDRO Gene Test, which is currently available for sale. This test is, to our knowledge, the first CLIA lab-based test able to provide information regarding the presence of ten MDRO resistance genes from one patient specimen. The ten drug resistant genes identified by the Acuitas MDRO Gene Test are associated with CRE (Carbapenem-resistant Enterobactercaceae), ESBL (extended spectrum beta lactamase) and VRE (vancomycin resistance enterobacteria) organisms, and are gastrointestinal organisms frequently associated with antibiotic-resistant infections. The test results can be used by healthcare providers to identify patients who are colonized with one of the drug-resistant genes or who are actively infected. To date, eight acute care hospitals and long-term care facilities have partnered with us to evaluate the capabilities and uses of the Acuitas MDRO Gene Test.

- Our Acuitas CR Elite Test, which is also commercially available, adds the ability for the provider to order a traditional microbiology culture result to be performed from the same specimen sent for the Acuitas MDRO Gene Test, thereby providing additional information about the organism or organisms associated with an active infection, as well as an antibiotic susceptibility profile for such organism or organisms.

- Our Acuitas Lighthouse™ MDRO bioinformatics platform, which is currently in development. Our Acuitas Lighthouse MDRO bioinformatics platform will be able to provide detailed MDRO molecular information about an individual patient's resistance profile, gleaned from our Acuitas MDRO Gene Test results, and integrate this data with other patient and hospital-wide data to help improve overall patient outcomes and to reduce hospital costs. We anticipate that this product will be launched commercially in the third quarter of 2015.

We believe we have an important first-mover advantage in developing and bringing to market the combined package of Acuitas-enabled molecular information about key drug-resistant genes associated with MDRO organisms, with specific genetic information about an acute care hospital's MDRO gene profile, including antibiotic resistance. We are aware of other products currently available that use molecular diagnostics to identify selected MDRO gene species or drug-resistant genes, however we believe our Acuitas products can test for a larger number of gastrointestinal-based drug-resistant genes, particularly those most commonly associated with infections or colonization in hospitalized patients. Our Acuitas MDRO Gene Test and our Acuitas CR Elite Test products, which we refer to as our Acuitas MDRO gene test products, provide results directly from a patient sample, and provide results that can be used by healthcare providers in the spectrum of activities that include identifying colonized patients, managing outbreaks and treating MDRO infections. These test results provide actionable information to healthcare providers so that positive patients (both colonized and symptomatic) receive appropriate isolation precautions and patients with negative results can be removed from isolation precautions if applicable. In addition, we believe we are closer to commercializing a companion bioinformatics product than our competitors. We anticipate that our Acuitas Lighthouse bioinformatics platform will provide meaningful information to healthcare providers to help proactively deal with colonized patients, leading to improved monitoring and antibiotic stewardship.

We introduced our lead MDRO product, the Acuitas MDRO Gene Test, in the first half of 2014, and introduced our Acuitas CR Elite Test in December 2014. In 2014 we achieved minimal revenues from sales of these products. To date, eight acute care hospitals and long-term care facilities have participated in our early look "Partner-Pilot-Program" described in the "Business" section of this prospectus under the heading "Commercialization Strategy and Plans." During 2015, we are working to convert these acute hospitals and long-term care facilities to become customers, supporting our growth projections. We anticipate expanding these programs to capture cost-benefit and clinical outcomes data for use by such facilities in addressing MDRO diagnosis and surveillance, antibiotic resistance and antibiotic stewardship concerns.

We expanded the focus of the Company beginning in 2013 to develop screening and diagnostic products for MDROs as described. Prior to that time, we had developed and commercialized our Argus® Whole Genome Mapping System, MapIt® Services and MapSolver™ bioinformatics products and services. Such products and services were and are sold to academic, public health and corporate customers to allow them to perform Whole Genome Mapping and analysis of microbial, plant, animal and human genomes for life sciences applications. Additional information about these whole genome mapping products and services is set forth below in this Summary under the heading "Microbial and human genome mapping and sequencing." For information regarding the revenues associated with our Whole Genome Mapping products and services, please refer to "Management's Discussion and Analysis of Financial Condition and Results of Operations" later in this prospectus.

Antimicrobial Resistance – An Urgent Global Issue

Antimicrobial resistance is an urgent global healthcare issue. MDROs have been prioritized as an urgent national and global threat by the Centers for Disease Control and Prevention, or CDC, the President of the United States and the World Health Organization, or WHO. In September 2014, The White House issued a National Strategy for combating antibiotic-resistant bacteria. The strategy calls for the strengthening of surveillance efforts to combat resistance, the development and use of innovative diagnostic tests for identification and characterization of resistant bacteria and antibiotic stewardship and development.

The CDC estimates that in the United States more than two million people are sickened every year with antibiotic-resistant infections, with at least 23,000 dying as a result. Antibiotic-resistant infections add considerable but often avoidable costs to the U.S. healthcare system. In most cases, these infections require prolonged and/or costlier treatments, extended hospital stays, additional doctor visits and healthcare facilities use, and result in greater disability and death compared with infections that are treatable with antibiotics. Estimates for the total economic cost to the U.S. economy range between $20 and $35 billion annually. As described in the article by Jim O'Neill titled "Antimicrobial Resistance: Tackling a Crisis for the Health and Wealth of Nations," published in Review on Antimicrobial Resistance in December 2014, 300 million people are expected to die prematurely because of drug resistance over the next 35 years, which could result in $60 to $100 trillion worth of economic output if the problem of antimicrobial drug resistance is not resolved.

In the United States, as reported by the Center for Medicare and Medicaid Services, or CMS, on August 1, 2014, CMS is offering financial incentives to hospitals that can demonstrate reduction in hospital acquired infections, or HAIs; the estimated amount available for these value-based incentive payments in fiscal year 2015 will be approximately $1.4 billion. On the other hand, in December 2014, CMS announced its Hospital Acquired Condition Reduction Program, under which CMS will penalize hospitals for excess rates of infections and other patient injuries by reducing Medicare payments. Total penalties are estimated to be approximately $373 million in the first year.

An emerging U.S. and global threat are CREs - carbapenem-resistant Enterobactercaceae bacteria - that are either difficult to treat or wholly untreatable. According to CDC Director Dr. Tom Frieden, CREs are a nightmare bacteria. Our strongest antibiotics do not work and patients are left with potentially untreatable infections with mortality rates ranging between 40% and 80%. CRE strains are transmitted easily in healthcare settings from patients with asymptomatic intestinal colonization, and the CRE strains have the potential to spread antibiotic resistance through plasmid transfer to other bacterial species, including common human flora and potential pathogens such as Escherichia coli. The CDC has called for urgent action to combat the threat of CRE bacteria. Core prevention measures recommended by the CDC for all acute and long-term care facilities include: contact precautions for all patients who are colonized or infected with CRE, single patient room housing or cohorting, laboratory notification procedures, antibiotic stewardship and screening to identify unrecognized CRE colonization in patients admitted to high risk settings such as ICUs, long-term acute care units or facilities, or epidemiologically linked contacts.

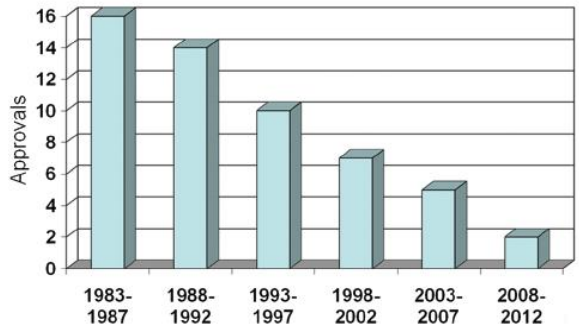
Our Acuitas MDRO Gene Test detects the presence of CRE resistance genes with higher sensitivity and specificity than conventional screening methods. In the summer of 2014, we conducted a comparison on samples of patients known to have CRE infections, using both the Acuitas MDRO Gene Test and a standard microbial culture testing method, and had the microbial culture results confirmed by a national reference lab. In such comparison, the Acuitas MDRO Gene Test was 100% sensitive, while the standard culture method was 72% sensitive. We also tested the rate of false positive results, *i.e.*, identification of MDRO-resistant genes when they were not present, from the Acuitas MDRO Gene Test and conventional culture methods. Thirty-two percent of the initial culture screen results were false positives, while the Acuitas MDRO Gene Test had no false positives – all results matched the known clinical results.

Emergence of Superbugs and Lack of Treatment Options

Over the last decade, multi-drug-resistant gram-negative bacteria, or MDR-GNB, frequently referred to as Superbugs, have been implicated in severe HAIs, and their occurrence has increased steadily. For example, Klebsiella pneumonia, or K. pneumonia, is responsible for roughly 15% of gram-negative infections in hospital intensive care units. Infections caused by Klebsiella pneumonia carbapenemase, or KPC, strains have few treatment options and are associated with a mortality rate upwards of 50%.

Exacerbating the problems associated with the emergence of these highly resistant KPC strains is their propensity to cause outbreaks in healthcare institutions. These pathogens persist both in the flora of hospitalized patients and in the hospital environment and they have the capacity to silently colonize patients or hospital personnel by establishing residence in the gastrointestinal tract without causing any signs of infection. Individuals can be silently colonized or become asymptomatic carriers for long periods of time, with detection of these carriers often proving difficult. These silent carriers act as reservoirs for continued transmission, which makes subsequent spread difficult to control and outbreaks difficult to stop. In addition, KPC strains can survive for several hours on the hands of hospital personnel, which likely facilitates spread from patient to patient. Effective control of KPC outbreaks requires a detailed understanding of how transmission occurs, but current technologies do not allow healthcare providers to routinely perform these investigations.

The lack of currently available treatment options and scarcity of new treatment options in development are compounding the emerging Superbug problem. Since the 1980s and 1990s, there has been a dramatic drop-off in the number of new antibiotics developed and approved by the United States Food and Drug Administration, or FDA. As a result, screening, infection control and antibiotic stewardship have become our most powerful weapons in the fight to contain this threat.



New systemic antibacterial agents approved by the FDA per 5-year period, through 2012. From Boucher et al. See references.

The Opportunity

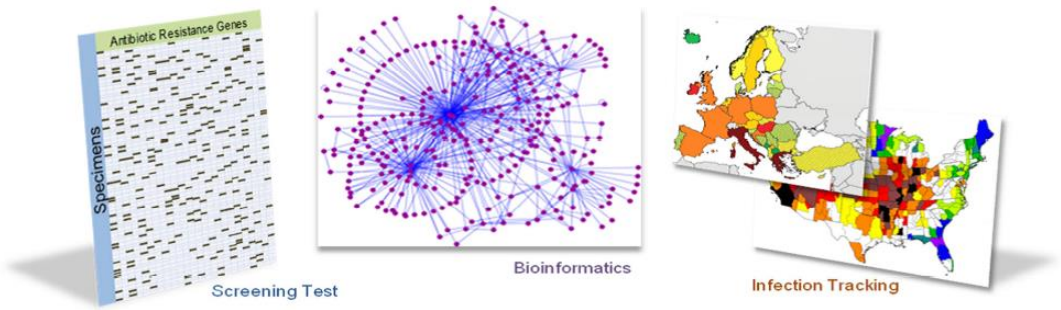
The discovery of antibiotics in the early 20th century fundamentally transformed human and veterinary medicine. Antibiotics save millions of lives each year in the U.S. and around the world. The rise of antibiotic resistant bacteria represents a growing and serious threat to public health and the economy. With the rising urgency of this issue and outbreaks of other difficult to treat infectious diseases, such as Ebola, dealing with infectious diseases and combating antibiotic resistant bacteria has become a global priority. Investment in new diagnostic technologies, antibiotic stewardship programs, antibiotic development, vaccines and information technology advances are seen as critical elements in the fight against antimicrobial resistance.

Culture-based microbiologic methods have been evolving for centuries and are important components of the diagnostic approach to detecting infectious disease. However, we believe the potential for improvements based on cell culture have reached a plateau. In contrast, the opportunities for improved detection and organism typing with DNA testing are expanding exponentially. Genomic diagnostics using DNA probe analysis, DNA sequencing and advanced bioinformatics have the potential to transform clinical and public health microbiology practice. Using technologies developed for production genetics applications and high resolution genome sequencing, it is now possible to achieve rapid, cost effective and highly accurate methods for characterizing bacterial colonization and infections in patients and, more broadly, in hospitals and other areas of human healthcare. This breakthrough combined with the speed, reliability and increased information content available with evolving DNA detection methods is leading to the opportunity to dramatically improve patient outcomes.

Our Solution

OpGen intends to transform infectious disease management through innovation in molecular diagnostics, information technology and microbiology to aid healthcare providers in reducing the burden of drug-resistant infections. Our vision is that no patient should suffer from a life threatening, drug-resistant infection. We are developing solutions for screening patients to determine underlying colonization with antibiotic resistant organisms such as CREs and for the development of early warning antibiotic stewardship programs for colonized patients who become infected. With our Acuitas™ family of products, we anticipate making it possible to rapidly detect and molecularly characterize targeted microorganisms in a hospital or other healthcare setting, including both patients with active infections, and patients or healthcare providers who may be colonized but not currently symptomatic. With this information, we believe it will be possible to allow targeted antibiotic therapy earlier and more effectively.

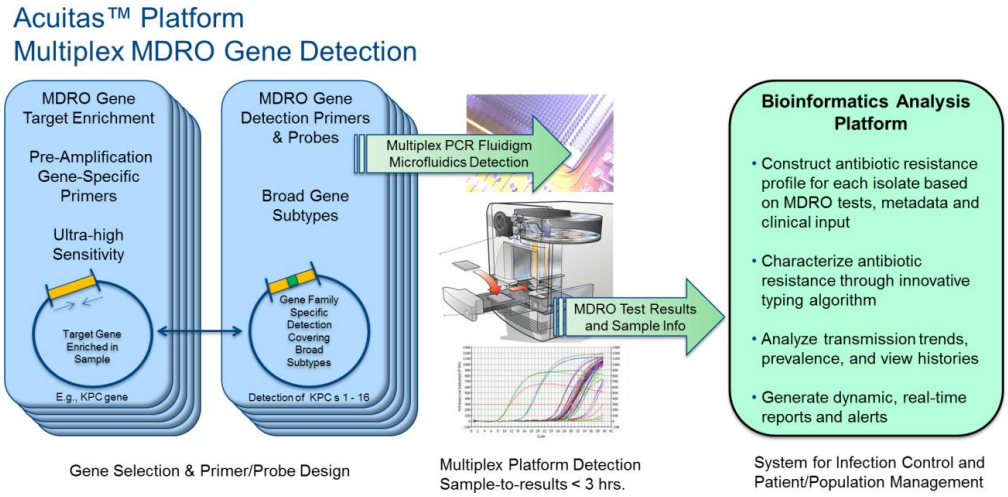
We have developed an approach for screening for MDROs in hospitals using DNA testing. Our Acuitas MDRO Gene Test and Acuitas CR Elite Test are commercially available and will be integrated with our Acuitas Lighthouse MDRO Management System in 2015 to provide real-time information on the MDRO colonization status for patients and hospitals and long-term care facilities. Acuitas Lighthouse MDRO profiles will facilitate MDRO tracking and integrate de-identified patient-specific and aggregated hospital data to provide customized reports including alerts, prevalence information, trend analysis and transmission information. We anticipate providing this information on a local, regional and national basis to our customers, public health organizations and others to help reduce overall disease rates and to strengthen the national capacity to detect and manage treatment of drug-resistant bacterial strains. We intend to launch our Acuitas Lighthouse MDRO bioinformatics product in the third quarter of 2015.



The OpGen solution will include the Acuitas MDRO gene tests for hospital surveillance programs, the Acuitas Lighthouse MDRO Management System for in-hospital MDRO patient management and tracking and integrated reporting capabilities to track MDROs on a local, regional and national basis.

Acuitas MDRO Gene Test and Acuitas CR Elite Test

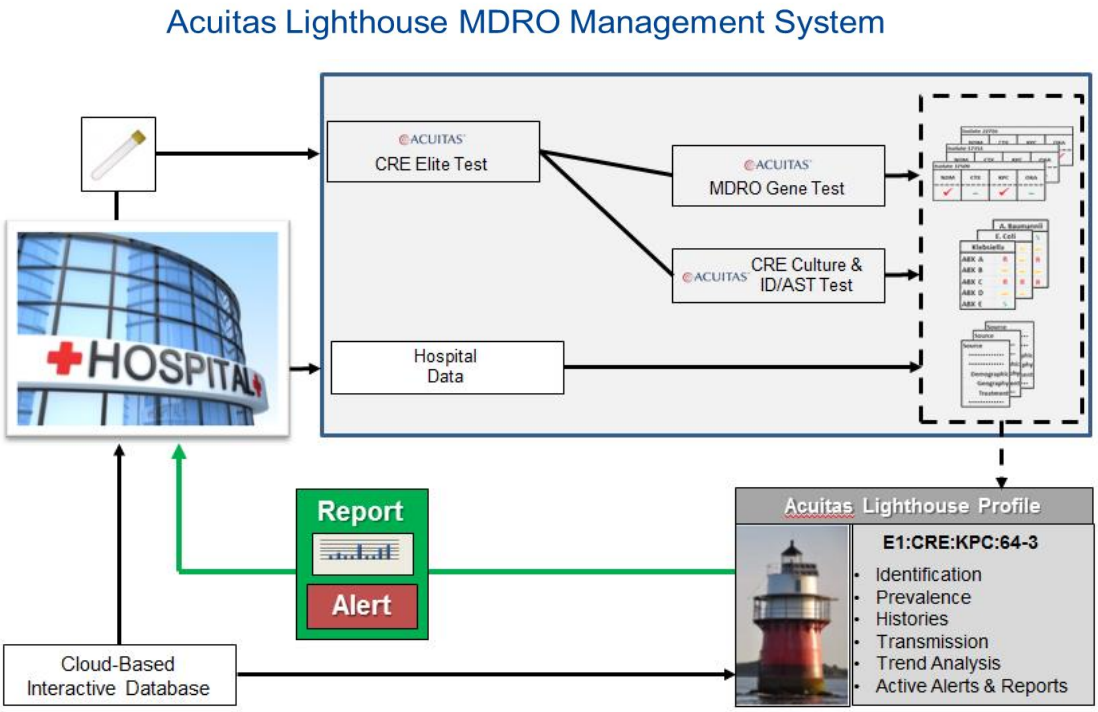
Our Acuitas MDRO Gene Test detects ten critical MDRO genes from one patient swab. The test provides fast, molecular results for genes associated with CRE (7 genes), ESBL (extended spectrum beta lactamase) (2 genes) and VRE (vancomycin resistance enterobacteria) resistant genes. In our CLIA lab validation studies and partner test programs, the test has been proven to be highly sensitive and specific for the presence of these resistant genes when compared to established reference methods, demonstrating nearly 100% correlation in identifying patients carrying MDROs and those free of MDRO bacteria. The Acuitas CR Elite Test adds the ability to procure a standard microbiological culture result that provides additional information about the identified MDRO gene and its antibiotic susceptibility profile.



Acuitas MDRO gene tests combine Fluidigm microfluidic-based production genomics technology with DNA probe reagents designed and manufactured to power our CLIA lab-based Acuitas gene tests.

Acuitas Lighthouse MDRO

Our Acuitas Lighthouse MDRO Management System solution, currently in development and undergoing analytical and clinical validation, enables proactive MDRO management to prevent in-hospital transmission events and to help improve patient outcomes. Trend analysis of patient-specific data, and data specific to individual hospital facilities and health systems is provided confidentially to healthcare providers. Acuitas Lighthouse MDRO dynamic profiling incorporates identity, phenotype and MDRO gene presence and assigns unique microbe identifiers, Acuitas Lighthouse MDRO profiles, based on MDRO gene composition and antibiotic susceptibility, or AST, data. Acuitas Lighthouse MDRO profiling provides the first diagnostic tracking tool for MDRO infection in the hospital setting. Our Acuitas Lighthouse MDRO solution is based on our CLIA- and HIPAA-compliant LIMS database system. We are developing a web-based portal to allow our customers to access to LIMS based lab reports and Acuitas Lighthouse MDRO data reports. We anticipate commercializing our Acuitas Lighthouse MDRO solution in the third quarter of 2015. A schematic description of our Acuitas Lighthouse MDRO product is set forth below.



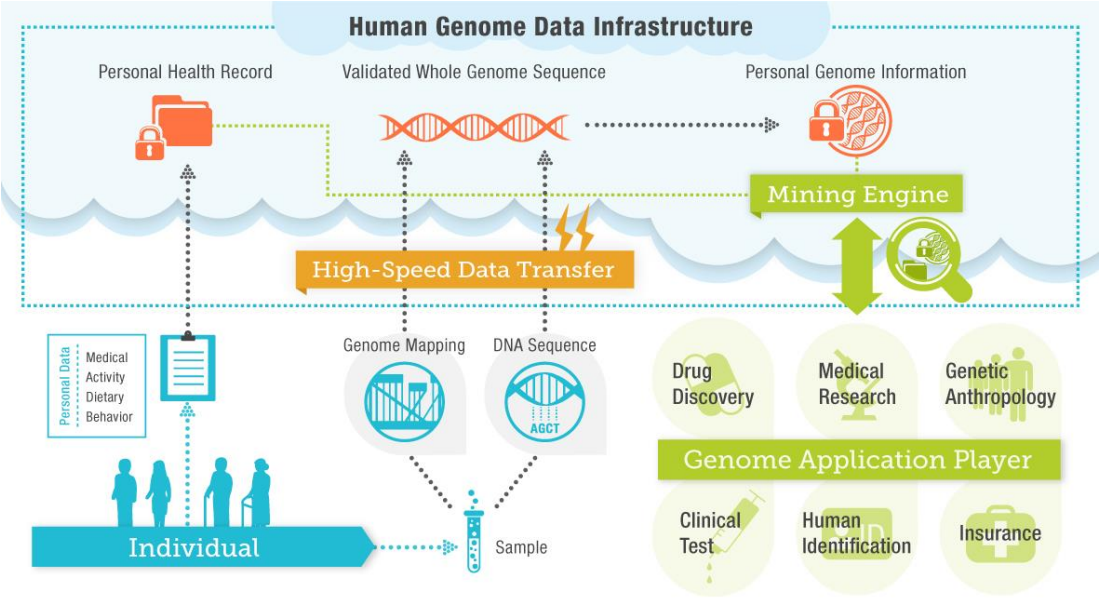
Microbial and human genome mapping and sequencing

Infectious disease testing is undergoing a transformation in which DNA testing is replacing classical culture-based methods because of its accuracy and speed. DNA tests make it possible to simultaneously detect drug-resistant genes, identify the presence of bacteria, viruses and funguses, and perform high resolution genotyping. These tests are generally more sensitive and provide more information than individual cultures. In addition, DNA tests can detect organisms that were undetectable by culture because the target organism was dead or would not grow in the culture medium. High resolution DNA analysis methods, such as whole genome DNA sequencing, offer the ability to analyze the presence of such antibiotic-resistant genes to track the spread of the associated organisms and potentially improve patient diagnosis.

We have developed and commercialized the Argus® Whole Genome Mapping System, MapIt® Services and MapSolver™ bioinformatics products and services for mapping and analysis of microbial, plant, animal and human genomes for life sciences applications. We have more than ten years of experience mapping microbial genomes. Our customers for these products include government and public health agencies such as the CDC, FDA, USDA and biodefense organizations, who use the Argus and MapSolver products in research and development, food safety and public health settings. We continue to provide these products and services to existing customers, however, we anticipate that such revenues will decline as we have shifted our focus to our MDRO and bioinformatics products and services.

In September 2013, we entered into a strategic collaboration with Hitachi High-Technologies Corporation, or Hitachi, to commercialize our Whole Genome Mapping technology for mapping, assembly and analysis of human DNA. In conjunction with Hitachi, we are developing cloud-based genome assembly capabilities for human genomes. We intend to continue commercializing microbial applications of these products through our direct sales efforts. DNA tests and bioinformatics for analysis of whole human genomes will be commercialized through our collaboration with Hitachi.

The following schematic provides a summary of the potential outcome of our collaboration with Hitachi:



Our Strategy

- Accelerate the commercialization of our Acuitas MDRO Gene Test and Acuitas CR Elite Test.
- Complete development of and commercialize our Acuitas Lighthouse MDRO Management System to healthcare providers, governments and diagnostic companies.
- Capitalize on our first-mover advantage through our CLIA lab-based test offerings. We are working to integrate hospital-wide infectious organism molecular diagnostic information with antibiotic susceptibility data with patient specific data for healthcare providers. These infection control, antibiotic stewardship and patient management data product capabilities will be difficult for future market entrants to replicate.
- Develop and commercialize additional proprietary molecular diagnostic products with companion data offerings that provide the ability to efficiently analyze data about MDROs present in a patient sample.
- Expand our lab service offerings and capabilities through the supply of kits for use on our DNA probe assay platform and commercially available rapid diagnostic testing systems, develop additional MDRO DNA sequencing tests and informatics, and partner these offerings with our Grow on the Go™ technology.
- Partner with reference laboratories, government agencies, diagnostic companies and information technology providers to offer our Acuitas Lighthouse MDRO solution on a global basis.
- Build on our established Whole Genome Mapping position through our collaboration with Hitachi for human genome assembly and analysis and expanded research programs directed at complete DNA sequence assembly and bioinformatics.
- Accelerate growth through strategic partnerships, sponsored research programs with governments and industry and strategic acquisitions.

Risk Factors

Our business is subject to numerous risks and uncertainties, including those highlighted in the section entitled "Risk Factors" immediately following this prospectus summary. These risks include, but are not limited to, the following:

- We are an early stage company with a history of losses, and we expect to incur losses for the foreseeable future and may never achieve or sustain profitability. For the years ended December 31, 2014 and 2013, we had a net loss of $5.7 million and $10.1 million, respectively. From our inception through December 31, 2014, we had an accumulated deficit of $96.8 million. The report of our independent registered public accounting firm on our financial statements for the years ended December 31, 2014 and 2013 contains explanatory language that substantial doubt exists about our ability to continue as a going concern. Our monthly cash burn rate is approximately $500,000, and we have required bridge funding from our current investors to maintain our cash position until consummation of the offering contemplated in this prospectus.

- We may not be able to generate sufficient revenue from the Acuitas MDRO gene test products and Acuitas Lighthouse MDRO Management System or our relationships with hospitals to achieve or maintain profitability.

- Our success depends on the market acceptance of the Acuitas MDRO gene test products and Acuitas Lighthouse MDRO Management System. If physicians do not believe the Acuitas MDRO Gene Test, Acuitas CR Elite test and our Acuitas Lighthouse MDRO Management System consistently generate actionable information about MDROs present at their facilities, they may be less likely to order our products and services, and our business could suffer.

- If we are unable to scale our operations to support increased demand for the Acuitas MDRO gene test products and Acuitas Lighthouse MDRO Management System, our business could suffer.

- Our information technology systems are vital to the development and commercialization of our Acuitas Lighthouse MDRO Management System and the Human Chromosome Explorer we are developing with Hitachi, and any failure of these systems could harm our business.

- In order to successfully commercialize our Acuitas MDRO Gene Test and Acuitas CR Elite Test and our future products, including our Acuitas Lighthouse MDRO Management System, we need to expand our sales and marketing capabilities and will require substantial additional capital to fund such expansion.

- We face competition from large, well-capitalized companies who are developing rapid diagnostic systems for MDROs. If we cannot compete successfully with our competitors, we may be unable to increase or sustain our revenue or achieve and sustain profitability.

- If our sole laboratory facility becomes damaged or inoperable, our ability to conduct our business may be jeopardized.

- We rely on a limited number of suppliers or, in some cases, a sole supplier, for some of our laboratory instruments and materials and we may not be able to find replacements or immediately transition to alternative suppliers.

- If the FDA were to begin regulating our tests, we could incur substantial costs and delays associated with trying to obtain premarket clearance or other approvals.

- Our patent and intellectual property rights may not adequately protect our technologies, products and services.

Company and Other Information

We were incorporated under the laws of the State of Delaware in January 2001. Our principal executive office is located at 708 Quince Orchard Road, Suite 160, Gaithersburg, Maryland, 20878, and our telephone number is (301) 869-9683. Our website address is www.opgen.com. We do not incorporate the information on or accessible through our website into this prospectus, and you should not consider any information on, or accessible through, our website as part of this prospectus.

On December 18, 2013, we effected a 1 for 790.5407 reverse stock split of our common stock. All references to common shares, stock options, restricted stock units and warrants outstanding and the exercise price of outstanding derivative securities, have been adjusted to reflect such reverse stock split.

We own various U.S. federal trademark registrations and applications and unregistered trademarks and servicemarks, including OpGen®, Acuitas™, Lighthouse™, Argus®, MapSolver™ and Genome-Builder™, BioMark™ and EP1™ are trademarks of Fluidigm Corporation and Human Chromosome Explorer℠ is a servicemark of Hitachi High-Technologies Corporation. All other trademarks, servicemarks or trade names referred to in this prospectus are the property of their respective owners. Solely for convenience, the trademarks and trade names in this prospectus are sometimes referred to without the ® and ™ symbols, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto. We do not intend the use or display of other companies' trademarks and trade names to imply a relationship with, or endorsement or sponsorship of us by, any other companies, products or services.

Implications of Being an Emerging Growth Company

As a company with less than $1.0 billion in revenue during our last fiscal year, we qualify as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act, or JOBS Act, enacted in April 2012. An "emerging growth company" may take advantage of exemptions from some of the reporting requirements that are otherwise applicable to public companies. These exceptions include:

- being permitted to present only two years of audited financial statements and only two years of related Management's Discussion and Analysis of Financial Condition and Results of Operations in this prospectus;
- not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended;
- reduced disclosure obligations regarding executive compensation in our periodic reports, proxy statements and registration statements; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We may take advantage of these provisions until the last day of our fiscal year following the fifth anniversary of the closing of this offering. However, if certain events occur prior to the end of such five-year period, including if we become a "large accelerated filer," our annual gross revenue exceeds $1.0 billion or we issue more than $1.0 billion of non-convertible debt in any three-year period, we will cease to be an emerging growth company prior to the end of such five-year period.

In this prospectus, we have elected to take advantage of certain of the reduced disclosure obligations, and may elect to take advantage of other reduced reporting requirements in future filings. As a result, the information that we provide to our stockholders may be different from what you might receive from other public reporting companies in which you hold equity interests. In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. We have irrevocably elected not to avail ourselves of this exemption and, therefore, we will be subject to the same new or revised accounting standards, at the same time, as other public companies that are not emerging growth companies.

THE OFFERING

Common stock offered by us	shares
Common stock to be outstanding after this offering	shares (shares if the underwriters exercise their option to purchase additional shares in full)
Underwriters' option to purchase additional shares	We have granted a 45-day option to the underwriters to purchase up to an aggregate of additional shares of common stock at the public offering price less the underwriting discount and commissions, solely to cover over-allotments.
Use of proceeds	We estimate that we will receive net proceeds from this offering of approximately $ million, or approximately $ million if the underwriters exercise their option to purchase additional shares in full, at an assumed public offering price of $ per share, after deducting the underwriting discount, commissions and estimated offering expenses. See "Underwriting" for additional information. We expect to use the net proceeds from this offering to fund increased sales and marketing activities for our Acuitas MDRO gene test products and Acuitas Lighthouse MDRO Management System, research and development activities to complete the development of our Acuitas Lighthouse MDRO Management System and future product development, for general and administrative expenses and for working capital purposes. See "Use of Proceeds" for additional information.
Risk factors	You should carefully read "Risk Factors" in this prospectus for a discussion of factors that you should consider before deciding to invest in our common stock.
NASDAQ Capital Market trading symbol reserved	OPGN

All outstanding shares of our Series A Redeemable Convertible Preferred Stock, or Series A Preferred Stock, and all outstanding convertible notes issued in 2014 and convertible into shares of Series A Preferred Stock, or the 2014 convertible notes, will convert into shares of common stock upon completion of the offering contemplated by this prospectus. The number of shares of our common stock to be outstanding after this offering is based on 5,993,042 shares of our common stock outstanding as of December 31, 2014, on an as-converted basis, assuming conversion of all of our outstanding Series A Preferred Stock and 2014 convertible notes, but excluding:

- 1,230,772 shares of common stock issuable upon the exercise of stock options outstanding as of December 31, 2014 at a weighted-average exercise price of $0.78 per share;
- 217,019 shares of common stock reserved for future issuance under our 2008 Stock Option and Restricted Stock Plan, as amended, or the 2008 Plan;
- up to 1,500,000 shares of common stock reserved for future issuance upon the conversion of our 2015 convertible notes; and
- up to 258,607 shares of common stock issuable upon the exercise of outstanding warrants to purchase our common stock.

Unless otherwise indicated, all information in this prospectus reflects or assumes the following:

- no issuance or exercise of derivative securities on or after December 31, 2014; and
- no exercise by the underwriters of their option to purchase additional shares of common stock in this offering.

SUMMARY FINANCIAL DATA

The following summary financial data should be read together with our financial statements and related notes, "Selected Financial Data" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" appearing elsewhere in this prospectus. The summary statements of operations data for the years ended December 31, 2014 and 2013, and the balance sheet data as of December 31, 2014, have been derived from our audited financial statements included elsewhere in this prospectus.

	Year Ended December 31,	
	2014	2013
	(In thousands, except share and per share data)	
Statements of Operations Data:		
Revenue	$ 4,126	$ 2,411
Operating expenses:		
Cost of sales	952	1,823
Research and development[1]	4,368	4,152
General and administrative[1]	2,313	2,762
Sales and marketing[1]	2,058	3,053
Argus Whole Genome obsolescence	-	951
Total operating expenses[1]	9,691	12,741
Loss from operations	(5,565)	(10,330)
Interest income	-	1
Interest expense	(111)	(32)
Change in fair value of warrant liability	-	135
Other income (expense), net	5	91
Net loss	$ (5,671)	$ (10,135)
Net loss available to common stockholders [2]	$ (6,299)	$ (15,508)
Net loss per common share, basic and diluted	$ (16.25)	$ (896.09)
Shares used in computing net loss per common share, basic and diluted	387,590	17,306
Pro forma net loss per common share, basic and diluted (unaudited) [3]	$ (1.20)	
Pro forma shares used in computing pro forma net loss per common share, basic and diluted (unaudited) [3]	4,687,713	

(1) Includes stock-based compensation as follows:

	Year Ended December 31,	
	2014	2013
	(In thousands)	
Research and development	$ 5	$ 8
General and administrative	56	143
Sales and marketing	3	2
Total stock-based compensation	$ 64	$ 153

(2) Net loss reduced by preferred stock dividends.

(3) Pro forma net loss per common share, basic and diluted, is calculated assuming the conversion of all shares of Series A Preferred Stock and our 2014 convertible notes into common stock outstanding at the beginning of the period or at the original date of issuance, if later, up to December 31, 2014, but does not include 1,500,000 shares of common stock that may be issued upon the conversion of the 2015 convertible notes (assuming the $1.5 million 2015 convertible notes offering is fully subscribed) that were not outstanding at December 31, 2014.

	As of December 31, 2014	
	Actual	Pro Forma [1]
	(In thousands) (Unaudited)	
Balance Sheet Data:		
Cash and cash equivalents	$ 750	$ 750
Working capital deficiency	(4,308)	(2,808)
Total assets	2,655	2,655
Series A Preferred Stock	4,565	-
Accumulated deficit	(96,772)	(96,772)
Total stockholders' deficit	(8,066)	(2,001)

The preceding table presents a summary of our audited balance sheet data as of December 31, 2014:

- on an actual basis;
- on a pro forma basis to give effect to the automatic conversion of all outstanding shares of our Series A Preferred Stock and convertible notes outstanding at December 31, 2014 into an aggregate of 5,499,864 shares of our common stock upon the closing of this offering; and
- on a pro forma as adjusted basis to give further effect to the receipt of the estimated net proceeds from the sale of shares of common stock in this offering at the initial public offering price of $ per share, and after deducting the underwriting discount and commissions and estimated expenses payable by us.

(1) The pro forma presentation does not include 1,500,000 shares of common stock that may be issued upon the conversion of the 2015 convertible notes (assuming the $1.5 million 2015 convertible notes offering is fully subscribed).

RISK FACTORS

Investing in our common stock involves a high degree of risk. You should consider carefully the risks and uncertainties described below, together with all of the other information in this prospectus, including our financial statements and related notes included elsewhere in this prospectus, before making an investment decision. If any of the following risks occur, our business, financial condition, results of operations and prospects could be materially and adversely affected. In that event, the trading price of our common stock could decline and you could lose part or all of your investment.

Risks Related to Our Business

We are an early commercial stage company and our Acuitas MDRO gene test products and Acuitas Lighthouse MDRO Management System may never achieve significant commercial market acceptance.

Currently, we rely principally on the commercialization of our Acuitas MDRO gene test products, and will rely on the launch and commercialization of our Acuitas Lighthouse MDRO Management System products and services, to generate future revenue growth. To date, such Acuitas MDRO gene test products have delivered only minimal revenue. We believe that our commercialization success is dependent upon our ability to significantly increase the number of hospitals, long-term care facilities and other inpatient healthcare settings that use our products. We achieved our first commercial sales of our Acuitas MDRO Gene Tests in the third quarter of 2014, and experienced very limited revenue and customer adoption during 2014. In addition, demand for our Acuitas and Acuitas Lighthouse MDRO products may not increase as quickly as planned and we may be unable to increase our revenue levels as expected. We are currently not profitable. Even if we succeed in increasing adoption of our products by our target inpatient health care markets, maintaining and creating relationships with our existing and new customers and developing and commercializing additional molecular testing products, we may not be able to generate sufficient revenue to achieve or sustain profitability.

Our products may never achieve significant commercial market acceptance.

Our Acuitas MDRO Gene Test, Acuitas CR Elite Test and Acuitas Lighthouse MDRO Management System products may never gain significant acceptance in the marketplace and, therefore, may never generate substantial revenue or profits for us. Our ability to achieve commercial market acceptance for our products will depend on several factors, including:

- our ability to convince the medical community of the clinical utility of our products and services and their potential advantages over existing tests;
- our ability to convince the medical community of the accuracy and speed of our products and services, as contrasted with the current methods available;
- the willingness of hospitals and physicians to use our products and services; and
- the recognition by inpatient health care facilities of the patient safety, improved outcome and cost-effectiveness benefits of using our products and the willingness to pay for them without reimbursement.

We have a history of losses, and we expect to incur losses for the next several years. The report of our independent registered public accounting firm on our financial statements for the years ended December 31, 2014 and 2013 contains explanatory language that substantial doubt exists about our ability to continue as a going concern.

We have incurred substantial losses since our inception, and we expect to continue to incur additional losses for the next several years. For the years ended December 31, 2014 and 2013, we had a net loss of $5.7 million and $10.1 million, respectively. From our inception through December 31, 2014, we had an accumulated deficit of $96.8 million. The report of our independent registered public accounting firm on our financial statements for the years ended December 31, 2014 and 2013 contains explanatory language that substantial doubt exists about our ability to continue as a going concern. Our monthly cash burn rate is approximately $500,000. From October 2014 through January 2015 we received bridge funding on a monthly basis from our current investors to maintain our cash position. In February 2015, we raised an additional $1.2 million through the issuance of convertible notes, or the 2015 notes offering, and have provided investors with participation rights with the right to subscribe for an additional $0.3 million. See the description of the 2015 convertible notes offering on page 48 of this prospectus. We believe such additional funding will help us maintain our cash position until consummation of the offering contemplated in this prospectus. We expect to continue to incur significant operating expenses and anticipate that our expenses will increase due to costs relating to, among other things:

- commercializing our Acuitas MDRO gene test products and Acuitas Lighthouse MDRO Management System and potential future diagnostic and screening products and services;
- developing, presenting and publishing additional clinical and economic utility data intended to increase clinician adoption of our current and future products and services;
- expansion of our operating capabilities;
- maintenance, expansion and protection of our intellectual property portfolio and trade secrets;
- future clinical trials;
- expansion of the size and geographic reach of our sales force and our marketing capabilities to commercialize potential future products and services;
- employment of additional clinical, quality control, scientific, customer service, laboratory, billing and reimbursement and management personnel; and
- employment of operational, financial, accounting and information systems personnel, consistent with expanding our operations and our status as a newly public company following this offering.

Even if we achieve significant revenues, we may not become profitable, and even if we achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain consistently profitable could adversely affect the market price of our common stock and could significantly impair our ability to raise capital, expand our business or continue to pursue our growth strategy. For a detailed discussion of our financial condition and results of operations, see "Management's Discussion and Analysis of Financial Condition and Results of Operations."

The further commercialization of our Acuitas MDRO gene test products and Acuitas Lighthouse MDRO Management System products are key to our business. If we fail to take advantage of our first-mover position, we may not be able to grow our revenue and additional product offerings.

Our ability to generate revenue is currently principally dependent on sales of our Whole Genome Mapping products, Acuitas MDRO gene test products and Acuitas Lighthouse MDRO Management System products. If we are not able to take advantage of our first-mover position in the MDRO testing market to increase our customer base quickly, we may find that our competitors, many of whom are better capitalized and larger than us, can access inpatient health care settings more quickly with competing assay and information system products. If that happens, our business could suffer.

Our future success is dependent upon our ability to expand our customer base.

The current customers we are targeting for our Acuitas MDRO Gene Test are acute care hospitals, particularly those with advanced care units, such as intensive care units. We believe it is these types of acute care facilities where the risk of colonization and the presence of active MDRO infections are most likely to occur. Our success will depend, in part, upon our ability to increase our market penetration to other inpatient facilities, such as nursing homes, rehabilitation centers and other acute and long-term care facilities where the presence of patients colonized with MDROs can significantly increase the facility's risk of outbreak infections. We need to provide a compelling case for the savings, patient safety and recovery, reduced length of stay and reduced costs that come from adopting our MDRO diagnosis and management products and services. If we are not able to successfully increase our customer base, sales of our products and our margins may not meet expectations. Attracting new customers and introducing new products and services requires substantial time and expense. Any failure to expand our existing customer base, or launch new products and services, would adversely affect our ability to improve our operating results.

We have seen declining revenues from our current customers for our Whole Genome Mapping products and services over the past few years, as DNA sequencing techniques and products have grown in popularity. While we continue to provide products and services to our existing customer base, including federal and state agencies, including the CDC and public health agencies, universities and global research organizations, we anticipate that such revenues will be replaced by revenue from our Hitachi collaboration-based products or continue to decline, particularly in view of our focus on our MDRO products and services.

Our sales cycle is lengthy and variable, which makes it difficult for us to forecast revenue and other operating results.

The sales cycle for our Acuitas MDRO gene test products is, and we anticipate the sales cycle for our pending Acuitas Lighthouse MDRO Management System products will be, lengthy, which makes it difficult for us to accurately forecast revenues in a given period, and may cause revenue and operating results to vary significantly from period to period. Potential customers for our products typically need to commit significant time and resources to evaluate our products, and their decision to purchase our products may be further limited by budgetary constraints and numerous layers of internal review and approval, which are beyond our control. We spend substantial time and effort assisting potential customers in evaluating our products. Even after initial approval by appropriate decision makers, the negotiation and documentation processes for the actual adoption of our products on a facility-wide basis can be lengthy. As a result of these factors, based on our experience to date, our sales cycle, the time from initial contact with a prospective customer to routine commercial use of our products, has varied and could be 12 months or longer, which has made it difficult for us to accurately project revenues and operating results. In addition, the revenue generated from sales of our products may fluctuate from time to time due to changes in the testing volumes of our customers. As a result, our results may fluctuate on a quarterly basis, which may adversely affect the price of our common stock.

We have limited experience in marketing and selling our Acuitas products, and if we are unable to adequately address our customers' needs, it could negatively impact sales and market acceptance of our product and we may never generate sufficient revenue to achieve or sustain profitability.

We sell our Acuitas MDRO gene test products through our own direct sales force. We have limited experience in marketing and selling these products, which had their formal commercial launch in 2014. In addition, our Acuitas tests and Acuitas Lighthouse MDRO Management System represent a new technology to the inpatient healthcare facility market. Our future sales will depend in large part on our ability to increase our marketing efforts and adequately address our customers' needs. The inpatient health care facility industry is a large and diverse market. As a result, we believe it is necessary to maintain a sales force that includes sales representatives with specific technical backgrounds that can support our customers' needs. We will also need to attract and develop sales and marketing personnel with industry expertise. Competition for such employees is intense. We may not be able to attract and retain sufficient personnel to maintain an effective sales and marketing force. If we are unable to adequately address our customers' needs, it could negatively impact sales and market acceptance of our products and we may never generate sufficient revenue to achieve or sustain profitability.

We may be unable to manage our future growth effectively, which could make it difficult to execute our business strategy.

We commenced the formal commercial launch of our CLIA lab in late 2013, launched the Acuitas MDRO Gene Test in the second quarter of 2014, and launched the Acuitas CR Elite Test in December 2014. We anticipate growth in our business operations. This future growth could create strain on our organizational, administrative and operational infrastructure, including laboratory operations, quality control, customer service and sales force management. We may not be able to maintain the quality or expected turn-around times of our diagnostic or screening results, or satisfy customer demand as it grows. Our ability to manage our growth properly will require us to continue to improve our operational, financial and management controls, as well as our reporting systems and procedures. The time and resources required to implement the systems to handle such growth is uncertain, and failure to complete this in a timely and efficient manner could adversely affect our operations.

If the utility of our current products and products in development is not supported by studies published in peer-reviewed medical publications, the rate of adoption of our current and future products and services by clinicians and healthcare facilities may be negatively affected.

The results of our clinical and economic validation studies involving our Acuitas MDRO gene test products have been presented at major infectious disease and infection control society meetings. We anticipate publishing results in peer-reviewed publications in leading medical journals in the near future. We need to maintain and grow a continued presence in peer-reviewed publications to promote clinician adoption of our products. We believe that peer-reviewed journal articles that provide evidence of the utility of our current and future solutions and adoption by key opinion leaders in the infectious disease market are very important to the commercial success of our current and any future products. Clinicians typically take a significant amount of time to adopt new products and testing practices, partly because of perceived liability risks and the uncertainty of a favorable cost/benefit analysis. It is critical to the success of our sales efforts that we educate a sufficient number of clinicians and administrators about our products and demonstrate the clinical benefits of these solutions. Clinicians may not adopt our current and future solutions unless they determine, based on published peer-reviewed journal articles and the experience of other clinicians, that our products provide accurate, reliable, useful and cost-effective information that is useful in MDRO diagnosis, screening and outbreak prevention. If our current and future solutions or the technology underlying Acuitas MDRO gene test products or Acuitas Lighthouse MDRO Management System products or our future solutions do not receive sufficient favorable exposure in peer-reviewed publications, the rate of clinician adoption could be negatively affected. The publication of clinical data in peer-reviewed journals is a crucial step in commercializing our products, and our inability to control when, if ever, results are published may delay or limit our ability to derive sufficient revenue from any product that is the subject of a study.

Our products and services are not covered by reimbursement by Medicare, Medicaid and other governmental and third party payors. If we cannot convince our customers that the savings from use of our products and services will increase their overall reimbursement, our business could suffer.

Our products and services do not currently receive reimbursement from Medicare, Medicaid, other governmental payors or commercial third party payors. The recent policy and rule changes in reimbursement announced by CMS, including potential financial incentives for reductions in HAIs, and penalties and decreased Medicare reimbursement for patients with HAIs, provide us with an opportunity to establish a business case for the purchase and use of our screening and diagnostic products and services. If we cannot convince our customers that the savings from use of our products and services will increase or stabilize their overall reimbursement, our business will suffer.

The performance of clinical and economic utility studies is expensive and demands significant attention from our management team.

The performance of clinical and economic utility studies is expensive and demands significant attention from our management team. Data collected from these studies may not be positive or consistent with our existing data, or may not be statistically significant or compelling to the medical community. If the results obtained from our ongoing or future studies are inconsistent with certain results obtained from our previous studies, adoption of our current and future solutions would suffer and our business would be harmed.

If we cannot enter into and maintain new clinical collaborations, our efforts to commercialize our existing products, and to further develop our products in develpment could be delayed.

Our collaboration with Hitachi is important to the development of new products using our Whole Genome Mapping technology in human chromosome applications. In addition, in 2014, Hitachi represented our most significant source of revenue (64%), and no other customer represented more than 10% of our revenues. We believe the collaboration with Hitachi is important to our business, and the loss of such relationship could have a material effect on our business.

We also seek collaborations with MDRO-related industry participants and partner with acute care hospitals in conducting clinical evaluations of our Acuitas MDRO gene test products. These collaborations are important to us. In the future, we intend to work with our clinical collaborators to commercialize our Acuitas MDRO gene test products and may work with a clinical collaborator to further develop our test products as diagnostic kits for which FDA clearance or other approvals will be sought. If any of our collaborators decides not to work with us in the future, or, if acute care hospital partners or long-term care facilities do not convert to customers, it could materially adversely affect our business.

If our sole laboratory facility becomes inoperable, we will be unable to perform Acuitas MDRO gene test products and future solutions, if any, and our business will be harmed.

We perform all of our diagnostic services in our CLIA laboratory located in Gaithersburg, Maryland. We do not have redundant laboratory facilities. Our facility and the equipment we use to perform our diagnostic and screening assays would be costly to replace and could require substantial lead time to repair or replace, if damaged or destroyed. The facility may be harmed or rendered inoperable by natural or man-made disasters, including flooding and power outages, which may render it difficult or impossible for us to perform our tests for some period of time. The inability to perform our tests may result in the loss of customers or harm our reputation, and we may be unable to regain those customers in the future. Although we possess insurance for damage to our property and the disruption of our business, this insurance may not be sufficient to cover all of our potential losses and may not continue to be available to us on acceptable terms, if at all.

In order to establish a redundant laboratory facility, we would have to spend considerable time and money securing adequate space, constructing the facility, recruiting and training employees, and establishing the additional operational and administrative infrastructure necessary to support a second facility. Additionally, any new clinical laboratory facility opened by us would be required to be certified under the Clinical Laboratory Improvement Amendments of 1988, or CLIA, a federal law that regulates clinical laboratories that perform testing on specimens derived from humans for the purpose of providing information for the diagnosis, prevention or treatment of disease. We would also be required to secure and maintain state licenses required by several states, including California, Florida, New York and Pennsylvania, which can take a significant amount of time and result in delays in our ability to begin operations at that facility. If we failed to secure any such licenses, we would not be able to process samples from recipients in such states. We also expect that it would be difficult, time-consuming and costly to train, equip and use a third-party to perform tests on our behalf. We could only use another facility with the established state licensures and CLIA certification necessary to perform our current or future tests following validation and other required procedures. We cannot assure you that we would be able to find another CLIA-certified facility willing or able to adopt our current or future tests and comply with the required procedures, or that this laboratory would be willing or able to perform the tests for us on commercially reasonable terms.

In order to meet the turn-around time required for our Acuitas MDRO gene test products, we rely on transport of specimens to our sole laboratory facility; any disruption in such transport could significantly adversely affect our business.

Our current customers are located near to our sole laboratory facility in Gaithersburg, Maryland. As we expand our customer base, we will need to secure the proper licenses for shipment of specimens and rely on accurate and timely delivery of the specimens by overnight delivery services such as FedEx. Any failure to procure the proper licenses, to comply with the license regulations or to receive undamaged specimens from overnight delivery services could adversely affect our business and reputation.

We rely on a limited number of suppliers or, in some cases, sole suppliers, for some of our laboratory instruments and materials and may not be able to find replacements or immediately transition to alternative suppliers.

We rely on several sole suppliers, including Fluidigm, for certain laboratory reagents, supplies and substances which we use in our laboratory operations and products. An interruption in our laboratory operations could occur if we encounter delays or difficulties in securing these reagents, sequencers, or other laboratory materials, and if we cannot, then obtain an acceptable substitute. Any such interruption could significantly affect our business, financial condition, results of operations and reputation. In particular, we rely on Fluidigm as the sole supplier of the microfluidic test platform used in our Acuitas MDRO Gene Test and as the sole provider of maintenance and repair services for its BioMark HD system. Any disruption in Fluidigm's operations could impact our supply chain and laboratory operations of our molecular information platform and our ability to conduct our business and generate revenue.

We believe that there are only a few other equipment manufacturers that are currently capable of supplying and servicing the equipment and other supplies and materials necessary for our laboratory operations. The use of equipment or materials furnished by these replacement suppliers would require us to alter our laboratory operations. Transitioning to a new supplier would be time consuming and expensive, may result in interruptions in our laboratory operations, could affect the performance specifications of our laboratory operations or could require that we revalidate our products. There can be no assurance that we will be able to secure alternative equipment and other materials, and bring such equipment and materials on line and revalidate them without experiencing interruptions in our workflow. In the case of an alternative supplier for Fluidigm, there can be no assurance that replacement equipment will be available or will meet our quality control and performance requirements for our laboratory operations. If we should encounter delays or difficulties in securing, reconfiguring or revalidating the equipment we require for our products, our business, financial condition, results of operations and reputation could be adversely affected.

If we cannot compete successfully with our competitors, we may be unable to increase or sustain our revenue or achieve and sustain profitability.

We face competition from companies that offer products or have conducted research to diagnose or screen for MDROs. Our principal competition comes from Cepheid, Becton-Dickinson, bioMerieux and Nanosphere. Our competitors also include laboratory companies such as Bio-Reference Laboratories, Inc., Laboratory Corporation of America Holdings and Quest Diagnostics Incorporated. Many hospitals and academic medical centers may also seek to perform the type of molecular testing we perform at their own facilities. Most of these competitors are better capitalized or have access to more resources than we do. We may not be able to effectively compete in the MDRO testing or screening market despite our first-mover advantage.

If we are unable to raise additional capital on acceptable terms in the future, it may limit our ability to develop and commercialize new diagnostic and screening solutions and technologies, and we may have to curtail or cease operations.

We expect capital outlays and operating expenditures to increase over the next several years as we expand our infrastructure, commercial operations and research and development activities. Specifically, we may need to raise additional capital to, among other things:

- complete the commercialization of our Acuitas MDRO gene test products, complete the development of our Acuitas Lighthouse MDRO Management System products and develop future Acuitas and Lighthouse products and services;
- increase our selling and marketing efforts to drive market adoption and address competitive developments;
- expand our clinical laboratory operations;
- fund our clinical validation study activities;
- expand our research and development activities;
- sustain or achieve broader commercialization of our products;
- acquire or license products or technologies; and
- finance our capital expenditures and general and administrative expenses.

Our present and future funding requirements will depend on many factors, including:

- the level of research and development investment required to develop our current and future product and service offerings;
- costs of filing, prosecuting, defending and enforcing patent claims and other intellectual property rights;
- our need or decision to acquire or license complementary technologies or acquire complementary businesses;
- changes in test development plans needed to address any difficulties in commercialization;
- competing technological and market developments;
- whether our diagnostic solutions become subject to additional FDA, or other, regulation; and
- changes in regulatory policies or laws that affect our operations.

Additional capital, if needed, may not be available on satisfactory terms, or at all. Furthermore, if we raise additional funds by issuing equity securities, dilution to our existing stockholders could result. Any equity securities issued also may provide for rights, preferences or privileges senior to those of holders of our common stock. If we raise additional funds by issuing debt securities, these debt securities would have rights, preferences and privileges senior to those of holders of our common stock, and the terms of the debt securities issued could impose significant restrictions on our operations. If we raise additional funds through collaborations and licensing arrangements, we might be required to relinquish significant rights to our technologies or our products under development, or grant licenses on terms that are not favorable to us, which could lower the economic value of those programs to us. If adequate funds are not available, we may have to scale back our operations or limit our research and development activities, which may cause us to grow at a slower pace, or not at all, and our business could be adversely affected.

The loss of key members of our senior management team or our inability to attract and retain highly skilled scientists and laboratory and field personnel could adversely affect our business.

Our success depends largely on the skills, experience and performance of key members of our executive management team. The efforts of each of these persons will be critical to us as we continue to develop our products and services and as we attempt to transition to a company with broader product offerings. If we were to lose one or more of these key employees, we may experience difficulties in competing effectively, developing our technologies and implementing our business strategies. We are in the process of procuring key man insurance for Evan Jones, our CEO, and Eric Winzer, our CFO.

Our research and development programs and commercial laboratory operations depend on our ability to attract and retain highly skilled scientists and technicians. We may not be able to attract or retain qualified scientists and technicians in the future due to the intense competition for qualified personnel among life science businesses. We also face competition from universities, public and private research institutions and other organizations in recruiting and retaining highly qualified scientific personnel.

In addition, our success depends on our ability to attract and retain laboratory and field personnel with extensive experience in infection control in inpatient settings. We may have difficulties locating, recruiting or retaining qualified salespeople, which could cause a delay or decline in the rate of adoption of our current and future products and service offerings. If we are not able to attract and retain the necessary personnel to accomplish our business objectives, we may experience constraints that will adversely affect our ability to support our discovery, development, verification and commercialization programs.

If we lose the support of key opinion leaders, it may be difficult to establish our products as a standard of care for infectious disease diagnosis and screening, which may limit our revenue growth and ability to achieve profitability.

We have established relationships with leading opinion leaders at premier institutions. If these key opinion leaders determine that our products or services are not clinically effective or that alternative technologies are more effective and/or less costly, or if they elect to use internally developed products, we would encounter significant difficulty establishing our product offerings as a standard of care, which would limit our revenue growth and our ability to achieve profitability .

If we are unable to develop products to keep pace with rapid technological, medical and scientific change, our operating results and competitive position could be harmed. New test development involves a lengthy and complex process, and we may not be successful in our efforts to develop and commercialize our diagnostic and screening products and services. The further development and commercialization of additional diagnostic and screening solutions are key to our growth strategy.

A key element of our strategy is to discover, develop, validate and commercialize a portfolio of additional diagnostic and screening products and services to combat MDRO outbreaks and the associated costs to patients, inpatient facilities and the health care industry. We cannot assure you that we will be able to successfully complete development of or commercialize any of our planned future products and services, or that they will be clinically usable. The product development process involves a high degree of risk and may take up to several years or more. Our new product development efforts may fail for many reasons, including:

- failure of the test at the research or development stage;
- lack of clinical validation data to support the effectiveness of the test;
- delays resulting from the failure of third-party suppliers or contractors to meet their obligations in a timely and cost-effective manner;
- failure to obtain or maintain necessary certifications, licenses, clearances or approvals to market or perform the test; or
- lack of commercial acceptance by inpatient health care facilities.

Few research and development projects result in commercial products, and success in early clinical studies often is not replicated in later studies. At any point, we may abandon development of new products, or we may be required to expend considerable resources repeating clinical studies or trials, which would adversely impact the timing for generating potential revenues from those new products. In addition, as we develop new products, we will have to make additional investments in our sales and marketing operations, which may be prematurely or unnecessarily incurred if the commercial launch of a product is abandoned or delayed.

Failure in our information technology, storage systems or our digital platform technology could significantly disrupt our operations and our research and development efforts, which could adversely impact our revenues, as well as our research, development and commercialization efforts.

Our ability to execute our business strategy depends, in part, on the continued and uninterrupted performance of our information technology, or IT, systems, which support our operations and our research and development efforts, as well as our storage systems and our analyzers. Due to the sophisticated nature of the technology we use in our products and service offerings, including our Acuitas Lighthouse MDRO Management System, we are substantially dependent on our IT systems. IT systems are vulnerable to damage from a variety of sources, including telecommunications or network failures, malicious human acts and natural disasters. Moreover, despite network security and back-up measures, some of our servers are potentially vulnerable to physical or electronic break-ins, computer viruses and similar disruptive problems. Despite the precautionary measures we have taken to prevent unanticipated problems that could affect our IT systems, sustained or repeated system failures that interrupt our ability to generate and maintain data, and in particular to operate our digital immunoassay platform, could adversely affect our ability to operate our business. Any interruption in the operation of our digital immunoassay platform, due to IT system failures, part failures or potential disruptions in the event we are required to relocate our instruments within our facility or to another facility, could have an adverse effect on our operations.

If we fail to comply with federal, state and foreign laboratory licensing requirements, we could lose the ability to perform our tests or experience disruptions to our business.

We are subject to CLIA, a federal law that regulates clinical laboratories that perform testing on specimens derived from humans for the purpose of providing information for the diagnosis, prevention or treatment of disease. CLIA regulations mandate specific standards in the areas of personnel qualifications, administration and participation in proficiency testing, patient test management and quality assurance. CLIA certification is also required in order for us to be eligible to bill state and federal healthcare programs, as well as many private third-party payors. To renew these certifications, we are subject to survey and inspection every two years. Moreover, CLIA inspectors may make random inspections of our clinical reference laboratories.

We are also required to maintain state licenses to conduct testing in our laboratories. Maryland law requires that we maintain a state license and establishes standards for the day-to-day operation of our clinical reference laboratory in Gaithersburg, including the training and skills required of personnel and quality control matters. In addition, our clinical reference laboratory is required to be licensed on a test-specific basis by New York State. New York law also mandates proficiency testing for laboratories licensed under New York state law, regardless of whether such laboratories are located in New York. Moreover, several other states require that we hold licenses to test samples from patients in those states. Other states may adopt similar requirements in the future.

If we were to lose, or have restrictions imposed on, our CLIA certificate or Maryland license for our Gaithersburg laboratory, whether as a result of revocation, suspension or limitation, we would no longer be able to perform our test products, which would eliminate our primary source of revenue and harm our business. If we cannot secure a license from New York or from other states where we are required to hold licenses, we will not be able to test specimens from those states.

If the FDA were to begin regulating our tests, we could incur substantial costs and delays associated with trying to obtain premarket clearance or other approvals.

Clinical laboratory tests, like the Acuitas MDRO Gene Test, are regulated under CLIA, as well as by applicable state laws. Historically, most laboratory developed tests, or LDTs, were not subject to FDA regulations applicable to medical devices, although reagents, instruments, software or components provided by third parties and used to perform LDTs may be subject to regulation. The FDA defines the term "laboratory developed test" as an *in vitro* diagnostic test that is intended for clinical use and designed, manufactured and used within a single laboratory. We believe that our Acuitas MDRO gene test products are LDTs. Until 2014, the FDA exercised enforcement discretion such that it did not enforce provisions of the Food, Drug, and Cosmetic Act, or FDA Act, with respect to LDTs. In July 2014, due to the increased proliferation of LDTs for complex diagnostic testing and concerns with several high-risk LDTs related to lack of evidentiary support for claims, erroneous results and falsification of data, the FDA issued guidance that, when finalized, would adopt a risk-based framework that would increase FDA oversight of LDTs. As part of this developing framework, FDA issued draft guidance in October 2014, informing manufacturers of LDTs of its intent to collect information from laboratories regarding their current LDTs and newly developed LDTs through a notification process. The FDA will use this information to classify LDTs and to prioritize enforcement of premarket review requirements for categories of LDTs based on risk, using a public process. Specifically, the FDA plans to use advisory panels to provide recommendations to the agency on LDT risks, classification and prioritization of enforcement of applicable regulatory requirements on certain categories of LDTs, as appropriate.

We cannot provide any assurance that FDA regulation, including premarket review, will not be required in the future for our tests, whether through additional guidance or regulations issued by the FDA, new enforcement policies adopted by the FDA or new legislation enacted by Congress. It is possible that legislation will be enacted into law, regulations could be promulgated or guidance could be issued by the FDA which may result in increased regulatory burdens for us to continue to offer our tests or to develop and introduce new tests. We cannot predict the timing or content of future legislation enacted, regulations promulgated or guidance issued regarding LDTs, or how it will affect our business.

If FDA premarket review, including clearance or approval, is required for the Acuitas MDRO gene test products or any of our future tests (either alone or together with sample collection devices), products or services we may develop, or we decide to voluntarily pursue FDA clearance or approval, we may be forced to stop selling our tests while we work to obtain such FDA clearance or approval. Our business would be negatively affected until such review was completed and clearance to market or approval was obtained. The regulatory process may involve, among other things, successfully completing additional clinical studies and submitting premarket notification or filing a premarket approval application with the FDA. If premarket review is required by the FDA or if we decide to voluntarily pursue FDA premarket review of our tests, there can be no assurance that the Acuitas MDRO Gene Test or any tests, products or services we may develop in the future will be cleared or approved on a timely basis, if at all, nor can there be assurance that labeling claims will be consistent with our current claims or adequate to support continued adoption of for our tests. If our tests are allowed to remain on the market but there is uncertainty in the marketplace about our tests, if we are required by the FDA to label them investigational, or if labeling claims the FDA allows us to make are limited, orders may decline. Ongoing compliance with FDA regulations would increase the cost of conducting our business, and subject us to heightened regulation by the FDA and penalties for failure to comply with these requirements.

If we are required to but fail to maintain regulatory approvals and clearances, or are unable to obtain, or experience significant delays in obtaining, FDA clearances or approvals for our products or product enhancements, our ability to commercially distribute and market our products could suffer.

If the FDA determines that enforcement discretion is not appropriate or that LDTs are generally subject to FDA regulation and that premarket review, including clearance or approval, is required for the Acuitas MDRO Gene Test or any of our future tests, diagnostic test kits that we may develop, or other products that would be classified as medical devices, the process of obtaining regulatory clearances or approvals to market a medical device can be costly and time consuming, and we may not be able to obtain these clearances or approvals on a timely basis, if at all. In particular, the FDA permits commercial distribution of a new medical device only after the device has received clearance under Section 510(k) of the Federal Food, Drug and Cosmetic Act, or is the subject of an approved premarket approval application, or PMA unless the device is specifically exempt from those requirements. The FDA will clear marketing of a lower risk medical device through the 510(k) process if the manufacturer demonstrates that the new product is substantially equivalent to other 510(k)-cleared products. High risk devices deemed to pose the greatest risk, such as life-sustaining, life-supporting, or implantable devices, or devices not deemed substantially equivalent to a previously cleared device, require the approval of a PMA. The PMA process is more costly, lengthy and uncertain than the 510(k) clearance process. A PMA application must be supported by extensive data, including, but not limited to, technical, preclinical, clinical trial, manufacturing and labeling data, to demonstrate to the FDA's satisfaction the safety and efficacy of the device for its intended use. Our currently commercialized products have not received FDA clearance or approval, as they are marketed under the FDA's enforcement discretion for LDTs or are class I medical devices, which are exempt from the requirement for FDA clearance or approval.

Our failure to comply with U.S. federal, state and foreign governmental regulations could lead to the issuance of warning letters or untitled letters, the imposition of injunctions, suspensions or loss of regulatory clearance or approvals, product recalls, termination of distribution, product seizures or civil penalties. In the most extreme cases, criminal sanctions or closure of our manufacturing facility are possible.

Foreign governmental authorities that regulate the manufacture and sale of medical devices have become increasingly stringent and, to the extent we market and sell our products internationally, we may be subject to rigorous international regulation in the future. In these circumstances, we would rely significantly on our foreign independent distributors to comply with the varying regulations, and any failures on their part could result in restrictions on the sale of our products in foreign countries.

Modifications to our marketed products may require new 510(k) clearances or PMA approvals, or may require us to cease marketing or recall the modified products until clearances or approvals are obtained.

If we are required to obtain 510(k) clearance or PMA approval for any of our current or future products, any modification to those products would require additional clearances or approvals. Modifications to a 510(k)-cleared device that could significantly affect its safety or efficacy, or that would constitute a major change in its intended use, requires a new 510(k) clearance or, possibly, a PMA. The FDA requires every manufacturer to make this determination in the first instance, but the FDA may review the manufacturer's decision. The FDA may not agree with our decisions regarding whether new clearances or approvals are necessary. If the FDA requires us to seek 510(k) clearance or a PMA for any modification to a previously cleared product, we may be required to cease marketing and distributing, or to recall the modified product until we obtain such clearance or approval, and we may be subject to significant regulatory fines or penalties. Further, our products could be subject to recall if the FDA determines, for any reason, that our products are not safe or effective. Any recall or FDA requirement that we seek additional approvals or clearances could result in significant delays, fines, increased costs associated with modification of a product, loss of revenue and potential operating restrictions imposed by the FDA.

There is no guarantee that the FDA will grant 510(k) clearance or PMA approval of our future products, and failure to obtain necessary clearances or approvals for our future products would adversely affect our ability to grow our business.

Some of our future products may require FDA 510(k) clearance. Other products, potentially, could require PMA approval. In addition, some of our new products may require clinical trials to support regulatory approval and we may not successfully complete these clinical trials. The FDA may not approve or clear these products for the indications that are necessary or desirable for successful commercialization. Indeed, the FDA may refuse our requests for 510(k) clearance or premarket approval of new products. Failure to receive a required clearance or approval for our new products would have an adverse effect on our ability to expand our business.

Even if our products are approved by regulatory authorities, if we or our suppliers fail to comply with ongoing FDA, or other foreign regulatory authority, requirements, or if we experience unanticipated problems with our products, these products could be subject to restrictions or withdrawal from the market.

Any product regulated as a medical device, and the manufacturing processes, reporting requirements, post-approval clinical data and promotional activities for such product, will be subject to continued regulatory review, oversight and periodic inspections by the FDA and other domestic and foreign regulatory bodies. In particular, we and our suppliers would be required to comply with FDA's Quality System Regulations, or QSR, and International Standards Organization, or ISO, regulations for the manufacture of our products and other regulations which cover the methods and documentation of the design, testing, production, control, quality assurance, labeling, packaging, storage and shipping of any product for which we obtain clearance or approval. Regulatory bodies, such as the FDA, enforce the QSR and other regulations through periodic inspections. The failure by us or one of our suppliers to comply with applicable statutes and regulations administered by the FDA and other regulatory bodies, or the failure to timely and adequately respond to any adverse inspectional observations or product safety issues, could result in, among other things, any of the following enforcement actions: (1) untitled letters, warning letters, fines, injunctions, consent decrees and civil penalties; (2) unanticipated expenditures to address or defend such actions; (3) customer notifications for repair, replacement and refunds; (4) recall, detention or seizure of our products; (5) operating restrictions or partial suspension or total shutdown of production; (6) refusing or delaying our requests for 510(k) clearance or premarket approval of new products or modified products; (7) operating restrictions; (8) withdrawing 510(k) clearances or PMA approvals that have already been granted; (9) refusal to grant export approval for our products; or (10) criminal prosecution.

If any of these actions were to occur it would harm our reputation and cause our product sales and profitability to suffer and may prevent us from generating revenue. Furthermore, our key component suppliers may not currently be or may not continue to be in compliance with all applicable regulatory requirements which could result in our failure to produce our products on a timely basis and in the required quantities, if at all.

Even if regulatory clearance or approval of a product is granted, such clearance or approval may be subject to limitations on the intended uses for which the product may be marketed and reduce our potential to successfully commercialize the product and generate revenue from the product. If the FDA determines that our promotional materials, labeling, training or other marketing or educational activities constitute promotion of an unapproved use, it could request that we cease or modify our training or promotional materials or subject us to regulatory enforcement actions. It is also possible that other federal, state or foreign enforcement authorities might take action if they consider our training or other promotional materials to constitute promotion of an unapproved use, which could result in significant fines or penalties under other statutory authorities, such as laws prohibiting false claims for reimbursement.

In addition, we may be required to conduct costly post-market testing and surveillance to monitor the safety or effectiveness of our products, and we must comply with medical device reporting requirements, including the reporting of adverse events and malfunctions related to our products. Later discovery of previously unknown problems with our products, including unanticipated adverse events or adverse events of unanticipated severity or frequency, manufacturing problems, or failure to comply with regulatory requirements such as QSR, may result in changes to labeling, restrictions on such products or manufacturing processes, withdrawal of the products from the market, voluntary or mandatory recalls, a requirement to repair, replace or refund the cost of any medical device we manufacture or distribute, fines, suspension of regulatory approvals, product seizures, injunctions or the imposition of civil or criminal penalties which would adversely affect our business, operating results and prospects.

Our products may in the future be subject to product recalls that could harm our reputation, business and financial results.

The FDA and similar foreign governmental authorities have the authority to require the recall of regulated products in the event of material deficiencies or defects in design or manufacture. In the case of the FDA, the authority to require a recall must be based on an FDA finding that there is a reasonable probability that the device would cause serious injury or death. In addition, foreign governmental bodies have the authority to require the recall of our products in the event of material deficiencies or defects in design or manufacture. Manufacturers may, under their own initiative, recall a product if any material deficiency in a device is found. A government-mandated or voluntary recall by us or one of our distributors could occur as a result of component failures, manufacturing errors, design or labeling defects or other deficiencies and issues. Recalls of any of our products would divert managerial and financial resources and have an adverse effect on our financial condition and results of operations. The FDA requires that certain classifications of recalls be reported to FDA within 10 working days after the recall is initiated. Companies are required to maintain certain records of recalls, even if they are not reportable to the FDA. We may initiate voluntary recalls involving our products in the future that we determine do not require notification of the FDA. If the FDA disagrees with our determinations, they could require us to report those actions as recalls. A future recall announcement could harm our reputation with customers and negatively affect our sales. In addition, the FDA could take enforcement action for failing to report the recalls when they were conducted.

If our products cause or contribute to a death or a serious injury, or malfunction in certain ways, we will be subject to medical device reporting regulations, which can result in voluntary corrective actions or agency enforcement actions.

Under the FDA medical device reporting regulations, medical device and LDT manufacturers are required to report to the FDA information that a device or LDT has or may have caused or contributed to a death or serious injury or has malfunctioned in a way that would likely cause or contribute to death or serious injury if the malfunction of the device or one of our similar devices were to recur. If we fail to report these events to the FDA within the required timeframes, or at all, FDA could take enforcement action against us. Any such adverse event involving our products also could result in future voluntary corrective actions, such as recalls or customer notifications, or agency action, such as inspection or enforcement action. Any corrective action, whether voluntary or involuntary, as well as defending ourselves in a lawsuit, will require the dedication of our time and capital, distract management from operating our business, and may harm our reputation and financial results.

We may be subject to fines, penalties or injunctions if we are determined to be promoting the use of our products for unapproved or "off-label" uses.

We believe that our Acuitas MDRO gene test products are LDTs, subject to the FDA's enforcement discretion. To remain within the FDA's enforcement discretion, we are restricted in the ways we can promote and market our products. Furthermore, certain of our future products, including specimen transport containers we may develop such as Grow on the Go, might be regulated as class I medical devices for which premarket clearance or approval is not required, subject to certain limitations. We believe that our promotional activities for our products fall within the scope of the FDA's enforcement discretion and applicable premarket exemptions. However, the FDA could disagree and require us to stop promoting our products in certain ways unless and until we obtain FDA clearance or approval for them. In addition, because our products are not currently cleared or approved by the FDA, if the FDA determines that our promotional materials constitutes promotion of a use for which premarket clearance or approval is required, it could request that we modify our promotional materials or subject us to regulatory or enforcement actions, including the issuance of an untitled letter, a warning letter, injunction, seizure, civil fine and criminal penalties. It is also possible that other federal, state or foreign enforcement authorities might take action if they consider our promotional materials to constitute promotion of an unapproved use, which could result in significant fines or penalties under other statutory authorities, such as laws prohibiting false claims for reimbursement. In that event, our reputation could be damaged and adoption of the products would be impaired.

Changes in healthcare policy, including legislation reforming the U.S. healthcare system, may have a material adverse effect on our financial condition and operations.

The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act, collectively, the PPACA, enacted in March 2010, made changes that significantly affect the pharmaceutical and medical device industries and clinical laboratories. As begun in 2013, each medical device manufacturer must pay a sales tax in an amount equal to 2.3% of the price for which such manufacturer sells its FDA-listed medical devices. The FDA has asserted that clinical laboratory tests such as the Acuitas MDRO Gene Test are medical devices. Our Acuitas MDRO gene test products are not currently listed as a medical device with the FDA, but we cannot assure you that the tax will not be extended to LDTs such as ours in the future if they were to be regulated as a device.

Other significant measures contained in the PPACA include coordination and promotion of research on comparative clinical effectiveness of different technologies and procedures, initiatives to revise Medicare payment methodologies, such as bundling of payments across the continuum of care by providers and physicians, and initiatives to promote quality indicators in payment methodologies. The PPACA also includes significant new fraud and abuse measures, including required disclosures of financial arrangements with physician customers, lower thresholds for violations and increasing potential penalties for such violations. In addition, the PPACA establishes an Independent Payment Advisory Board, or IPAB, to reduce the per capita rate of growth in Medicare spending. The IPAB has broad discretion to propose policies to reduce healthcare expenditures, which may have a negative impact on payment rates for services, including our tests. The IPAB proposals may impact payments for clinical laboratory services for our customers beginning in 2016, and for hospital services beginning in 2020, and may indirectly reduce demand for our product candidates.

In addition, other legislative changes have been proposed and adopted in the United States since the PPACA was enacted. On August 2, 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions to Medicare payments to providers of 2% per fiscal year, which went into effect on April 1, 2013 and will stay in effect through 2021 unless additional Congressional action is taken. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, further reduced Medicare payments to several providers, including hospitals, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

The full impact on our business of the PPACA and the other new laws is uncertain. Nor is it clear whether other legislative or regulatory changes will be adopted or how such changes would affect our industry generally or our ability to successfully commercialize our product candidates, if approved. In addition, sales of our tests outside of the United States will subject us to foreign regulatory requirements, which may also change over time.

We cannot predict whether future healthcare initiatives will be implemented at the federal or state level or in countries outside of the United States in which we may do business, or the effect any future legislation or regulation will have on us. The taxes imposed by the new federal legislation and the expansion in government's effect on the United States healthcare industry may result in decreased profits to us, which may adversely affect our business, financial condition and results of operations.

Security breaches, loss of data and other disruptions could compromise sensitive information related to our business or prevent us from accessing critical information and expose us to liability, which could adversely affect our business and our reputation.

In the ordinary course of our business, we collect and store sensitive data, including legally protected health information and personally identifiable information about our customers and their patients. We also store sensitive intellectual property and other proprietary business information, including that of our customers. We manage and maintain our applications and data utilizing a combination of on-site systems and cloud-based data center systems. These applications and data encompass a wide variety of business critical information, including research and development information, commercial information and business and financial information.

We face four primary risks relative to protecting this critical information: loss of access risk, inappropriate disclosure risk, inappropriate modification risk and the risk of our being unable to identify and audit our controls over the first three risks.

We are highly dependent on information technology networks and systems, including the Internet, to securely process, transmit and store this critical information. Security breaches of this infrastructure, including physical or electronic break-ins, computer viruses, attacks by hackers and similar breaches, can create system disruptions, shutdowns or unauthorized disclosure or modification of confidential information. The secure processing, storage, maintenance and transmission of this critical information is vital to our operations and business strategy, and we devote significant resources to protecting such information. Although we take measures to protect sensitive information from unauthorized access or disclosure, our information technology and infrastructure may be vulnerable to attacks by hackers or viruses or breached due to employee error, malfeasance or other disruptions.

A security breach or privacy violation that leads to disclosure or modification of or prevents access to consumer information (including personally identifiable information or protected health information) could harm our reputation, compel us to comply with disparate state breach notification laws, require us to verify the correctness of database contents and otherwise subject us to liability under laws that protect personal data, resulting in increased costs or loss of revenue. If we are unable to prevent such security breaches or privacy violations or implement satisfactory remedial measures, our operations could be disrupted, and we may suffer loss of reputation, financial loss and other regulatory penalties because of lost or misappropriated information, including sensitive consumer data. In addition, these breaches and other inappropriate access can be difficult to detect, and any delay in identifying them may lead to increased harm of the type described above.

Any such breach or interruption could compromise our networks, and the information stored there could be inaccessible or could be accessed by unauthorized parties, publicly disclosed, lost or stolen. Any such interruption in access, improper access, disclosure or other loss of information could result in legal claims or proceedings, liability under laws that protect the privacy of personal information, such as the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, and regulatory penalties. Unauthorized access, loss or dissemination could also disrupt our operations, including our ability to perform tests, provide test results, bill facilities or patients, process claims and appeals, provide customer assistance services, conduct research and development activities, collect, process and prepare Company financial information, provide information about our current and future solutions and other patient and clinician education and outreach efforts through our website, and manage the administrative aspects of our business and damage our reputation, any of which could adversely affect our business. Any such breach could also result in the compromise of our trade secrets and other proprietary information, which could adversely affect our competitive position.

In addition, the interpretation and application of consumer, health-related, privacy and data protection laws in the U.S. and elsewhere are often uncertain, contradictory and in flux. It is possible that these laws may be interpreted and applied in a manner that is inconsistent with our practices. If so, this could result in government-imposed fines or orders requiring that we change our practices, which could adversely affect our business. Complying with these various laws could cause us to incur substantial costs or require us to change our business practices and compliance procedures in a manner adverse to our business.

If we cannot license rights to use technologies on reasonable terms, we may not be able to commercialize new products in the future.

In the future, we may license third-party technology to develop or commercialize new products. In return for the use of a third party's technology, we may agree to pay the licensor royalties based on sales of our solutions. Royalties are a component of cost of services and affect the margins on our products. We may also need to negotiate licenses to patents and patent applications after introducing a commercial product. Our business may suffer if we are unable to enter into the necessary licenses on acceptable terms, or at all, if any necessary licenses are subsequently terminated, if the licensors fail to abide by the terms of the license or fail to prevent infringement by third parties, or if the licensed patents or other rights are found to be invalid or unenforceable.

If we are unable to protect our intellectual property effectively, our business would be harmed.

We rely on patent protection as well as trademark, copyright, trade secret and other intellectual property rights protection and contractual restrictions to protect our proprietary technologies, all of which provide limited protection and may not adequately protect our rights or permit us to gain or keep any competitive advantage. If we fail to protect our intellectual property, third parties may be able to compete more effectively against us and we may incur substantial litigation costs in our attempts to recover or restrict use of our intellectual property.

We apply for patents covering our products and technologies and uses thereof, as we deem appropriate, however we may fail to apply for patents on important products and technologies in a timely fashion or at all, or we may fail to apply for patents in potentially relevant jurisdictions. As of December 31, 2014, we had license or ownership rights to 73 patents, including 30 pending United States non-provisional patent applications and 20 issued United States patents. It is possible that none of our pending patent applications will result in issued patents in a timely fashion or at all, and even if patents are granted, they may not provide a basis for intellectual property protection of commercially viable products, may not provide us with any competitive advantages, or may be challenged and invalidated by third parties. It is possible that others will design around our current or future patented technologies. We may not be successful in defending any challenges made against our patents or patent applications. Any successful third-party challenge to our patents could result in the unenforceability or invalidity of such patents and increased competition to our business. The outcome of patent litigation can be uncertain and any attempt by us to enforce our patent rights against others may not be successful, or, if successful, may take substantial time and result in substantial cost, and may divert our efforts and attention from other aspects of our business.

The patent positions of life sciences companies can be highly uncertain and involve complex legal and factual questions for which important legal principles remain unresolved. No consistent policy regarding the breadth of claims allowed in such companies' patents has emerged to date in the United States or elsewhere. Courts frequently render opinions in the biotechnology field that may affect the patentability of certain inventions or discoveries, including opinions that may affect the patentability of methods for analyzing or comparing DNA.

In particular, the patent positions of companies engaged in the development and commercialization of genomic diagnostic tests, like ours, are particularly uncertain. Various courts, including the U.S. Supreme Court, have recently rendered decisions that affect the scope of patentability of certain inventions or discoveries relating to certain diagnostic tests and related methods. These decisions state, among other things, that patent claims that recite laws of nature (for example, the relationship between blood levels of certain metabolites and the likelihood that a dosage of a specific drug will be ineffective or cause harm) are not themselves patentable. What constitutes a law of nature is uncertain, and it is possible that certain aspects of genetic diagnostics tests would be considered natural laws. Accordingly, the evolving case law in the United States may adversely affect our ability to obtain patents and may facilitate third-party challenges to any owned and licensed patents. The laws of some foreign countries do not protect intellectual property rights to the same extent as the laws of the United States, and we may encounter difficulties protecting and defending such rights in foreign jurisdictions. The legal systems of many other countries do not favor the enforcement of patents and other intellectual property protection, particularly those relating to biotechnology, which could make it difficult for us to stop the infringement of our patents in such countries. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial cost and divert our efforts and attention from other aspects of our business.

Changes in either the patent laws or in interpretations of patent laws in the United States or other countries may diminish the value of our intellectual property. We cannot predict the breadth of claims that may be allowed or enforced in our patents or in third-party patents. We may not develop additional proprietary products, methods and technologies that are patentable.

In addition to pursuing patents on our technology, we take steps to protect our intellectual property and proprietary technology by entering into agreements, including confidentiality agreements, non-disclosure agreements and intellectual property assignment agreements, with our employees, consultants, academic institutions, corporate partners and, when needed, our advisors. Such agreements may not be enforceable or may not provide meaningful protection for our trade secrets or other proprietary information in the event of unauthorized use or disclosure or other breaches of the agreements, and we may not be able to prevent such unauthorized disclosure. If we are required to assert our rights against such party, it could result in significant cost and distraction.

Monitoring unauthorized disclosure is difficult, and we do not know whether the steps we have taken to prevent such disclosure are, or will be, adequate. If we were to enforce a claim that a third party had illegally obtained and was using our trade secrets, it would be expensive and time consuming, and the outcome would be unpredictable. In addition, courts outside the United States may be less willing to protect trade secrets.

We may also be subject to claims that our employees have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of third parties, or to claims that we have improperly used or obtained such trade secrets. Litigation may be necessary to defend against these claims. If we fail in defending such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights and face increased competition to our business. A loss of key research personnel work product could hamper or prevent our ability to commercialize potential products, which could harm our business. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

Further, competitors could attempt to replicate some or all of the competitive advantages we derive from our development efforts, willfully infringe our intellectual property rights, design around our protected technology or develop their own competitive technologies that fall outside of our intellectual property rights. Others may independently develop similar or alternative products and technologies or replicate any of our products and technologies. If our intellectual property does not adequately protect us against competitors' products and methods, our competitive position could be adversely affected, as could our business.

We have not yet registered certain of our trademarks in all of our potential markets. If we apply to register these trademarks, our applications may not be allowed for registration in a timely fashion or at all, and our registered trademarks may not be maintained or enforced. In addition, opposition or cancellation proceedings may be filed against our trademark applications and registrations, and our trademarks may not survive such proceedings. If we do not secure registrations for our trademarks, we may encounter more difficulty in enforcing them against third parties than we otherwise would.

To the extent our intellectual property offers inadequate protection, or is found to be invalid or unenforceable, we would be exposed to a greater risk of direct competition. If our intellectual property does not provide adequate coverage of our competitors' products, our competitive position could be adversely affected, as could our business. Both the patent application process and the process of managing patent disputes can be time consuming and expensive.

We may be involved in litigation related to intellectual property, which could be time-intensive and costly and may adversely affect our business, operating results or financial condition.

We may receive notices of claims of direct or indirect infringement or misappropriation or misuse of other parties' proprietary rights from time to time. Some of these claims may lead to litigation. We cannot assure you that we will prevail in such actions, or that other actions alleging misappropriation or misuse by us of third-party trade secrets, infringement by us of third-party patents and trademarks or other rights, or the validity of our patents, trademarks or other rights, will not be asserted or prosecuted against us.

We might not have been the first to make the inventions covered by each of our pending patent applications and we might not have been the first to file patent applications for these inventions. To determine the priority of these inventions, we may have to participate in interference proceedings, derivation proceedings, or other post-grant proceedings declared by the United States Patent and Trademark Office that could result in substantial cost to us. No assurance can be given that other patent applications will not have priority over our patent applications. In addition, recent changes to the patent laws of the United States allow for various post-grant opposition proceedings that have not been extensively tested, and their outcome is therefore uncertain. Furthermore, if third parties bring these proceedings against our patents, we could experience significant costs and management distraction.

Litigation may be necessary for us to enforce our patent and proprietary rights or to determine the scope, coverage and validity of the proprietary rights of others. The outcome of any litigation or other proceeding is inherently uncertain and might not be favorable to us, and we might not be able to obtain licenses to technology that we require on acceptable terms or at all. Further, we could encounter delays in product introductions, or interruptions in product sales, as we develop alternative methods or products. In addition, if we resort to legal proceedings to enforce our intellectual property rights or to determine the validity, scope and coverage of the intellectual property or other proprietary rights of others, the proceedings could be burdensome and expensive, even if we were to prevail. Any litigation that may be necessary in the future could result in substantial costs and diversion of resources and could have a material adverse effect on our business, operating results or financial condition.

As we move into new markets and applications for our products, incumbent participants in such markets may assert their patents and other proprietary rights against us as a means of slowing our entry into such markets or as a means to extract substantial license and royalty payments from us. Our competitors and others may now and, in the future, have significantly larger and more mature patent portfolios than we currently have. In addition, future litigation may involve patent holding companies or other adverse patent owners who have no relevant product revenue and against whom our own patents may provide little or no deterrence or protection. Therefore, our commercial success may depend in part on our non-infringement of the patents or proprietary rights of third parties. Numerous significant intellectual property issues have been litigated, and will likely continue to be litigated, between existing and new participants in our existing and targeted markets and competitors may assert that our products infringe their intellectual property rights as part of a business strategy to impede our successful entry into or growth in those markets. Third parties may assert that we are employing their proprietary technology without authorization. In addition, our competitors and others may have patents or may in the future obtain patents and claim that making, having made, using, selling, offering to sell or importing our products infringes these patents. We could incur substantial costs and divert the attention of our management and technical personnel in defending against any of these claims. Parties making claims against us may be able to obtain injunctive or other relief, which could block our ability to develop, commercialize and sell products, and could result in the award of substantial damages against us. In the event of a successful claim of infringement against us, we may be required to pay damages and ongoing royalties, and obtain one or more licenses from third parties, or be prohibited from selling certain products. We may not be able to obtain these licenses on acceptable terms, if at all. We could incur substantial costs related to royalty payments for licenses obtained from third parties, which could negatively affect our financial results. In addition, we could encounter delays in product introductions while we attempt to develop alternative methods or products to avoid infringing third-party patents or proprietary rights. Defense of any lawsuit or failure to obtain any of these licenses could prevent us from commercializing products, and the prohibition of sale of any of our products could materially affect our business and our ability to gain market acceptance for our products.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. In addition, during the course of this kind of litigation, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock.

In addition, our agreements with some of our customers, suppliers or other entities with whom we do business require us to defend or indemnify these parties to the extent they become involved in infringement claims, including the types of claims described above. We could also voluntarily agree to defend or indemnify third parties in instances where we are not obligated to do so if we determine it would be important to our business relationships. If we are required or agree to defend or indemnify third parties in connection with any infringement claims, we could incur significant costs and expenses that could adversely affect our business, operating results, or financial condition.

Our insurance policies are expensive and protect us only from some business risks, which will leave us exposed to significant uninsured liabilities.

We do not carry insurance for all categories of risk that our business may encounter. Some of the policies we currently maintain include general liability, employee benefits liability, property, umbrella, business interruption, workers' compensation, product liability, errors and omissions and directors' and officers' insurance. We do not know, however, if we will be able to maintain existing insurance with adequate levels of coverage. Any significant uninsured liability may require us to pay substantial amounts, which would adversely affect our cash position and results of operations.

If we use hazardous materials in a manner that causes injury, we could be liable for damages.

Our activities currently require the use of hazardous materials and the handling of patient samples. We cannot eliminate the risk of accidental contamination or injury to employees or third parties from the use, storage, handling or disposal of these materials. In the event of contamination or injury, we could be held liable for any resulting damages, and any liability could exceed our resources or any applicable insurance coverage we may have. Additionally, we are subject on an ongoing basis to federal, state and local laws and regulations governing the use, storage, handling and disposal of these materials and specified waste products. We are, or may be in the future, subject to compliance with additional laws and regulations relating to the protection of the environment and human health and safety, and including those relating to the handling, transportation and disposal of medical specimens, infectious and hazardous waste and Occupational Health and Safety, or OSHA, requirements.

We may use third party collaborators to help us develop, validate or commercialize any new diagnostic solutions, and our ability to commercialize such solutions could be impaired or delayed if these collaborations are unsuccessful.

We may in the future selectively pursue strategic collaborations for the development, validation and commercialization of any new products and services we may develop. In any future third party collaboration, we may be dependent upon the success of the collaborators in performing their responsibilities and their continued cooperation. Our collaborators may not cooperate with us or perform their obligations under our agreements with them. We cannot control the amount and timing of our collaborators' resources that will be devoted to performing their responsibilities under our agreements with them. Our collaborators may choose to pursue alternative technologies in preference to those being developed in collaboration with us. The development, validation and commercialization of our potential solutions may be delayed if collaborators fail to fulfill their responsibilities in a timely manner or in accordance with applicable regulatory requirements or if they breach or terminate their collaboration agreements with us. Disputes with our collaborators could also impair our reputation or result in development delays, decreased revenues and litigation expenses.

Changes in, or interpretations of, accounting rules and regulations could result in unfavorable accounting changes or require us to change our compensation policies.

Accounting methods and policies for diagnostic companies, including policies governing revenue recognition, research and development and related expenses and accounting for stock-based compensation, are subject to further review, interpretation and guidance from relevant accounting authorities, including the Securities and Exchange Commission, or the SEC. Changes to, or interpretations of, accounting methods or policies may require us to reclassify, restate or otherwise change or revise our financial statements, including those contained in this filing.

If we are sued for product liability or errors and omissions liability, we could face substantial liabilities that exceed our resources.

The marketing, sale and use of the Acuitas MDRO gene test products could lead to product liability claims if someone were to allege that an Acuitas MDRO gene test product failed to perform as it was designed. We may also be subject to liability for errors in the results we provide to physicians or for a misunderstanding of, or inappropriate reliance upon, the information we provide. For example, if we diagnosed a patient as having an MDRO but such result was a false positive, the patient could be unnecessarily isolated in an in-patient setting or receive inappropriate treatment. We may also be subject to similar types of claims related to products we may develop in the future. A product liability or errors and omissions liability claim could result in substantial damages and be costly and time consuming for us to defend. Although we maintain product liability and errors and omissions insurance, we cannot assure you that our insurance would fully protect us from the financial impact of defending against these types of claims or any judgments, fines or settlement costs arising out of any such claims. Any product liability or errors and omissions liability claim brought against us, with or without merit, could increase our insurance rates or prevent us from securing insurance coverage in the future. Additionally, any product liability lawsuit could cause injury to our reputation or cause us to suspend sales of our products and solutions. The occurrence of any of these events could have an adverse effect on our business and results of operations.

Our ability to utilize our net operating loss carryforwards and certain other tax attributes may be limited.

We have incurred net losses since inception and do not expect to become profitable in 2015 or for several years thereafter. To the extent that we continue to generate taxable losses, unused losses will carry forward to offset future taxable income, if any, until such unused losses expire. We may be unable to use these net operating loss carryforwards, or NOLs, and certain tax credit carryforwards to offset income before such unused NOLs tax credit carryforwards expire. Under Section 382 of the Internal Revenue Code of 1986, as amended, or the Code, if a corporation undergoes an "ownership change" (generally defined as a greater than 50% change (by value) in its equity ownership over a three-year period), the corporation's ability to use its pre-change NOLs and other pre-change tax attributes to offset its post-change income may be further limited. We have not performed an analysis on whether we have experienced any ownership changes in the past. It is possible that we have experienced an ownership change, or that we will experience an ownership change in the future, including pursuant to this initial public offering. We had federal NOL carryforwards of $76.3 million and research and development tax credits of $1.9 million as of December 31, 2014, that may already be or could be limited if we experience an ownership change.

We may be adversely affected by the current economic environment and future adverse economic environments.

Our ability to attract and retain customers, invest in and grow our business and meet our financial obligations depends on our operating and financial performance, which, in turn, is subject to numerous factors, including the prevailing economic conditions and financial, business and other factors beyond our control, such as the rate of unemployment, the number of uninsured persons in the United States and inflationary pressures. We cannot anticipate all the ways in which the current economic climate and financial market conditions, and those in the future, could adversely impact our business.

We are exposed to risks associated with reduced profitability and the potential financial instability of our customers, many of which may be adversely affected by volatile conditions in the financial markets. For example, unemployment and underemployment, and the resultant loss of insurance, may decrease the demand for healthcare services and diagnostic testing. If fewer patients are seeking medical care because they do not have insurance coverage, we may experience reductions in revenues, profitability and/or cash flow. In addition, if economic challenges in the United States result in widespread and prolonged unemployment, either regionally or on a national basis, a substantial number of people may become uninsured or underinsured. To the extent such economic challenges result in less demand for our proprietary tests, our business, results of operations, financial condition and cash flows could be adversely affected.

If we accept payment from federal and state healthcare programs in the future, we will be subject to enforcement actions involving false claims, kickbacks, physician self-referral or other federal or state fraud and abuse laws, and we could incur significant civil and criminal sanctions and loss of reimbursement, which would hurt our business.

The government has made enforcement of the false claims, anti-kickback, physician self-referral and various other fraud and abuse laws a major priority. In many instances, private whistleblowers also are authorized to enforce these laws even if government authorities choose not to do so. Several clinical diagnostic laboratories and members of their management have been the subject of this enforcement scrutiny, which has resulted in very significant civil and criminal settlement payments. In most of these cases, private whistleblowers brought the allegations to the attention of federal enforcement agencies. The risk of our being found in violation of these laws and regulations is increased by the fact that some of the laws and regulations have not been fully interpreted by the regulatory authorities or the courts, and their provisions are open to a variety of interpretations. In the event we begin accepting reimbursement from federal or state healthcare programs for our tests, we would be subject to the following laws:

- the federal Anti-Kickback Statute, which constrains certain marketing practices, educational programs, pricing policies and relationships with healthcare providers or other entities by prohibiting, among other things, soliciting, receiving, offering or paying remuneration, directly or indirectly, to induce or in return for, the purchase or recommendation of an item or service reimbursable under a federal healthcare program, such as the Medicare and Medicaid programs;

- federal civil and criminal false claims laws and civil monetary penalty laws, which prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment from Medicare, Medicaid, or other third party payors that are false or fraudulent;

- federal physician self-referral laws, such as the Stark law, which prohibit a physician from making a referral to a provider of certain health services with which the physician or the physician's family member has a financial interest, and prohibit submission of a claim for reimbursement pursuant to a prohibited referral; and

- state law equivalents of each of the above federal laws, such as anti-kickback and false claims laws, which may apply to items or services reimbursed by any third party payor, including commercial insurers, many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts.

If we or our operations, or any contracted sales agent, are found to be in violation of any of these laws and regulations, we may be subject to penalties, including civil and criminal penalties, damages, fines, exclusion from participation in U.S. federal or state healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of our operations. We have compliance policies and are in the process of adopting a written compliance plan based on the HHS Office of the Inspector General guidance set forth in its model compliance plan for clinical laboratories, and federal and state fraud and abuse laws. We will monitor changes in government enforcement, particularly in these areas, as we grow and expand our business. Any action against us for violation of these laws, even if we successfully defend against it, could cause us to incur significant legal expenses, divert our management's attention from the operation of our business and hurt our reputation. If we were excluded from participation in U.S. federal healthcare programs, we would not be able to receive, or to sell our tests to other parties who receive reimbursement from Medicare, Medicaid and other federal programs, and that could have a material adverse effect on our business.

We may generate a portion of our future revenue internationally in the future and would then be subject to various risks relating to international activities which could adversely affect our operating results.

We believe that a portion of our future revenue will come from international sources as we implement and expand overseas operations. Engaging in international business involves a number of difficulties and risks, including:

- required compliance with existing and changing foreign healthcare and other regulatory requirements and laws, such as those relating to patient privacy;
- required compliance with anti-bribery laws, such as the U.S. Foreign Corrupt Practices Act and U.K. Bribery Act, data privacy requirements, labor laws and anti-competition regulations;
- export or import restrictions;
- various reimbursement and insurance regimes;
- laws and business practices favoring local companies;
- longer payment cycles and difficulties in enforcing agreements and collecting receivables through certain foreign legal systems;
- political and economic instability;
- potentially adverse tax consequences, tariffs, customs charges, bureaucratic requirements and other trade barriers;
- foreign exchange controls;
- difficulties and costs of staffing and managing foreign operations; and
- difficulties protecting or procuring intellectual property rights.

As we expand internationally, our results of operations and cash flows would become increasingly subject to fluctuations due to changes in foreign currency exchange rates. Our expenses are generally denominated in the currencies in which our operations are located, which is in the United States. If the value of the U.S. dollar increases relative to foreign currencies in the future, in the absence of a corresponding change in local currency prices, our future revenue could be adversely affected as we convert future revenue from local currencies to U.S. dollars.

If we dedicate resources to our international operations and are unable to manage these risks effectively, our business, operating results and prospects will suffer.

We face the risk of potential liability under the U.S. Foreign Corrupt Practices Act for past international distributions of products and to the extent we distribute products or otherwise operate internationally in the future.

In the past, we have distributed certain of our products internationally, and in the future we may distribute our products internationally and possibly engage in additional international operations. The U.S. Foreign Corrupt Practices Act, or FCPA, prohibits companies such as us from engaging, directly or indirectly, in making payments to foreign government and political officials for the purpose of obtaining or retaining business or securing any other improper advantage, including, among other things, the distribution of products and other international business operations. Like other U.S. companies operating abroad, we may face liability under the FCPA if we, or third parties we have used to distribute our products or otherwise advance our international business, have violated the FCPA. Any violations of these laws, or allegations of such violations, could disrupt our operations, involve significant management distraction, involve significant costs and expenses, including legal fees, and could result in a material adverse effect on our business, prospects, financial condition or results of operations. We could also suffer severe penalties, including criminal and civil penalties, disgorgement and other remedial measures.

Payments for our tests and other services could decline because of factors beyond our control.

If hospital patient volumes drop as a result of severe economic conditions, or other unforeseen changes in health care provision or affordability, individual hospitals and health systems may be less willing to invest in our MDRO surveillance and prevention programs. In addition, state and federal funds that are anticipated to be invested in the National Strategy for Combating Antibiotic-Resistant Bacteria could be reduced.

Risks Related to Being a Public Company

We will incur increased costs and demands on management as a result of compliance with laws and regulations applicable to public companies, which could harm our operating results.

As a public company, we will incur significant legal, accounting and other expenses that we did not incur as a private company, including costs associated with public company reporting requirements. In addition, the Sarbanes-Oxley Act of 2002 and the Dodd-Frank Act of 2010, as well as rules implemented by the SEC and The NASDAQ Stock Market, impose a number of requirements on public companies, including with respect to corporate governance practices. Our management and other personnel will need to devote a substantial amount of time to these compliance and disclosure obligations. Moreover, these rules and regulations will increase our legal, accounting and financial compliance costs and will make some activities more time-consuming and costly. We also expect that it will be more expensive for us to obtain director and officer liability insurance.

If we are unable to implement and maintain effective internal control over financial reporting, investors may lose confidence in the accuracy and completeness of our reported financial information and the market price of our common stock may be negatively affected.

As a public company, we will be required to maintain internal control over financial reporting and to report any material weaknesses in such internal control. Section 404 of the Sarbanes-Oxley Act of 2002 requires that we evaluate and determine the effectiveness of our internal control over financial reporting and, beginning with our annual report for the year ending December 31, 2015, provide a management report on the internal control over financial reporting. If we have a material weakness in our internal control over financial reporting, we may not detect errors on a timely basis and our financial statements may be materially misstated. We are in the process of compiling the system and processing documentation necessary to perform the evaluation needed to comply with Section 404 of the Sarbanes-Oxley Act. We may not be able to complete our evaluation, testing and any required remediation in a timely fashion.

During the evaluation and testing process, if we identify one or more material weaknesses in our internal control over financial reporting, our management will be unable to conclude that our internal control over financial reporting is effective. Moreover, when we are no longer an emerging growth company, our independent registered public accounting firm will be required to issue an attestation report on the effectiveness of our internal control over financial reporting. Even if our management concludes that our internal control over financial reporting is effective, our independent registered public accounting firm may conclude that there are material weaknesses with respect to our internal controls or the level at which our internal controls are documented, designed, implemented or reviewed.

If we are unable to conclude that our internal control over financial reporting is effective, or when we are no longer an emerging growth company, if our auditors were to express an adverse opinion on the effectiveness of our internal control over financial reporting because we had one or more material weaknesses, investors could lose confidence in the accuracy and completeness of our financial disclosures, which could cause the price of our common stock to decline. Internal control deficiencies could also result in a restatement of our financial results in the future.

We are an emerging growth company and may elect to comply with reduced public company reporting requirements applicable to emerging growth companies, which could make our common stock less attractive to investors.

We are an emerging growth company, as defined under the Securities Act of 1933, or the Securities Act. We will remain an emerging growth company for up to five years, although if our revenue exceeds $1 billion in any fiscal year before that time, we would cease to be an emerging growth company as of the end of that fiscal year. In addition, if the market value of our common stock that is held by non-affiliates exceeds $700 million as of the last business day of our second fiscal quarter of any fiscal year before the end of that five-year period, we would cease to be an emerging growth company as of December 31 of that year. As an emerging growth company, we may choose to take advantage of exemptions from various reporting requirements applicable to certain other public companies, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, reduced financial statement and financial-related disclosures, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirement of holding a nonbinding advisory vote on executive compensation and obtaining stockholder approval of any golden parachute payments not previously approved by our stockholders. We cannot predict whether investors will find our common stock less attractive if we choose to rely on any of these exemptions. If some investors find our common stock less attractive as a result of any choices to reduce future disclosure we may make, there may be a less active trading market for our common stock and our stock price may be more volatile.

Risks Related to this Offering and Our Common Stock

Our Series A Preferred Stock and 2014 convertible notes will convert into common stock upon the closing of the offering contemplated by this prospectus, but our 2015 convertible notes will only convert at the election of the holders of such notes. If the 2015 convertible notes are not converted by their holders, we may need to use proceeds from this offering to repay the 2015 convertible notes at maturity.

Our Ninth Amended and Restated Certification of Incorporation, as amended, as currently in effect, provides for the automatic conversion of our Series A Preferred Stock and our 2014 convertible notes if our initial public offering is a "Qualified IPO" – a firm commitment underwritten public offering with net cash proceeds to us (after underwriting discount, commissions and fees) of at least $30.0 million, and a purchase price of at least $4.00 per share. Regardless of whether the offering contemplated by this prospectus will constitute a Qualified IPO, therefore the holders of 70% of our Series A Preferred Stock, voting as a separate class, have approved a conversion of all outstanding shares of Series A Preferred Stock into common stock if the offering contemplated by this prospectus is consummated. In addition, the holders of 67% of the principal amount of the 2014 convertible notes have approved conversion of such notes into Series A Preferred Stock if the offering contemplated by this prospectus is consummated.

Our 2015 convertible notes can only be converted at the election of each holder. The 2015 convertible notes, in the aggregate principal amount of $1.5 million if all participation rights are exercised, have a maturity date of February 17, 2016. It is possible that if the 2015 convertible notes are not fully converted into common stock in the offering contemplated by this prospectus, we will need to use some proceeds from this offering to repay such 2015 convertible notes. In such event, the Company will have less funds available to finance the sales and marketing and research and development activities described under "Use of Proceeds."

Our stock price may be volatile, and you may not be able to sell shares of our common stock at or above the price you paid.

Prior to this offering, there has been no public market for our common stock, and an active public market for our stock may not develop or be sustained after this offering. We and the representatives of the underwriters have determined the initial public offering price of our common stock through negotiation. This price will not necessarily reflect the price at which investors in the market will be willing to buy and sell our stock following this offering. In addition, the trading price of our common stock following this offering is likely to be highly volatile and could be subject to wide fluctuations in response to various factors, some of which are beyond our control. These factors include:

- actual or anticipated variations in our and our competitors' results of operations;
- announcements by us or our competitors of new products, commercial relationships or capital commitments;
- issuance of new securities analysts' reports or changed recommendations for our stock;
- periodic fluctuations in our revenue, due in part to the way in which we recognize revenue;
- actual or anticipated changes in regulatory oversight of our products;
- developments or disputes concerning our intellectual property or other proprietary rights;
- commencement of, or our involvement in, litigation;
- announced or completed acquisitions of businesses or technologies by us or our competitors;
- any major change in our management; and
- general economic conditions and slow or negative growth of our markets.

In addition, the stock market in general, and the market for stock of life sciences companies in particular, has experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of those companies. Broad market and industry factors may seriously affect the market price of our common stock, regardless of our actual operating performance. These fluctuations may be even more pronounced in the trading market for our stock shortly following this offering. In addition, in the past, following periods of volatility in the overall market and the market price of a particular company's securities, securities class action litigation has often been instituted against these companies. This litigation, if instituted against us, could result in substantial costs and a diversion of our management's attention and resources.

If securities or industry analysts issue an adverse opinion regarding our stock or do not publish research or reports about our Company , our stock price and trading volume could decline.

The trading market for our common stock will depend in part on the research and reports that equity research analysts publish about us and our business. We do not control these analysts or the content and opinions included in their reports. Securities analysts may elect not to provide research coverage of our Company after the closing of this offering, and such lack of research coverage may adversely affect the market price of our common stock. The price of our common stock could also decline if one or more equity research analysts downgrade our common stock or if those analysts issue other unfavorable commentary or cease publishing reports about us or our business. If one or more equity research analysts cease coverage of our Company , we could lose visibility in the market, which in turn could cause our stock price to decline.

Future sales of shares by existing stockholders could cause our stock price to decline.

If our existing stockholders sell, or indicate an intention to sell, substantial amounts of our common stock in the public market after the lock-up and other legal restrictions on resale discussed in this prospectus lapse, the trading price of our common stock could decline. Based on shares outstanding as of February 18, 2015 (assuming full subscription of the 2015 convertible notes offering), on an as converted basis, and assuming the conversion of our all of our then-outstanding Series A Preferred Stock and all convertible notes, upon the closing of this offering, we will have outstanding a total of 7,493,347 shares of common stock. Of these shares, 176,861 will be freely tradable, without restriction, in the public market immediately after the offering. Each of our directors and officers and substantially all of our other stockholders has entered into lock-up agreements with the underwriters that restrict their ability to sell or transfer their shares. The lock-up agreements pertaining to this offering will expire 180 days after the date of this prospectus. The underwriters, however, may, in their sole discretion, waive the contractual lock-up prior to the expiration of the lock-up agreements. After the lock up agreements expire, based on shares outstanding as of February 18, 2015, up to an additional 7,316,486 shares of common stock will be eligible for sale in the public market, of which 5,935,013 shares are held by directors, executive officers and other affiliates and will be subject to volume limitations under Rule 144 under the Securities Act, and various vesting agreements. In addition, 1,229,494 shares of common stock that are subject to outstanding options, and up to 258,607 shares of common stock that are subject to outstanding warrants will become eligible for sale in the public market to the extent permitted by the provisions of various vesting agreements, the lock-up agreements and Rules 144 and 701 under the Securities Act. We intend to file a registration statement on Form S-8 under the Securities Act covering all of the shares of common stock subject to options outstanding and reserved for issuance under our stock plans. This registration statement will become effective immediately upon filing, and shares covered by this registration statement will be eligible for sale in the public markets, subject to Rule 144 limitations applicable to affiliates and any lock-up agreements described above. If these additional shares are sold, or if it is perceived that they will be sold, in the public market, the trading price of our common stock could decline.

Insiders have substantial control over us and will be able to influence corporate matters.

As of February 18, 2015, directors and executive officers and their affiliates beneficially owned, in the aggregate, approximately 80.7% of our outstanding capital stock. After the consummation of this offering, this will be %, assuming . As a result, these stockholders will be able to exercise significant influence over all matters requiring stockholder approval, including the election of directors and approval of significant corporate transactions, such as a merger or other sale of our Company or its assets. This concentration of ownership could limit stockholders' ability to influence corporate matters and may have the effect of delaying or preventing a third party from acquiring control over us.

Anti-takeover provisions in our charter documents and under Delaware law could discourage, delay or prevent a change in control and may affect the trading price of our common stock.

Provisions in our restated certificate of incorporation and our amended and restated bylaws to become effective upon the closing of this offering may have the effect of delaying or preventing a change of control or changes in our management. Our restated certificate of incorporation and amended and restated bylaws include provisions that:

- authorize our board of directors to issue, without further action by the stockholders, up to 5,000,000 shares of undesignated preferred stock;

- require that any action to be taken by our stockholders be effected at a duly called annual or special meeting and not by written consent;
- specify that special meetings of our stockholders can be called only by our board of directors, our chairman of the board or our chief executive officer;
- establish an advance notice procedure for stockholder approvals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors;
- provide that our directors may be removed only for cause;
- provide that vacancies on our board of directors may, except as otherwise required by law, be filled only by a majority of directors then in office, even if less than a quorum;
- specify that no stockholder is permitted to cumulate votes at any election of directors; and
- require a super-majority of votes to amend certain of the above-mentioned provisions.

In addition, we are subject to the provisions of Section 203 of the Delaware General Corporation Law regulating corporate takeovers. Section 203 generally prohibits us from engaging in a business combination with an interested stockholder, subject to certain exceptions.

Our management will have discretion in the use of the net proceeds from this offering and may not use them in a way which increases the value of your investment.

We currently intend to use the net proceeds of this offering for selling and marketing activities, including expansion of our sales force to accelerate the ongoing commercialization of our Acuitas MDRO gene test products, for research and development activities, including finalizing development of the Acuitas Lighthouse MDRO Management System, as well as the development of our product pipeline, including the Acuitas Resistome Test, and for general and administrative expenses (including compensation of our officers and directors and other personnel-related costs and the costs of operating as a public company), and for working capital and other general corporate purposes. However, our management will have discretion in the application of the net proceeds from this offering and investors will be relying on the judgment of our management regarding the application of those proceeds. The amounts and timing of our actual expenditures depend on numerous factors, including the timing and amount of our cash receipts from the sale of products; the timing and amount of our expenses related to the sale of our products and costs related to geographical expansion of our sales efforts; the ongoing status of and results from our clinical trials and other studies; changes in regulatory requirements or other regulatory or compliance matters applicable to our current or future products and services; identification of opportunities to acquire businesses or assets or license technologies that we believe are in the best interests of our stockholders; and any unforeseen cash needs. Depending on the outcome of these factors, our plans and priorities may change and we may apply the net proceeds of this offering differently than we currently anticipate. Our management may spend the proceeds in ways that do not improve our results of operations or enhance the value of our common stock, and you will not have the opportunity to influence management's decisions on how to use the proceeds from this offering. Our failure to apply these funds effectively could have a material adverse effect on our business, delay the development of new tests and cause the price of our common stock to decline.

Purchasers in this offering will experience immediate and substantial dilution in the book value of their investment.

The initial public offering price of our common stock is substantially higher than the net tangible book value per share of our common stock immediately after this offering. Therefore, if you purchase our common stock in this offering, you will incur an immediate dilution of $ in net tangible book value per share from the price you paid, based on the initial public offering price of $ per share. In addition, new investors who purchase shares in this offering will contribute approximately % of the total amount of equity capital raised by us through the date of this offering, but will only own approximately % of the outstanding equity. The exercise of outstanding options and warrants will result in further dilution. For a detailed description of the dilution that you will experience immediately after this offering, see "Dilution."

We have never paid dividends on our capital stock, and we do not anticipate paying dividends in the foreseeable future.

We have never paid dividends on any of our capital stock and currently intend to retain any future earnings to fund the growth of our business. Any determination to pay dividends in the future will be at the discretion of our board of directors and will depend on our financial condition, operating results, capital requirements, general business conditions and other factors that our board of directors may deem relevant. As a result, capital appreciation, if any, of our common stock will be the sole source of gain for the foreseeable future.

If an active, liquid trading market for our common stock does not develop, you may not be able to sell your shares quickly or at or above the initial offering price.

There has not been a public market for our common stock. An active and liquid trading market for our common stock may not develop or be sustained following this offering. You may not be able to sell your shares quickly or at or above the initial offering price. The initial public offering price has been determined by negotiations with the representatives of the underwriters. This price may not be indicative of the price at which our common stock will trade after this offering, and our common stock could trade below the initial public offering price.

INFORMATION REGARDING FORWARD-LOOKING STATEMENTS

This prospectus includes forward-looking statements. All statements other than statements of historical facts contained in this prospectus, including statements regarding our future results of operations and financial position, strategy and plans, and our expectations for future operations, are forward-looking statements. The words "believe," "may," "will," "estimate," "continue," "anticipate," "design," "intend," "expect" or the negative version of these words and similar expressions are intended to identify forward-looking statements. We have based these forward-looking statements on our current expectations and projections about future events and trends that we believe may affect our financial condition, results of operations, strategy, short- and long-term business operations and objectives, and financial needs. These forward-looking statements are subject to a number of risks, uncertainties and assumptions, including those described in "Risk Factors." In light of these risks, uncertainties and assumptions, the forward-looking events and circumstances discussed in this prospectus may not occur, and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements. Given these uncertainties, you should not place undue reliance on these forward-looking statements. Forward-looking statements include, but are not limited to, statements about:

- the commercialization of our current Acuitas MDRO gene test products and completed development and commercialization of our Acuitas Lighthouse MDRO Management System products;
- anticipated trends and challenges in our business and the competition that we face;
- the execution of our business plan and our growth strategy;
- our expectations regarding the size of and growth in potential markets;
- changes in laws or regulations applicable to our business, including potential regulation by the FDA;
- our ability to develop and commercialize new products and the timing of commercialization;
- our liquidity and working capital requirements, including our long-term future cash requirements beyond the next 12 months;
- our expectations regarding future revenue and expenses; and
- our expectations regarding the use of proceeds from this offering.

Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, level of activity, performance or achievements. In addition, neither we nor any other person assumes responsibility for the accuracy and completeness of any of these forward-looking statements. Any forward-looking statement made by us in this prospectus speaks only as of the date on which it is made. We disclaim any duty to update any of these forward-looking statements after the date of this prospectus to confirm these statements to actual results or revised expectations.

You may rely only on the information contained in this prospectus. You should read this prospectus and the documents that we reference in this prospectus and have filed with the SEC as exhibits to the registration statement of which this prospectus is a part completely and with the understanding that our actual future results, levels of activity, performance and events and circumstances may be materially different from what we expect. We qualify all of our forward-looking statements by these cautionary statements. This prospectus contains statistical data and estimates that we obtained from industry publications and reports. These publications typically indicate that they have obtained their information from sources they believe to be reliable, but do not guarantee the accuracy and completeness of their information. Some data contained in this prospectus is also based on our internal estimates. We are responsible for the information contained in the prospectus and believe it to be reasonable.

USE OF PROCEEDS

We estimate that the net proceeds from the sale of shares of our common stock in this offering will be approximately $ million, after deducting the underwriting discount and commissions and estimated offering expenses payable by us. If the underwriters' over-allotment option to purchase additional shares from us is exercised in full, we estimate that our net proceeds will be approximately $ million.

The principal purposes of this offering are to obtain additional capital to support our operations, establish a public market for our common stock and to facilitate our future access to the public capital markets. We currently intend to use the net proceeds from this offering as follows:

- approximately $ million for sales and marketing activities, including expansion of our sales force to support the ongoing commercialization of our MDRO gene test products and, when development is completed, our Acuitas Lighthouse MDRO Management System, and for working capital and general and administrative purposes;

- approximately $ million for research and development related to the continued support of our completion of the development of our Acuitas Lighthouse MDRO Management System and future products in our pipeline; and

- the remainder for general and administrative expenses (including compensation of our officers and directors and other personnel-related costs and costs of operating as a public company), and for working capital and other general corporate purposes.

We estimate that the net proceeds from this offering will allow us to pursue our planned sales and marketing activities through the end of calendar year 2016. The expected use of the net proceeds from this offering represents our intentions based upon our current plans and business conditions, which could change in the future as our plans and business conditions evolve. As of the date of this prospectus, we cannot specify with certainty all of the particular uses for the net proceeds to be received upon the closing of this offering. We will have discretion in the way that we use the net proceeds and investors will be relying on our judgment regarding the application of the net proceeds of this offering. The amounts and timing of our actual expenditures depend on numerous factors, including the success of our product development pipeline activities and acceptance of our products by key opinion leaders, hospitals, long-term care facilities and other healthcare providers.

Depending on the outcome of these factors, our plans and priorities may change, and we may be required to apply the net proceeds of this offering differently than we currently anticipate, and it may be necessary to allocate more or less of the net proceeds to the categories described above. We do not expect that we will decrease our estimated allocations to selling and marketing or research and development activities to fund potential acquisitions or for general and administrative expenses if doing so would have an adverse effect on the financial resources we believe will be necessary for us to pursue our business goals.

DIVIDEND POLICY

We have never declared or paid any dividends on our capital stock. We currently intend to retain all available funds and any future earnings, if any, to fund the development and expansion of our business and we do not anticipate paying any cash dividends in the foreseeable future. Any future determination to pay dividends will be made at the discretion of our board of directors. Investors should not purchase our common stock with the expectation of receiving cash dividends.

CAPITALIZATION

The following table sets forth our cash and cash equivalents and capitalization as of December 31, 2014, as follows:

- on an actual basis;
- on a pro forma basis to give effect to the automatic conversion of all outstanding shares of our convertible preferred stock and convertible notes into an aggregate of 5,499,864 shares of common stock upon the closing of this offering; and
- on a pro forma as adjusted basis to give further effect to the receipt of the estimated net proceeds from the sale of shares of common stock in this offering at the initial public offering price of $ per share, after deducting the underwriting discount and commissions and estimated expenses payable by us.

You should read this table in conjunction with "Selected Financial Data" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our financial statements and related notes included elsewhere in this prospectus.

	As of December 31, 2014		
	Actual	Pro Forma	Pro Forma as Adjusted
	(In thousands, except share data) (Unaudited)		
Cash and cash equivalents	$ 750	$ 750	$
Convertible notes	$ 1,500	$ -	$
Promissory notes (secured demand notes)	1,500	1,500	
Long-term debt	235	235	
Redeemable convertible preferred stock, par value $0.01 per share: 6,000,000 shares authorized, 3,999,864 issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted.	4,565	-	
Stockholder's (deficit) equity:			
Common stock, par value $0.01 per share: 7,500,000 shares authorized, 493,178 shares issued and outstanding, actual; 7,500,000 shares authorized, 5,993,042 shares issued and outstanding proforma; and shares authorized and shares issued and outstanding, proforma as adjusted.	5	60	
Preferred stock, par value $0.01 per share: no shares authorized, issued or outstanding, actual and pro forma; 5,000,000 shares authorized, no shares issued or outstanding, pro forma as adjusted	-	-	
Additional paid-in capital	88,701	94,711	
Accumulated deficit	(96,772)	(96,772)	
Total stockholders' deficit	(8,066)	(2,001)	
Total capitalization	$ (266)	$ (266)	$

If the underwriters' over-allotment option is exercised in full, pro forma as adjusted cash and cash equivalents, common stock, additional paid-in capital, total stockholders' equity and common stock issued and outstanding as of December 31, 2014 would be $, $, $, $ and $, respectively.

The number of shares of common stock in the table above excludes:

- 1,230,772 shares of common stock issuable upon the exercise of options outstanding at December 31, 2014 at a weighted average exercise price of $0.78 per share;
- 217,019 shares of common stock reserved for future issuance under our 2008 Plan;
- up to 1,500,000 shares of common stock reserved for future issuance upon the conversion of our 2015 convertible notes; and
- up to 258,607 shares of common stock issuable upon the exercise of warrants to purchase our common stock.

DILUTION

If you invest in our common stock in this offering, your ownership interest will be diluted to the extent of the difference between the initial public offering price per share of our common stock and the pro forma as adjusted net tangible book value per share of our common stock immediately after this offering.

Our historical net tangible book value per share is determined by dividing our total tangible assets less our total liabilities by the total number of shares of common stock outstanding as of December 31, 2014. Our historical net tangible book value (deficit) as of December 31, 2014, was ($3.5) million, or ($7.10) per share of common stock. Our pro forma net tangible book value (deficit) as of December 31, 2014 was ($2.0) million, or ($0.33) per share of common stock. Our pro forma net tangible book value is determined by our total tangible assets less our total liabilities divided by the total number of shares of common stock outstanding as of December 31, 2014, assuming conversion of all shares of Series A Preferred Stock and all convertible notes outstanding at December 31, 2014.

The pro forma presentation does not include 1,500,000 shares of common stock that may be issued upon the conversion of the 2015 convertible notes (assuming the $1.5 million 2015 convertible notes offering is fully subscribed) that were not outstanding at December 31, 2014.

After giving effect to the sale of shares of common stock in this offering at the initial public offering price of $ per share, after deducting the underwriting discount and commissions and estimated offering expenses payable by us, our pro forma as adjusted net tangible book value as of December 31, 2014 would have been $ million, or $ per share. This represents an immediate increase in pro forma net tangible book value of $ per share to existing stockholders and an immediate dilution in pro forma net tangible book value of $ per share to purchasers of common stock in this offering, as illustrated in the following table:

Initial public offering price per share		$
Pro forma net tangible book value per share as of December 31, 2014	$ (0.33)	
Increase in pro forma net tangible book value per share attributable to new investors		
Pro forma as adjusted net tangible book value per share after this offering		
Dilution per share to investors participating in this offering		$

If the underwriters' over-allotment option to purchase additional shares is exercised in full, the pro forma as adjusted net tangible book value per share after this offering would be $ per share, the increase in pro forma as adjusted net tangible book value per share to existing stockholders would be $ per share and the dilution to new investors purchasing common stock in this offering would be $ per share.

The following table presents, on a pro forma as adjusted basis as of December 31, 2014, the differences between existing stockholders and purchasers of common stock in this offering with respect to the number of shares purchased from us, the total consideration paid and the average price paid per share, which, with respect to the purchasers of common stock in this offering, is based on the initial public offering price of $ per share, before deducting the underwriting discount and commissions and estimated expenses payable by us:

	Total Shares		Total Consideration		Average Price per Share
	Number	Percent	Amount	Percent	
Existing stockholders before this offering					
Purchasers of common stock in this offering					
Total		100.0%		$ 100.0%	

If the underwriters' over-allotment option to purchase additional shares is exercised in full, existing stockholders would own % and new investors would own % of the total number of shares of our common stock outstanding immediately after this offering.

The calculations above are based on 5,993,042 shares outstanding as of December 31, 2014, after giving effect to the automatic conversion of all then-outstanding shares of Series A Preferred Stock and convertible notes into common stock upon the closing of this offering and exclude:

- 1,230,772 shares of common stock issuable upon the exercise of options outstanding at December 31, 2014, at a weighted average exercise price of $0.78 per share;
- 217,019 shares of common stock reserved for future issuance under our 2008 Plan;
- up to 1,500,000 shares of common stock reserved for future issuance upon the conversion of our 2015 convertible notes (if the offering is fully subscribed); and
- up to 258,607 shares of common stock issuable upon the exercise of warrants to purchase our common stock.

To the extent that any outstanding options or warrants are exercised or new shares, stock awards or stock options (which are then exercised) are issued under our incentive plans, there will be further dilution to investors participating in this offering.

SELECTED FINANCIAL DATA

We derived the selected statements of operations data for the years ended December 31, 2014 and 2013, and the selected actual balance sheet data as of December 31, 2014 and 2013, from our audited financial statements included elsewhere in this prospectus. You should read the selected financial data together with "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our financial statements, related notes and other financial information included elsewhere in this prospectus. The selected financial data is qualified in its entirety by the financial statements and related notes included elsewhere in this prospectus.

	Year Ended December 31,	
	2014	2013
	(In thousands, except share and per share data)	
Statements of Operations Data:		
Revenue	$ 4,126	$ 2,411
Operating expenses:		
Cost of sales	952	1,823
Research and development[1]	4,368	4,152
General and administrative[1]	2,313	2,762
Sales and marketing[1]	2,058	3,053
Argus Whole Genome obsolescence	-	951
Total operating expenses[1]	9,691	12,741
Loss from operations	(5,565)	(10,330)
Interest income	-	1
Interest expense	(111)	(32)
Change in fair value of warrant liability	-	135
Other income (expense), net	5	91
Net loss	$ (5,671)	$ (10,135)
Net loss available to common stockholders [2]	$ (6,299)	$ (15,508)
Net loss per common share, basic and diluted	$ (16.25)	$ (896.09)
Shares used in computing net loss per common share, basic and diluted	387,590	17,306
Pro forma net loss per common share, basic and diluted (unaudited) [3]	$ (1.20)	
Pro forma shares used in computing net loss per common share, basic and diluted (unaudited) [3]	4,687,713	

(1) Includes stock-based compensation as follows:

	Year Ended December 31,	
	2014	2013
	(In Thousands)	
Research and development	$ 5	$ 8
General and administrative	56	143
Sales and marketing	3	2
Total stock-based compensation	$ 64	$ 153

(2) Net loss reduced by preferred stock dividends.

(3) Pro forma net loss per common share, basic and diluted, is calculated assuming the conversion of all shares of Series A Preferred Stock and our 2014 convertible notes into common stock outstanding at the beginning of the period or at the original date of issuance, if later, up to December 31, 2014, but does not include 1,500,000 shares of common stock that may be issued upon the conversion of the 2015 convertible notes (assuming the $1.5 million 2015 convertible notes offering is fully subscribed) that were not outstanding at December 31, 2014.

	December 31, 2014	December 31, 2013
Balance Sheet Data:		
Cash and cash equivalents	$ 750	$ 1,400
Working capital deficiency	(4,308)	(791)
Total assets	2,655	3,159
Series A Preferred Stock	4,565	2,000
Accumulated deficit	(96,772)	(91,101)
Total stockholders' deficit	(8,066)	(1,831)

	As of December 31, 2014	
	Actual	Pro Forma [1]
	(In thousands) (Unaudited)	
Balance Sheet Data:		
Cash and cash equivalents	$ 750	$ 750
Working capital deficiency	(4,308)	(2,808)
Total assets	2,655	2,655
Series A Preferred Stock	4,565	-
Accumulated deficit	(96,772)	(96,772)
Total stockholders' deficit	(8,066)	(2,001)

(1) The pro forma presentation above does not include 1,500,000 shares of common stock that may be issued upon the conversion of the 2015 convertible notes (assuming the $1.5 million 2015 convertible notes offering is fully subscribed) that were not outstanding at December 31, 2014.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our financial statements and related notes included elsewhere in this prospectus. This discussion contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those discussed below. Factors that could cause or contribute to such differences include, but are not limited to, those identified below and those discussed in "Risk Factors" included elsewhere in this prospectus.

Overview

OpGen, Inc. was incorporated in Delaware on January 22, 2001. OpGen is an early commercial stage company using rapid molecular testing and bioinformatics to assist healthcare providers to combat multi-drug-resistant infections, as well as providing products and services for Whole Genome Mapping and analysis of microbial, plant, animal and human genomes for life sciences applications. The Company's recently developed MDRO-focused products and services enable healthcare providers to rapidly identify hospital patients who are colonized with multi-drug-resistant organisms, or MDROs, and other potentially life threatening microbes. These products can be enabled by our Acuitas Lighthouse™ bioinformatics platform in development, which can provide detailed MDRO molecular information about an individual patient's resistance profile and integrates this information with data from other patients and hospital wide aggregate results to help improve overall patient outcomes and to reduce hospital costs. The Company's lead MDRO product is the Acuitas™ MDRO Gene Test, a CLIA-lab-based test that provides a profile of MDRO resistant genes from patients screened for colonization or infection. In addition, we have more than ten years of experience mapping microbial and other genomes using our proprietary Whole Genome Mapping technology and providing related products and services to our customers. The Company's headquarters and principal operations are in Gaithersburg, Maryland. The Company operates in one business segment.

Recent Developments

In February and April 2013, the Company restructured its operations to reduce expenditures and conserve cash while accelerating its planned strategic re-focus into its CLIA lab molecular testing business for MDROs. In connection with this restructuring, the Company reduced its workforce by approximately 36%, or 16 employees. Also in April 2013, the Company discontinued development of software related to its Whole Genome Mapping product line and charged $203,858 of previously capitalized software development costs to research and development.

In September 2013, the Company entered into a technology development agreement with Hitachi High-Technologies Corporation to develop the Company's Whole Genome Mapping technology into applications to analyze human DNA. Prior to this agreement, the focus of the Company's Whole Genome Mapping product offerings were genomes other than human, especially microbial. The Company's current technology development activities with Hitachi are scheduled to be completed in the second quarter of 2015 and provide up to $0.5 million in revenue in 2015, upon achievement of designated milestones. The technology development agreement term expires on December 31, 2015.

The Company has experienced declining revenues from its Whole Genome Mapping products and services, beginning in 2012. Management believes improvements in DNA sequencing techniques and products have contributed to this decline. While the Company continues to provide Whole Genome Mapping products and services to existing customers it anticipates that such revenues will be replaced by revenue from its Hitachi collaboration-based products or continue to decline, particularly in view of the Company's focus on its MDRO and bioinformatics products and services.

In December 2013, management conducted a review of its inventory position and intellectual property portfolio for its Whole Genome Mapping product line based on actual and projected sales levels. As a result, a provision for inventory losses of $950,881 was charged against operations to write down inventory to its expected net realizable value. In addition, one technology license agreement was terminated and the remaining licensed technology costs related to that terminated license of $35,518 were amortized in full. A change in the estimated useful lives of the other Whole Genome Mapping technology assets was made such that the amortization period for all licensed technology ended no later than December 31, 2014. The inventory and technology charges in December 2013 were for assets that were primarily focused on non-human Whole Genome Mapping applications whose sales had been declining. Management believes it is likely that revenues will continue to decline for these applications.

In late 2013 and throughout 2014 and 2015, the Company has continued to seek to raise capital to further its business. We raised an aggregate of $4.0 million in a convertible notes offering during the fourth quarter of 2013 from current investors, which notes were converted into shares of Series A Preferred Stock on December 30, 2013, and a Series A Preferred Stock offering from current investors in early 2014, raised $1.5 million through the issuance of secured convertible notes in the third quarter of 2014 from current investors, raised another $1.5 million through the issuance of secured demand notes in the fourth quarter of 2014 from current investors, and raised $1.2 million in a convertible notes offering in February 2015 from current investors. The Company is offering an additional $0.3 million of these 2015 convertible notes in an offering to current investors with participation rights under our Third Amended and Restated Investors' Rights Agreement, as amended, who did not participate in the initial closing. The secured notes referred to above are secured against substantially all of the Company's assets. Management remains actively engaged in efforts to raise additional capital.

Going Concern

The report of our independent registered public accounting firm on our financial statements for the years ended December 31, 2014 and 2013 contains explanatory language that substantial doubt exists about our ability to continue as a going concern. Our monthly cash burn rate is approximately $500,000. Our current operating assumptions, which include our best estimate of future revenue and operating expenses, indicate that our current cash on hand as of December 31, 2014 of approximately $0.7 million, plus the 2015 convertible note funding, will not be sufficient to fund operations through the second quarter of 2015.

In the event the Company is unable to successfully raise additional capital, we will not have sufficient cash flows and liquidity to finance our business operations as currently contemplated. Accordingly, in such circumstances the Company would be compelled to reduce general and administrative expenses and delay research and development projects including the purchase of scientific equipment and supplies until it is able to obtain sufficient financing.

Results of Operations for the Years Ended December 31, 2014 and 2013

Revenues

	Year ended December 31,	
	2014	**2013**
Product sales	$ 1,236,349	$ 1,735,517
Laboratory services	478,909	630,851
Collaboration revenue	2,411,120	44,239
Total revenue	**$ 4,126,378**	**$ 2,410,607**

The Company's total revenue increased 71% from 2013 to 2014, from $2.4 million to $4.1 million. This change in revenues was primarily attributable to:

- Collaboration revenue of $2.4 million in 2014 compared with almost no revenue in 2013. Collaboration revenue in 2014 was from the Hitachi technology development collaboration which started in late 2013.

- A decrease of 29% in products sales as Whole Genome Mapping system and consumable sales declined $0.6 million, partially offset by an increase of $0.1 million in Argus™ System service revenues.

- A decrease of 24% in Laboratory services revenue. Laboratory services revenue in 2014 for non-human Whole Genome Mapping applications decreased 60% compared with 2013. This decline was partially offset by $225,000 of service revenue related to the Hitachi technology development collaboration and $2,000 of CLIA service revenues compared with no revenues in 2013 from these activities.

Management believes that product and laboratory service revenues for non-human Whole Genome Mapping applications have declined in recent periods as improvements in DNA sequencing technologies have reduced the demand for mapping, especially in microbial applications.

The Company expects revenues may decrease in 2015 over 2014. Collaboration revenue in 2015 related to the Hitachi technology development agreement will be up to $0.5 million upon achievement of designated milestones, unless the agreement is amended to provide for additional activities or scope, or unless other projects are undertaken. Whole Genome Mapping revenues are projected to decline in 2015 while CLIA services revenues are expected to increase.

Operating Expenses

	Year ended December 31,	
	2014	**2013**
Cost of product sales	$ 425,541	$ 1,501,648
Cost of services	526,196	320,938
Argus Whole Genome obsolescence	-	950,881
Research and development	4,368,302	4,151,936
General and administrative	2,312,935	2,762,205
Sales and marketing	2,058,085	3,053,394
Total operating expenses	**$ 9,691,059**	**$ 12,741,002**

In 2014, the Company's total operating expenses decreased 24% from 2013, from $12.7 million to $9.7 million. This decrease is primarily attributable to:

- A decrease of 72% in cost of product sales. This decrease resulted from lower manufacturing costs, lower unit volumes and lower royalty expense;
- A write-down of the Company's Whole Genome Mapping inventory of approximately $1.0 million in 2013 that did not reoccur in 2014;
- A 5% increase in research and development costs;
- A decrease of 16% in general and administrative expenses. Lower payroll, stock-based compensation and legal expenses were the principal reason general and administrative expenses declined;
- A decrease of 33% in sales and marketing expenses. Payroll, travel and outside marketing expenses for sales and marketing activities were $0.9 million lower in the 2014 period, reflecting lower costs after the 2013 restructuring; and
- An increase of 64% in cost of services revenues which partially offset the decreases described above. The increase in costs of services in 2014 was principally related to costs to run human genome samples in support of the Hitachi technology development collaboration.

Other Income (Expense)

	Year ended December 31,	
	2014	**2013**
Interest income	$ 156	$ 1,222
Interest expense	(111,345)	(31,598)
Change in fair value of derivative financial instruments	-	134,560
Other income (expense)	4,400	91,390
Total other income (expense)	**$ (106,789)**	**$ 195,574**

Total net other expense was $0.1 million in 2014 as compared to total net other income of $0.2 million in 2013. Significant changes from 2013 to 2014 include:

- our interest expense being higher in 2014 due to our outstanding notes due to stockholders in 2014;
- 2013 including $0.1 million of gains on the change in the fair value of derivative and derivative liabilities being reduced to zero in 2014 due to our recapitalization; and

· other income (expense) in 2013 including loan forgiveness and the reversal of bad debt expense.

Liquidity and Capital Resources

At December 31, 2014, the Company had approximately $0.7 million in cash and cash equivalents, compared to $1.4 million at December 31, 2013. During 2014, the Company raised gross proceeds of approximately $5.0 million through the issuance of its Series A Preferred Stock, convertible notes and secured demand notes, all from existing investors. In February 2015, the Company issued to existing investors $1.2 million principal amount of convertible notes, or 2015 convertible notes, which are convertible into shares of either common stock or Series A Preferred Stock, depending on whether the public offering contemplated by this prospectus is consummated by June 30, 2015. The 2015 convertible notes were issued pursuant to a Notes Purchase Agreement, dated as of February 11, 2015. Following the initial closing, the Company offered an additional $0.3 million principal of 2015 convertible notes, on the same terms, as a participation offering to existing investors in the Company who are party the Company's Third Amended and Restated Investors' Rights Agreement, as amended. The 2015 convertible note holders were, or will, also be issued an aggregate of 225,013 warrants, exercisable for shares of common stock at 110% of the initial public offering price and exercisable only if the offering contemplated by this prospectus is consummated.

Management remains actively engaged in efforts to raise additional capital. Our monthly cash burn rate is approximately $500,000. Our current operating assumptions, which include our best estimate of future revenue and operating expenses, indicate that our current cash on hand as of December 31, 2014 of approximately $0.7 million, plus the 2015 convertible note funding, will not be sufficient to fund operations through the second quarter of 2015. There is no firm commitment on the part of any current investor to participate in the convertible notes participation rights offering. The Company is continuing to seek sources of additional funding, including the offering contemplated by this prospectus.

The Company does not currently have any bank credit lines. If in the future the Company does not turn profitable or generate cash from operations as anticipated and additional capital is needed to support operations, management may be unable to obtain such financing, or obtain it on favorable terms. In the event the Company is unable to successfully raise additional capital, we will not have sufficient cash flows and liquidity to finance our business operations as currently contemplated. Accordingly, in such circumstances the Company would be compelled to reduce general and administrative expenses and delay research and development projects including the purchase of scientific equipment and supplies until it is able to obtain sufficient financing. See "– Going Concern" earlier in this Management's Discussion and Analysis and Results of Operations.

The Company's primary cash requirements are to fund operations, as well as research and development programs and collaborations, to support general and administrative activities, and to fund acquisitions of products or businesses. The Company has never generated positive cash flows from operations. To bridge the gap between revenues and operating and capital needs, the Company has, in the past, relied on a variety of financing sources, including the issuance of equity and equity-linked securities. The Company's financial statements have been prepared on a basis that assumes that it will continue as a going concern and which contemplates the realization of assets and the satisfaction of liabilities and commitments in the normal course of business. These statements do not include any adjustments that might result if the carrying amount of recorded assets and liabilities are not realized.

Sources and Uses of Cash

During 2014, the Company has raised gross proceeds of approximately $5.0 million through the issuance of Series A Preferred Stock, convertible notes and secured demand notes. The Company does not currently have any bank credit lines. Management remains actively engaged in efforts to raise additional capital.

The following table summarizes the net cash and cash equivalents provided by (used in) operating activities, investing activities and financing activities for the periods indicated:

	Year ended December 31,	
	2014	**2013**
Net cash used in operating activities	$ (5,385,542)	$ (7,487,822)
Net cash used in investing activities	$ (39,537)	$ (109,871)
Net cash provided by financing activities	$ 4,774,251	$ 1,880,324

Net Cash Used In Operating Activities

Net cash used in operating activities was $5.4 million for the year ended December 31, 2014, compared to $7.5 million for 2013 The decrease was primarily due to a $4.5 million decrease in net loss in 2014, offset by a $1.6 million net increase in cash used for working capital.

Net Cash Used In Investing Activities

Net cash used in investing activities for all periods consisted solely of purchases of property and equipment used in our business. The amount of capital expenditures varies from period to period based on operating needs and cash availability.

Net Cash Provided By Financing Activities

Net cash provided by financing activities was $4.8 million during 2014, as compared to $1.9 million during 2013. The primary sources and uses of financing activities in both periods were capital raised from the sale of Series A Preferred Stock and from the issuance of convertible notes and secured demand notes, offset in part by principal payments on debt and capital lease obligations.

Critical Accounting Policies and Estimates

This Management's Discussion and Analysis of Financial Condition and Results of Operations is based on the Company's financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America, or U.S. GAAP. The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. In the accompanying financial statements, estimates are used for, but not limited to, stock-based compensation, allowances for doubtful accounts and inventories, valuation of derivative financial instruments, deferred tax assets and liabilities and related valuation allowance, depreciation and amortization and estimated useful lives of long-lived assets. Actual results could differ from those estimates.

Revenue Recognition

The Company recognizes revenue primarily from sales of the Argus System, sales of extended warranty service contracts for the Argus System, and from "funded software development" arrangements with collaborative parties. Revenue is recognized when the following criteria are met: persuasive evidence of an arrangement exists; delivery has occurred; the selling price is fixed or determinable; and collectability is reasonably assured. At times, the Company sells products and services, or performs software development, under multiple-element arrangements with separate units of accounting; in these situations, total consideration is allocated to the identified units of accounting based on their relative selling prices and revenue is then recognized for each unit based on its specific characteristics.

When the Argus System is sold without the Genome Builder™ software, total arrangement consideration is recognized as revenue when the System is delivered to the customer. Ancillary performance obligations, including installation, limited customer training and limited consumables, are considered inconsequential and are combined with the Argus System as one unit of accounting. When the Argus System is sold with the Genome Builder software in a multiple-element arrangement, total arrangement consideration is allocated to the Argus System and to the Genome Builder software (considered multiple elements) based on their relative selling prices. Selling prices are determined based on sales of similar systems to similar customers and, where no sales have occurred, on management's best estimate of the expected selling price relative to similar products. Revenue related to the Argus System is recognized when it is delivered to the customer; revenue for the Genome Builder software is recognized when it is delivered to the customer. Revenue is recognized for Genome Builder software and for consumables, when sold on a stand-alone basis, upon delivery to the customer.

The Company recognizes revenue associated with extended warranty service contracts over the service period in proportion to the costs expected to be incurred over that same period.

The Company's funded software development arrangements generally consist of multiple elements. Total arrangement consideration is allocated to the identified units of accounting based on their relative selling prices and revenue is then recognized for each unit based on its specific characteristics. When funded software development arrangements include substantive research and development milestones, revenue is recognized for each such milestone when the milestone is achieved and is due and collectible. Milestones are considered substantive if all of the following conditions are met: (1) the milestone is nonrefundable; (2) achievement of the milestone was not reasonably assured at the inception of the arrangement; (3) substantive effort is involved to achieve the milestone; and (4) the amount of the milestone appears reasonable in relation to the effort expended, the other milestones in the arrangement and the related risk associated with achievement of the milestone.

Impairment of Long-Lived Assets

The Company assesses the recoverability of its long-lived assets whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of the long-lived asset is measured by a comparison of the carrying amount of the asset to future undiscounted net cash flows expected to be generated by the asset. An impairment loss would be measured as the amount by which the carrying value of the asset exceeds the estimated fair value of the asset. Assets to be disposed of are reported at the lower of the carrying amount or fair value, less costs to sell.

Stock-Based Compensation

Stock-based payments to employees, directors and consultants are recognized at fair value. The resulting fair value is recognized ratably over the requisite service period, which is generally the vesting period of the option. The estimated fair value of equity instruments issued to nonemployees are recorded at fair value on the earlier of the performance commitment date or the date the services required are completed.

For all time-vesting awards granted, expense is amortized using the straight-line attribution method. For awards that contain a performance condition, expense is amortized using the accelerated attribution method. Share-based compensation expense recognized is based on the value of the portion of stock-based awards that is ultimately expected to vest during the period.

The fair value of stock-based payments is estimated, on the date of grant, using the Black-Scholes model. Option valuation models, including the Black-Scholes model, require the input of highly subjective estimates and assumptions, and changes in those estimates and assumptions can materially affect the grant-date fair value of an award. These assumptions include the fair value of the underlying common stock at the grant date, risk-free rate of interest, expected dividend yield, expected volatility and the expected life of the award.

In estimating the fair value of the underlying common stock at the grant date for employee grants (or the performance commitment date or complete date for non-employee grants) given the lack of an active public market for the common stock, the Company's board of directors determined the fair value of the underlying common stock after considering contemporaneous third-party valuations, which valuations were made using highly complex and subjective judgments and estimates. In the absence of a public market, and as an emerging growth company with significant operating losses, the contemporaneous valuations were performed in accordance with applicable methodologies, approaches and assumptions as discussed in the technical practice-aid issued by the American Institute of Certified Public Accountants Practice Aid entitled "Valuation of Privately-Held Company Equity Securities Issued as Compensation," and considered many objective and subjective factors to determine the common stock fair market value at each valuation date, including:

1. the most recent sales of the Company's preferred stock;

2. the preferential rights of the outstanding preferred stock;

3. the achievement of clinical and operational milestones by the Company;

4. the status of strategic relationships with collaborators;

5. the significant risks associated with the Company's stage of development;

6. the capital market conditions for life science and medical diagnostic companies, particularly similarly situated, privately held, early-stage companies; and

7. the Company's available cash, financial condition and results of operations.

See additional discussion of the use of estimates relating to stock-based compensation, and a discussion of management's methodology for developing each of the assumptions used in such estimates, in Notes 3 and 8 to the financial statements as of and for the years ended December 31, 2014 and 2013, included elsewhere in this prospectus.

Off-Balance Sheet Arrangements

We have not entered into any off-balance sheet arrangements.

JOBS Act Accounting Election

We are an emerging growth company, as defined in the JOBS Act. Under the JOBS Act, emerging growth companies can delay adopting new or revised counting standards issued subsequent to the enactment of the JOBS Act until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, will be subject to the same new or revised accounting standards, at the same time, as other public companies that are not emerging growth companies.

Recently Issued Accounting Standards

In July 2013, the FASB issued guidance for the presentation of an unrecognized tax benefit when a net operating loss, or NOL, carryforward, a similar tax loss, or a tax credit carryforward exists. The guidance requires an entity to present in the financial statements an unrecognized tax benefit, or a portion of an unrecognized tax benefit, as a reduction to a deferred tax asset for an NOL carryforward, a similar tax loss, or a tax credit carryforward. If the NOL carryforward, a similar tax loss, or a tax credit carryforward is not available at the reporting date under the tax law of the jurisdiction or the tax law of the jurisdiction does not require the entity to use, and the entity does not intend to use, the deferred tax asset for such purpose, the unrecognized tax benefit will be presented in the financial statements as a liability and will not be combined with deferred tax assets. This guidance does not require any additional recurring disclosures and is effective for fiscal years beginning after December 15, 2013. The adoption of this guidance did not have a material impact on our financial statements.

In May 2014, the FASB issued guidance for revenue recognition for contracts, superseding the previous revenue recognition requirements, along with most existing industry-specific guidance. The guidance requires an entity to review contracts in five steps: (1) identify the contract, (2) identify performance obligations, (3) determine the transaction price, (4) allocate the transaction price, and (5) recognize revenue. The new standard will result in enhanced disclosures regarding the nature, amount, timing and uncertainty of revenue arising from contracts with customers. The standard is effective for our reporting year beginning January 1, 2017 and early adoption is not permitted. We are currently evaluating the impact, if any, that this new accounting pronouncement will have on our financial statements.

In August 2014, the FASB issued guidance requiring management to evaluate on a regular basis whether any conditions or events have arisen that could raise substantial doubt about the entity's ability to continue as a going concern. The guidance (1) provides a definition for the term "substantial doubt," (2) requires an evaluation every reporting period, interim periods included, (3) provides principles for considering the mitigating effect of management's plans to alleviate the substantial doubt, (4) requires certain disclosures if the substantial doubt is alleviated as a result of management's plans, (5) requires an express statement, as well as other disclosures, if the substantial doubt is not alleviated, and (6) requires an assessment period of one year from the date the financial statements are issued. The standard is effective for our reporting year beginning January 1, 2017 and early adoption is not permitted. We are currently evaluating the impact, if any, that this new accounting pronouncement will have on our financial statements.

The Company has evaluated all other issued and unadopted Accounting Standards Updates and believes the adoption of these standards will not have a material impact on its consolidated results of operations, financial position, or cash flows.

BUSINESS

Overview

We are an early commercial stage company using molecular testing and bioinformatics to assist healthcare providers to combat multi-drug resistant bacterial infections. Our products and services are designed to enable healthcare providers to rapidly identify hospital patients who are colonized or infected with life threatening, multi-drug-resistant organisms, or MDROs. Our products and products in development are:

- Our Acuitas MDRO Gene Test, which is currently available for sale. This test is, to our knowledge, the first CLIA lab-based test able to provide information regarding the presence of ten MDRO resistance genes from one patient specimen. The ten drug-resistant genes identified by the Acuitas MDRO Gene Test are associated with CRE (Carbapenem-resistant Enterobactercaceae), ESBL (extended spectrum beta lactamase) and VRE (vancomycin resistance enterobacteria) organisms, and are gastrointestinal organisms frequently associated with antibiotic-resistant infections. The test results can be used by healthcare providers to identify patients who are colonized with one of the drug-resistant genes or who are actively infected. To date, eight acute care hospitals and long-term care facilities have partnered with us to evaluate the capabilities and uses of the Acuitas MDRO Gene Test.

- Our Acuitas CR Elite Test, which is also commercially available, adds the ability for the provider to order a traditional microbiology culture result to be performed from the same specimen sent for the Acuitas MDRO Gene Test, thereby providing additional information about the organism or organisms associated with an active infection, as well as an antibiotic susceptibility profile for such organism or organisms.

- Our Acuitas Lighthouse MDRO bioinformatics platform, which is currently in development. Our Acuitas Lighthouse MDRO bioinformatics platform will be able to provide detailed MDRO molecular information about an individual patient's resistance profile, gleaned from our Acuitas MDRO Gene Test results, and integrate this data with other patient and hospital-wide data to help improve overall patient outcomes and to reduce hospital costs. We anticipate that this product will be launched commercially in the third quarter of 2015.

We believe we have an important first-mover advantage in developing and bringing to market the combined package of Acuitas-enabled molecular information about key drug-resistant genes associated with MDRO organisms, with specific genetic information about an acute care hospital's MDRO gene profile, including antibiotic resistance. We are aware of other products currently available that use molecular diagnostics to identify selected MDRO gene species or drug-resistant genes, however we believe our Acuitas products can test for a larger number of gastrointestinal-based drug-resistant genes, particularly those most commonly associated with infections or colonization in hospitalized patients. Our Acuitas products provide results directly from a patient sample, and provide results that can be used by healthcare providers in the spectrum of activities that include identifying colonized patients, managing outbreaks and treating MDRO infections. These test results provide actionable information to healthcare providers so that positive patients (both colonized and symptomatic) receive appropriate isolation precautions and patients with negative results can be removed from isolation precautions if applicable. In addition, we believe we are closer to commercializing a companion bioinformatics product than our competitors. We anticipate that our Acuitas Lighthouse bioinformatics platform will provide meaningful information to healthcare providers to help proactively deal with colonized patients, leading to improved monitoring and antibiotic stewardship.

We introduced our lead MDRO product, the Acuitas MDRO Gene Test, in the first half of 2014, and introduced our Acuitas CR Elite Test in December 2014. In 2014 we achieved minimal revenues from sales of these products. To date, eight acute care hospitals and long-term care facilities have participated in our early look "Partner-Pilot-Program" described in this "Business" section under the heading "Commercialization Strategy and Plans." During 2015, we are working to convert these acute hospitals and long-term care facilities to become customers, supporting our growth projections. We anticipate expanding these programs to capture cost-benefit and clinical outcomes data for use by such facilities in addressing MDRO diagnosis and surveillance, antibiotic resistance and antibiotic stewardship concerns. Please see "Business - Our Solution – Our Products in the Near-Term Pipeline" for a description of our products in development.

We expanded the focus of the Company beginning in 2013 to develop screening and diagnostic products for MDROs as described. Prior to that time, we had developed and commercialized our Argus® Whole Genome Mapping System, MapIt® Services and MapSolver™ bioinformatics products and services. Such products and services were and are sold to academic, public health and corporate customers to allow them to perform Whole Genome Mapping and analysis of microbial, plant, animal and human genomes for life sciences applications. Additional information about these whole genome mapping products and services is set forth below in this Business section under the heading "Microbial and human genome mapping and sequencing." For information regarding the revenues associated with our Whole Genome Mapping products and services, please refer to "Management's Discussion and Analysis of Financial Condition and Results of Operations" and in this "Business" section under the heading "Microbial and human genome mapping and sequencing."

Please refer to the Glossary on page 76 of this prospectus for definitions or descriptions of scientific, diagnostic, health care and regulatory terms used in this prospectus.

Antimicrobial Resistance – An Urgent Global Issue

Antimicrobial resistance is an urgent global healthcare issue. MDROs have been prioritized as an urgent national and global threat by the Centers for Disease Control and Prevention, or CDC, the President of the United States and the World Health Organization, or WHO. In September 2014, The White House issued a National Strategy for combating antibiotic-resistant bacteria. The strategy calls for the strengthening of surveillance efforts to combat resistance, the development and use of innovative diagnostic tests for identification and characterization of resistant bacteria and antibiotic stewardship and development.

The CDC estimates that in the United States more than two million people are sickened every year with antibiotic-resistant infections, with at least 23,000 dying as a result. Antibiotic-resistant infections add considerable but often avoidable costs to the U.S. healthcare system. In most cases, these infections require prolonged and/or costlier treatments, extended hospital stays, additional doctor visits and healthcare facilities use, and result in greater disability and death compared with infections that are treatable with antibiotics. Estimates for the total economic cost to the U.S. economy range between $20 and $35 billion annually. As described in the article by Jim O'Neill titled "Antimicrobial Resistance: Tackling a Crisis for the Health and Wealth of Nations," published in Review on Antimicrobial Resistance in December 2014, 300 million people are expected to die prematurely because of drug resistance over the next 35 years, which could result in $60 to $100 trillion worth of economic output if the problem of antimicrobial drug resistance is not resolved.

In the United States, as reported by CMS on August 1, 2014, CMS issued a final rule under the Affordable Care Act that, among other things, establishes CMS' financial incentive program to hospitals that can demonstrate reduction in HAIs; the estimated amount available for these value-based incentive payments in fiscal year 2015 will be approximately $1.4 billion. On the other hand, in December 2014, CMS announced its Hospital Acquired Condition Reduction Program, under which CMS will penalize hospitals for excess rates of infections and other patient injuries by reducing Medicare payments. Total penalties are estimated to be approximately $373 million in the first year.

An emerging U.S. and global threat are CREs - carbapenem-resistant Enterobactercaceae bacteria - that are either difficult to treat or wholly untreatable. According to CDC Director Dr. Tom Frieden, CREs are a nightmare bacteria. Our strongest antibiotics do not work and patients are left with potentially untreatable infections with mortality rates ranging between 40% and 80%. CRE strains are transmitted easily in healthcare settings from patients with asymptomatic intestinal colonization, and the CRE strains have the potential to spread antibiotic resistance through plasmid transfer to other bacterial species, including common human flora and potential pathogens such as Escherichia coli. The CDC has called for urgent action to combat the threat of CRE bacteria. Core prevention measures recommended by the CDC for all acute and long-term care facilities include: contact precautions for all patients who are colonized or infected with CRE, single patient room housing or cohorting, laboratory notification procedures, antibiotic stewardship and screening to identify unrecognized CRE colonization in patients admitted to high risk settings such as ICUs, long-term acute care units or facilities, or epidemiologically linked contacts.

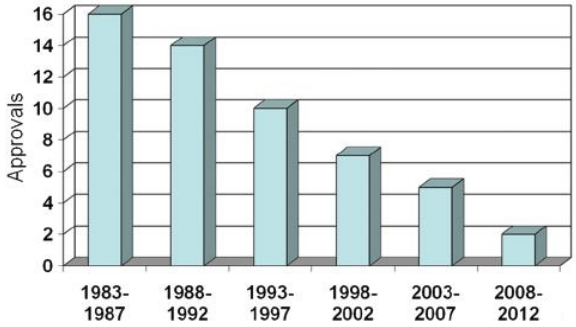
Our Acuitas MDRO Gene Test detects the presence of CRE resistance genes with higher sensitivity and specificity than conventional screening methods. In the summer of 2014, we conducted a comparison on samples of patients known to have CRE infections, using both the Acuitas MDRO Gene Test and a standard microbial culture testing method, and had the microbial culture results confirmed by a national reference lab. In such comparison, the Acuitas MDRO Gene Test was 100% sensitive, while the standard culture method was 72% sensitive. We also tested the rate of false positive results, *i.e.*, identification of MDRO-resistant genes when they were not present, from the Acuitas MDRO Gene Test and conventional culture methods. Thirty-two percent of the initial culture screen results were false positives, while the Acuitas MDRO Gene Test had no false positives – all results matched the known clinical results.

Emergence of Superbugs and Lack of Treatment Options

Over the last decade, multi-drug-resistant gram-negative bacteria, or MDR-GNB, frequently referred to as Superbugs, have been implicated in severe hospital acquired infections, or HAIs, and their occurrence has increased steadily. For example, Klebsiella pneumonia, or K. pneumonia, is responsible for roughly 15% of gram-negative infections in hospital intensive care units. Infections caused by Klebsiella pneumonia carbapenemase, or KPC, strains have few treatment options and are associated with mortality rate upwards of 50%.

Exacerbating the problems associated with the emergence of these highly resistant KPC strains is their propensity to cause outbreaks in healthcare institutions. These pathogens persist both in the flora of hospitalized patients and in the hospital environment and they have the capacity to silently colonize patients or hospital personnel by establishing residence in the gastrointestinal tract without causing any signs of infection. Individuals can be silently colonized or become asymptomatic carriers for long periods of time, with detection of these carriers often proving difficult. These silent carriers act as reservoirs for continued transmission, which makes subsequent spread difficult to control and outbreaks difficult to stop. In addition, KPC strains can survive for several hours on the hands of hospital personnel, which likely facilitates spread from patient to patient. Effective control of KPC outbreaks requires a detailed understanding of how transmission occurs, but current technologies do not allow healthcare providers to routinely perform these investigations.

The lack of currently available treatment options and scarcity of new treatment options in development are compounding the emerging Superbug problem. Since the 1980s and 1990s, there has been a dramatic drop-off in the number of new antibiotics developed and approved by the FDA. As a result, screening, infection control and antibiotic stewardship have become our most powerful weapons in the fight to contain this threat.



New systemic antibacterial agents approved by the FDA per 5-year period, through 2012. From Boucher et al. See references.

Carbapenem-Resistant ESBL Gram-Negative Bacteria

When gram-negative ESBL bacteria become resistant to carbapenem antibiotics, a Superbug resistant to virtually all currently available antibiotics is created. Enterobacteriaceae are a large family of gram-negative bacteria that represent many of the emerging Superbugs. Many of these bacteria are a normal part of human gastrointestinal flora and are frequent causes of urinary tract, bloodstream and intra-abdominal community-acquired and healthcare-associated infections. β-lactamases are enzymes produced by some of these bacteria that, depending on the type of enzyme, can make them resistant to various classes of β-lactam antibiotics, the main treatment for these infections. In the mid-1980's, a new group of these enzymes was detected, the extended-spectrum β-lactamases, ESBLs, which confer resistance to expanded-spectrum cephalosporin antibiotics but not to carbapenems. Carbapenems are used as last resort drugs. Because of their side-effects, they are primarily used for treating infections due to ESBL producing Enterobacteriaceae. Over the past decade, carbapenemases, a group of clinically important β-lactamases, have emerged and spread among Enterobacteriaceae. Carbapenemases are enzymes that can efficiently hydrolyse most β-lactams, including carbapenems. Some prevalent and emerging types of carbapenemases are KPC, Verona integron-encoded metallo-β-lactamases, or VIM, OXA type 48 β-lactamase, or OXA-48, and recently New Delhi metallo-β-lactamase, or NDM. Many carbapenemase producing Enterobacteriaceae strains frequently carry additional resistance determinants to other non β-lactam antibiotics, making them highly antibiotic-resistant. The most common last resort of antibiotics for treating these drug-resistant infections are colistin (in general, the polymyxins), tigecycline (although less consistently) and fosfomycin.

Current surveillance methods for MDROs can take up to five days to provide complete results. The turn-around time for these test results needs to be improved for them to benefit infection control programs and antibiotic stewardship.

The Opportunity

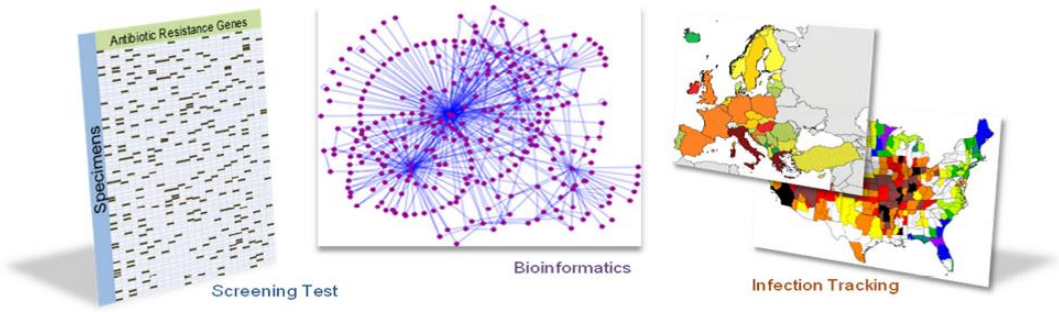
The discovery of antibiotics in the early 20th century fundamentally transformed human and veterinary medicine. Antibiotics save millions of lives each year in the U.S. and around the world. The rise of antibiotic resistant bacteria represents a growing and serious threat to public health and the economy. With the rising urgency of this issue and outbreaks of other difficult to treat infectious diseases, such as Ebola, dealing with infectious diseases and combating antibiotic resistant bacteria has become a global priority. Investment in new diagnostic technologies, antibiotic stewardship programs, antibiotic development, vaccines and information technology advances are seen as critical elements in the fight against antimicrobial resistance.

Culture-based microbiologic methods have been evolving for centuries and are important components of the diagnostic approach to detecting infectious disease. However, we believe the potential for improvements based on cell culture have reached a plateau. In contrast, the opportunities for improved detection and organism typing with DNA testing are expanding exponentially. Genomic diagnostics using DNA probe analysis, DNA sequencing and advanced bioinformatics have the potential to transform clinical and public health microbiology practice. Using technologies developed for production genetics applications and high resolution genome sequencing, it is now possible to achieve rapid, cost effective and highly accurate methods for characterizing bacterial colonization and infections in patients and, more broadly, in hospitals and other areas of human healthcare. This breakthrough combined with the speed, reliability and increased information content available with evolving DNA detection methods is leading to the opportunity to dramatically improve patient outcomes.

Our Solution

OpGen intends to transform infectious disease management through innovation in molecular diagnostics, information technology, and microbiology to aid healthcare providers in reducing the burden of drug-resistant infections. Our vision is that no patient should suffer from a life threatening, drug-resistant infection. We are developing solutions for screening patients to determine underlying colonization with antibiotic resistant organisms such as CREs and for the development of early warning antibiotic stewardship programs for colonized patients who become infected. With our Acuitas™ family of products, we anticipate making it possible to rapidly detect and molecularly characterize targeted microorganisms in a hospital or other healthcare setting, including both patients with active infections, and patients or healthcare providers who may be colonized but not currently symptomatic. With this information we believe it will be possible to allow targeted antibiotic therapy earlier and more effectively.

We have developed an approach for screening for MDROs in hospitals using DNA testing. Our Acuitas MDRO gene test products are commercially available and will be integrated with our Acuitas Lighthouse MDRO Management System and laboratory information products in 2015 to provide real-time information on the MDRO colonization status for patients, acute care ICUs, and hospitals. Acuitas Lighthouse MDRO profiles will facilitate MDRO tracking and integrate de-identified patient-specific and aggregated hospital data to provide customized reports including alerts, prevalence, trend analysis and transmission information. We anticipate providing this information on a local, regional, and national basis to our customers, public health organizations and others to help reduce overall disease rates and to strengthen the national capacity to detect and manage treatment of drug-resistant bacterial strains. We intend to launch our Acuitas Lighthouse MDRO bioinformatics product in the third quarter of 2015.



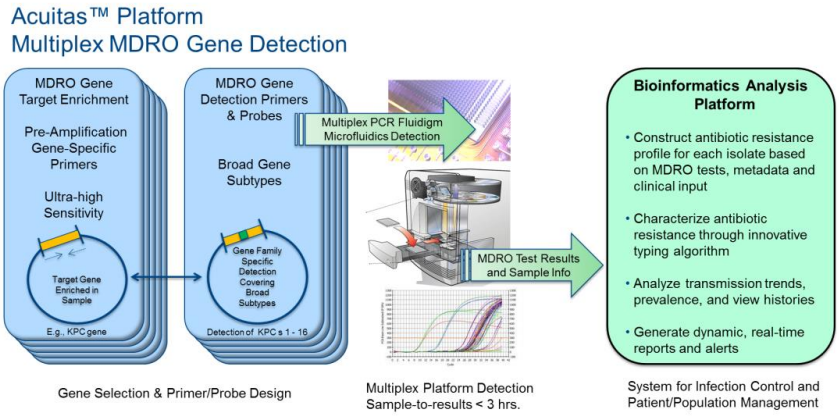
The OpGen solution will include the Acuitas MDRO Gene Test for hospital surveillance programs, the Acuitas Lighthouse MDRO Management System for in-hospital MDRO patient management and tracking, and integrated reporting capabilities to track MDROs on a local, regional and national basis.

Active surveillance for antibiotic-resistant microbial colonization has been shown to reduce overall infection rates and to help reduce hospital costs by avoiding unnecessary hospital days per patient. For example, Israel had a country-wide outbreak of KPC from 2005 to 2008. In late 2005, one patient with a KPC-positive infection was diagnosed. Within months, CRE infections spread through the hospital and then through the Israeli health care system. By March 2007, there were 1,275 cases nationwide. As a result, Israel implemented mandatory guidelines, including CRE surveillance, along with coordinated infection control interventions. The benefits of MDRO surveillance and coordinated infection control procedures were clearly documented in this broad-based, country-wide screening initiative. Infections per 100,000 patient days were reduced thirty fold and unnecessary patient days in the hospital were reduced from 24 days to 4.5 days.

Current Products

Acuitas MDRO Gene Test and Acuitas CR Elite Test

Our Acuitas MDRO Gene Test detects ten critical MDRO genes from one patient swab obtained using commercially available collection devices. The test provides fast, molecular results for genes associated with CRE (7 genes), ESBL (extended spectrum beta lactamase) (2 genes) and VRE (vancomycin resistance enterobacteria) resistant genes. In our CLIA lab validation studies and partner test programs, the test has been proven to be highly sensitive and specific for the presence of these resistant genes when compared to established reference methods, demonstrating nearly 100% correlation in identifying patients carrying MDROs and those free of MDRO bacteria. The Acuitas CR Elite Test adds the ability to procure a standard microbiological culture result that provides additional information about the identified MDRO gene and its antibiotic susceptibility profile.

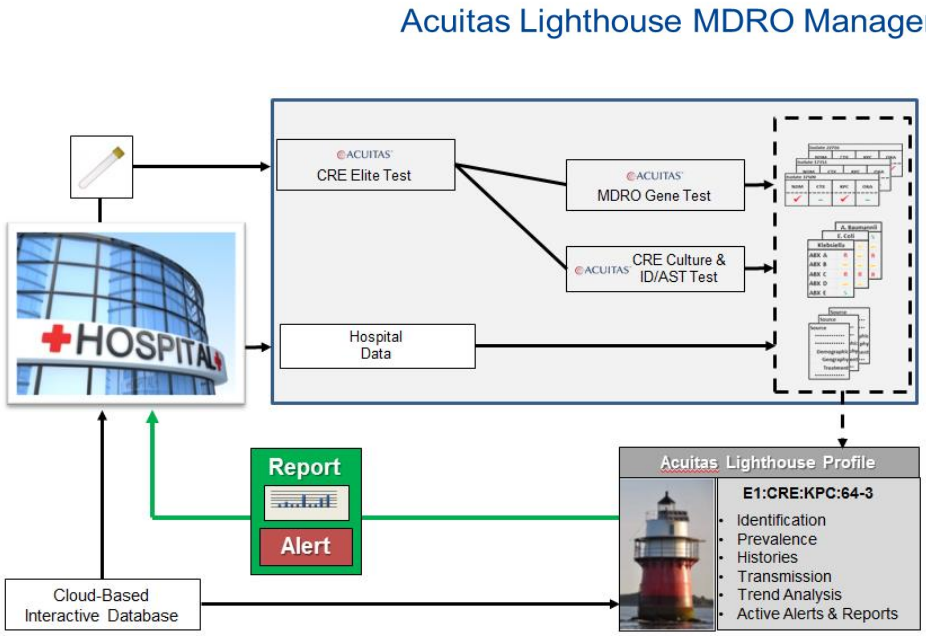


Acuitas MDRO gene tests combine Fluidigm microfluidic-based production genomics technology with DNA probe reagents designed and manufactured to power our CLIA lab-based Acuitas gene tests.

Our Products in the Near Term Pipeline

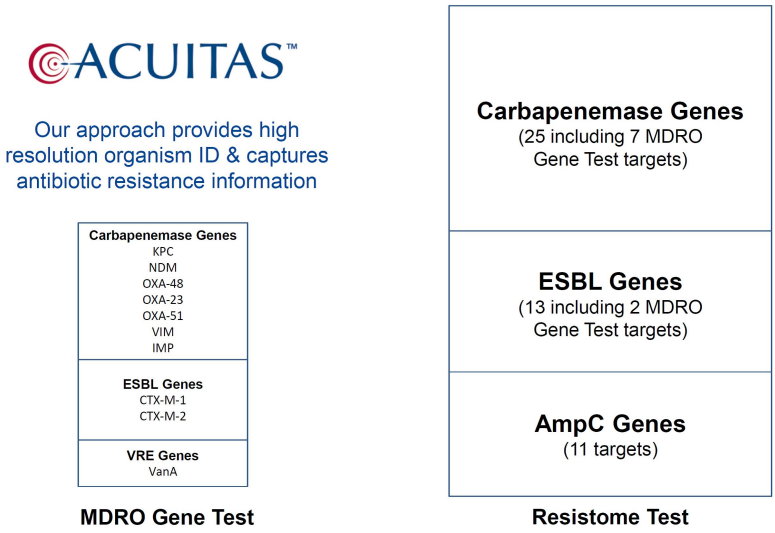
Acuitas Lighthouse MDRO

Our Acuitas Lighthouse MDRO Management System solution, currently in development and undergoing analytical and clinical validation, enables proactive MDRO management to prevent in-hospital transmission events and to help improve patient outcomes. Trend analysis of patient specific data, data specific to individual hospital facilities and health systems is provided safely and confidentially to healthcare providers. Acuitas Lighthouse MDRO dynamic profiling incorporates identity, phenotype and MDRO gene presence and assigns unique microbe identifiers, Acuitas Lighthouse MDRO profiles, based on MDRO gene composition and antibiotic susceptibility, or AST, data. Acuitas Lighthouse MDRO profiling provides the first diagnostic tracking tool for MDRO infection in the hospital setting. Our Acuitas Lighthouse MDRO solution is based on our CLIA and HIPAA compliant LIMS database system. We are developing a web-based portal to allow our customers access to LIMS-based lab reports and Acuitas Lighthouse MDRO data reports. We anticipate commercializing our Acuitas Lighthouse MDRO solution in the third quarter of 2015. A schematic description of our Acuitas Lighthouse MDRO product in development is set forth below:



Acuitas Resistome Test

We are using our production genomics capabilities to develop the Acuitas Resistome Test. The Acuitas Resistome Test includes additional resistance genes for carbapenems and ESBLs, and ampicillin-resistant class C cephalosporinases, or AmpC, genes in replacement of the vancomycin resistant genes. We believe the AmpC targets are more specific for gram negative bacteria, thereby strengthening the coverage provided by the Acuitas Resistome Test. We will use the Acuitas Resistome Test results for Acuitas Lighthouse MDRO profiling of specimens collected in hospitals for MDRO surveillance, and clinical isolates from infected patients. The Acuitas Lighthouse MDRO profiles will enable improved infection control procedures, antibiotic stewardship and individualized patient care. We also anticipate combining tests for important infectious diseases such as C. difficile, MRSA, and others to provide enhanced MDRO screening and patient management solutions. The following chart presents information regarding the changes between the Acuitas MDRO Gene Test and the Acuitas Resistome Test:



Grow on the Go

We are developing our Grow on the Go technology to use with specimens transported to our CLIA lab. With Grow on the Go, the culturing process starts while the specimen is being transported to our CLIA lab via overnight shipping. This will allow us to immediately begin the microbial culture analysis on receipt at our CLIA lab.

Other Products in Development

Please see the tabular and other information about additional MDRO- and Acuitas Lighthouse-related products in our research and development pipeline, beginning on page 62 of this prospectus.

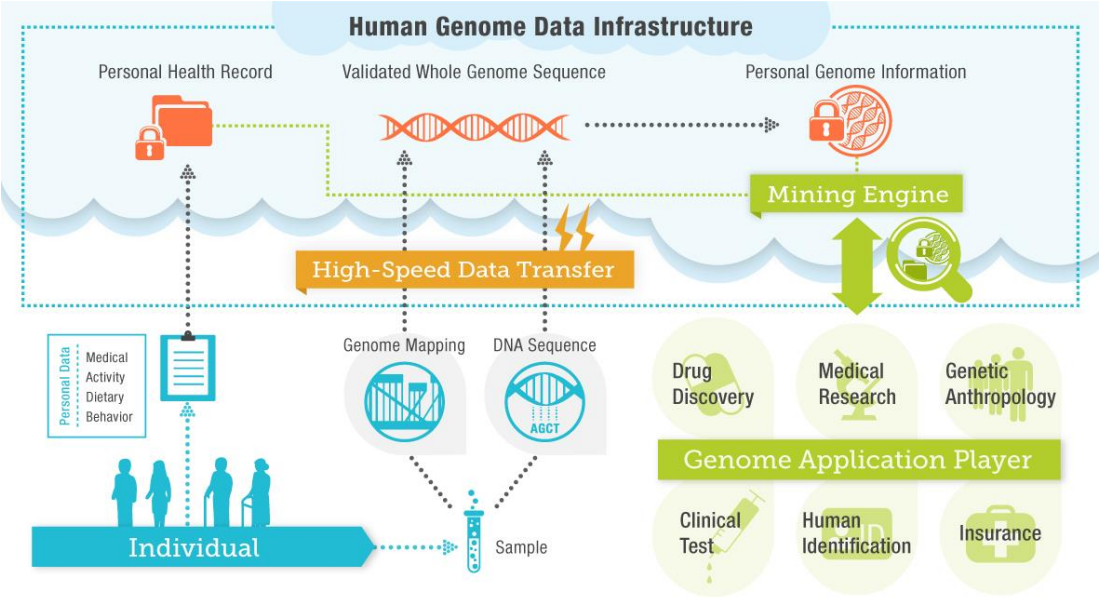
Microbial and human genome mapping and sequencing

Infectious disease testing is undergoing a transformation in which DNA testing is replacing classical culture-based methods because of its accuracy and speed. DNA tests make it possible to simultaneously detect drug-resistant genes, identify the presence of bacteria, viruses and funguses, and perform high resolution genotyping. These tests are generally more sensitive and provide more information than individual cultures. In addition, DNA tests can detect organisms that were undetectable by culture because the target organism was dead or would not grow in the culture medium. High resolution DNA analysis methods, such as whole genome DNA sequencing, offer the ability to analyze the presence of such antibiotic-resistant genes to track the spread of the associated organisms and potentially improve patient diagnosis.

We have developed and commercialized the Argus® Whole Genome Mapping System, MapIt® Services and MapSolver™ bioinformatics products and services for mapping and analysis of microbial, plant, animal and human genomes for life sciences applications. We have more than ten years of experience mapping microbial genomes. Our customers for these products include government and public health agencies such as the CDC, FDA, USDA and biodefense organizations, who use the Argus and MapSolver products in research and development, food safety and public health settings. We continue to provide these products and services to existing customers, however, we anticipate that such revenues will decline as we have shifted our focus to our MDRO and bioinformatics products and services.

In September 2013, we entered into a strategic collaboration with Hitachi High-Technologies Corporation, or Hitachi, to commercialize our Whole Genome Mapping technology for mapping, assembly and analysis of human DNA. In conjunction with Hitachi, we are developing cloud-based genome assembly capabilities for human genomes. We intend to continue commercializing microbial applications of these products through our direct sales efforts. DNA tests and bioinformatics for analysis of whole human genomes will be commercialized through our collaboration with Hitachi.

The following schematic provides a summary of the potential outcome of our collaboration with Hitachi:



During 2013, four customers of our Whole Genome Mapping and MapIt Services offerings each represented more than 10% of our revenue during the year: BGI-Hongkong, Co., Ltd (12%), VA Medical Center, Cleveland, OH (12%), Sciencewerke Pte Ltd (10%), and University of Antwerpen (10%). The revenues from a single customer have varied significantly from year to year, depending on the internal projects and external events causing them to increase or decrease the use of our products.

We have seen declining revenues from our current customers for our Whole Genome Mapping products and services over the past few years, as DNA sequencing techniques and products have grown in popularity. While we continue to provide products and services to our existing customer base, including federal and state agencies, including the CDC and public health agencies, universities, and global research organizations, we anticipate that such revenues will be replaced by revenue from our Hitachi collaboration-based products or continue to decline, particularly in view of our focus on our MDRO products and services. For the fiscal year ended December 31, 2014, Hitachi represented our most significant source of revenue under the collaboration described above (64% of our revenue) and no other customer represented more than 10% of our revenues in 2014. We believe the collaboration with Hitachi is important to our business, and loss of such relationship could have a material effect on our business.

Our Strategy

- Accelerate the commercialization of our Acuitas MDRO Gene Test and Acuitas CR Elite Test.
- Complete development of and commercialize our Acuitas Lighthouse MDRO Management System to healthcare providers, governments and diagnostic companies.
- Capitalize on our first-mover advantage through our CLIA lab-based test offerings. We are working to integrate hospital-wide infectious organism molecular diagnostic information with antibiotic susceptibility data with patient specific data for healthcare providers. These infection control, antibiotic stewardship and patient management data product capabilities will be difficult for future market entrants to replicate.
- Develop and commercialize additional proprietary molecular diagnostic products with companion data offerings that provide the ability to efficiently analyze data about MDROs present in a patient sample.

- Expand our lab service offerings and capabilities through the supply of kits for use on our DNA probe assay platform and commercially available rapid diagnostic testing systems, develop additional MDRO DNA sequencing tests and informatics, and partner these offerings with our Grow on the Go technology.
- Partner with reference laboratories, government agencies, diagnostic companies and information technology providers to offer our Acuitas Lighthouse MDRO solution on a global basis.
- Build on our established Whole Genome Mapping position through our collaboration with Hitachi for human genome assembly and analysis and expanded research programs directed at complete DNA sequence assembly and bioinformatics.
- Accelerate growth through strategic partnerships, sponsored research programs with governments and industry and strategic acquisitions.

Market Opportunities

We operate in the approximately $800 million annual U.S. market for screening and testing for hospital acquired infections. Our initial focus is the U.S. hospital market where there are approximately 6,000 hospitals and a potential market opportunity of 7 million tests annually for our Acuitas MDRO Gene Test. We estimate that approximately 25% of patients are high risk and candidates for our test in the 500 hospitals with more than 350 beds; and approximately 20% of patients are high risk, and candidates for our products and services, in the 1,000 hospitals with between 150 and 350 beds. The trend towards consolidated health systems is combining these two segments into large health systems that are the initial targets for our test and informatics solutions. A typical large health system could have more than $4 billion in annual revenue, a central hospital with more than 400 beds and 6-8 smaller hospitals and long-term care facilities. These large health systems have started to centralize their microbiology lab testing, making them an attractive target market for OpGen.

The trend towards forming accountable care organizations, or ACOs, is expected to increase the focus on reducing length of stay and the overall cost of hospital procedures. Since HAIs result in increased costs of approximately $24,000 per affected patient, we anticipate ACOs will be particularly receptive to our MDRO management solutions.

Over the last several years we have developed extensive experience in DNA analysis of human microbial pathogen outbreaks. Our Whole Genome Mapping technology played a key role in helping rapidly identify the source of a number of major disease outbreaks such as the E. coli 0104 outbreak in Germany in 2011, a recent cholera outbreak in Haiti, and outbreaks from contaminated spinach in the U.S. We have 40 of our Argus Whole Genome Mapping Systems at leading public health, biodefense, academic and industrial laboratories worldwide. Eight of our systems are in use at public health laboratories such as the CDC and the FDA.

We intend to market our solutions to state public health organizations and federal government agencies and internationally in the hospital market and to sovereign governments.

Commercialization Strategy and Plans

Our strategy is to help establish our Acuitas MDRO gene test products and our Acuitas Lighthouse MDRO Management System products and services as the standard of care in the U.S. We are capitalizing on our first-mover advantage by partnering with leading healthcare systems to evaluate the improved clinical outcomes that can be obtained using our products and services. Initially, we work to demonstrate that screening with our Acuitas MDRO gene test products will improve clinical outcomes and, with the addition of our Acuitas Lighthouse MDRO Management System in development, will reduce hospital HAI rates and costs. Our clinical evaluations with healthcare providers are designed to demonstrate the performance of our products and that implementation will result in more accurate and timely patient isolation, isolation decisions and infection control procedures. A second goal is to demonstrate the potential for improved antibiotic stewardship by appropriate antibiotic selection. During 2014, we have refined and implemented our Partner-Pilot-Program selling process described below.

- Partner. Through our consulting process and development of a client services agreement, we establish OpGen as a partner to provide the information necessary so that healthcare providers can manage infection control on an institution-wide basis .

- Pilot. A plan is prepared within the client institution to conduct point prevalence surveys, culture isolate characterization and comparison to internal methods currently in use. During the pilot phase and at completion, a formal report is prepared and provided. Our reports highlight overall test performance including the detection of colonization or infection missed by conventional methods.
- Program. The customized program for each institution includes implementation of MDRO screening, ongoing testing of clinical isolates, and the integration of this data into our Acuitas Lighthouse MDRO Management System.

To date, approximately eight acute care hospitals and long-term care facilities have participated in our Partner-Pilot-Program process, one of which initiated modest product purchases in 2014. During 2015, we are working to convert these hospitals and facilities to become long-term customers supporting our growth projections. We anticipate expanding these programs to capture cost-benefit and clinical outcomes data for use by such facilities in addressing MDRO diagnosis and surveillance, antibiotic resistance and antibiotic stewardship concerns.

We may also enter into performance-based risk sharing arrangements with hospitals and healthcare systems to promote the use of our diagnostic and screening products and services on an institution-wide basis. Under these arrangements, part of our fees would be a performance-based share of increased customer revenue or reduced customer expenses related to MDRO screening, better infection control resource utilization and antibiotic stewardship improvements.

A second major initiative is to develop institution-wide Acuitas Lighthouse MDRO Management System surveillance programs as a new standard of care. We intend to establish and brand our Acuitas Lighthouse MDRO surveillance and control management systems, with fees based on a capitated approach. We believe our surveillance testing program is intended to bring the following benefits to participating institutions:

- Platinum status as a proactive MDRO surveillance and "best practices" institution;
- Patient safety and enhanced hospital reputational benefits;
- Compliance with CDC and public health guidelines and reporting requirements;
- Reduced length of stay, improved antibiotic stewardship and overall cost savings;
- Insurance against potential reputational harm from undetected MDRO hospital wide outbreaks.

Establishing MDRO surveillance screening as the standard of care in the U.S. is an important corporate objective. Capitalizing on the President's National Strategy for Combating Antibiotic Resistance, we intend to help establish additional clinical practice guidelines and legislative requirements.
At the healthcare system level, our plan is to:

- Sell to early adopter institutions;
- Demonstrate the value of our solutions in clinical practice;
- Educate healthcare providers regarding the clinical validation, clinical utility and improved outcomes that can be obtained with our solutions;
- Demonstrate the cost effectiveness of MDRO surveillance to hospital administrators;
- Build consumer and public awareness regarding the benefits of MDRO surveillance and best practices in infection control.

Opportunity for single solution

We believe our products and services can be integrated into a single solution for healthcare providers. By seeking to address institutional needs for informatics, genetic analysis and microbiologic testing, we are working to establish a market leadership position in MDRO testing. The OpGen solution is intended to help hospitals reduce hospital acquired infection rates by helping to rapidly identify patients colonized with MDROs who should receive contact precautions, and helping to guide antibiotic therapy. Additional products in development are outlined below.

R&D

For the years ended December 31, 2014 and 2013, our research and development expenditures were $4,368,302 and $4,151,936, respectively.

We intend to continue to invest in the development of additional Acuitas and Acuitas Lighthouse MDRO product offerings. Our current focus is on completing the development of our Acuitas Lighthouse MDRO Management System. Our ongoing research and development efforts include:

- Investments in information technology including our Acuitas Lighthouse MDRO portal database interpretation capabilities, and next generation sequencing assembly and bioinformatics;
- Further development of additional Acuitas gene tests;
- Improved microbiology methods for MDRO culture screening such as our Grow on the Go technology, ESBL culture method and additional culture methods to help improve test workflows;
- Combined testing methods from new sample types;
- Multiplex tests addressing newly identified clinical needs; and
- Converting our CLIA lab-based products to in vitro diagnostic kits that could be sold, upon receipt of FDA clearance and other approvals, directly to our customers and to other clinical reference laboratories.

Acuitas Resistome Test

We are developing the Acuitas Resistome Test for rapid, high resolution testing of microbial isolates. The Resistome Test adds additional resistant genes for carbapenems and ESBLs, and AmpC as contrasted with the Acuitas MDRO Gene Test, and would enable higher resolution Acuitas Lighthouse MDRO profiling for patients with positive gene test results.

Acuitas Lighthouse MDRO Web Portal

We are developing an Acuitas Lighthouse MDRO web portal to house Acuitas Lighthouse MDRO bioinformatics information, which could be used by an institution to provide to a range of infection control personnel and physicians, access to data from our CLIA lab and to allow users to generate customized tracking reports for MDROs in the institution.

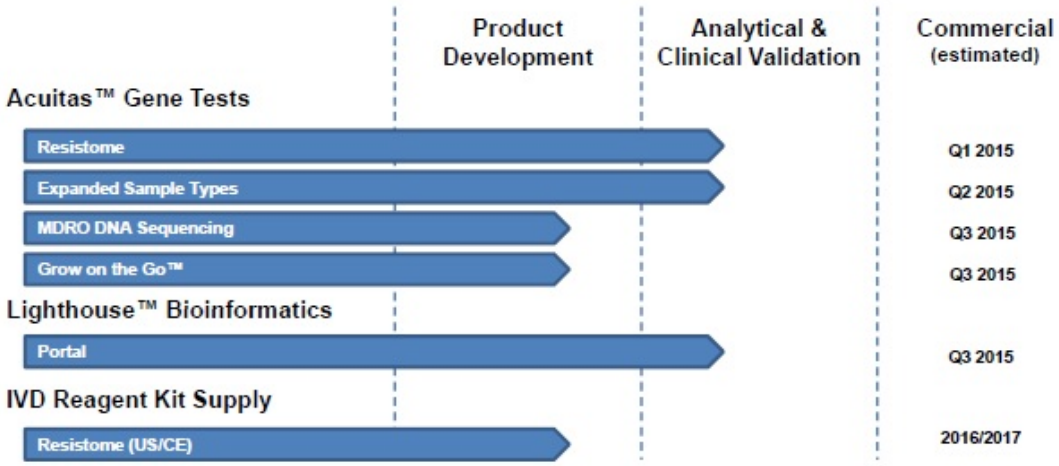
Acuitas MDRO DNA Sequencing

The Acuitas MDRO DNA sequencing tests under development would allow healthcare providers to conduct high resolution typing of MDRO isolates with the same Acuitas Lighthouse MDRO profile to determine if patients are infected with the same organism or different ones. We anticipate healthcare providers will use this information to help address infection rates, track outbreaks, and adjudicate claims with payors to prove if an infection is hospital-acquired or was colonized on the patient on arrival.

Expanded Sample Types

The Acuitas MDRO Gene Test is CLIA lab-validated for perianal swabs. We anticipate expanding the sample types for the test to include stool, nasal swabs, skin, urine and groin swabs and environmental specimens. We expect that the expanded sample types will open new market opportunities for the Company, including the ability to offer combined C. difficile/MDRO testing and MRSA/MDRO testing, and to expand our environment testing service offerings.

The following table highlights our key MDRO development programs and their anticipated commercial launch dates:



Clinical Studies and Validation Testing

Documenting the performance of our products and their clinical utility through rigorous clinical and economic outcome studies is an important element of our business strategy.

We have developed an extensive clinical study plan designed to demonstrate the utility of our products and services to stakeholders in the healthcare system. The objective of these studies is to demonstrate that our Acuitas gene tests combined with the Acuitas Lighthouse MDRO Management System will enable clinical decisions that favorably improve patient outcomes reduce length of stay and hospital costs, and help to reduce the overall level of infectious disease in hospital systems.

Such clinical studies have been completed with the Children's National Medical Center, the University of Maryland Medical System, and the University of Louisville Hospital as part of our Partner-Pilot-Program. These studies compared the performance of our Acuitas MDRO Gene test with standard microbiology culture results. In a separate comparison with perianal swabs spiked with known levels of MDROs, the Acuitas MDRO Gene test was 100% sensitive and specific while the standard culture method at a national reference lab was just 72% sensitive. The studies also demonstrated that the standard culture method creates many false positive results after the initial culture, which potentially result in patients receiving unnecessary and costly contact precautions.

We have also completed CLIA lab-validation studies for our MRSA, C. difficile and MDRO gene tests and for our CR Elite CRE culture test. These validation studies were designed to show the accuracy, sensitivity, specificity and reproducibility of our test result. Accuracy testing reveals how often a test correctly detects the organism or gene that is being tested for. The sensitivity of a test reflects the probability that a patient with a specific bacterial organism present will have a positive test result. Specificity reflects the probability that a patient without the specific bacterial organism will have a negative test result. Reproducibility reflects the consistency of the test results over time.

The CLIA validation study for our Acuitas MDRO Gene Test showed that the test detected the presence of antibiotic resistant genes in specimens containing as few as 13 to 250 bacterial cells. The following table shows the number of bacterial cells (Limit of Detection) present in samples associated with the listed bacterial organisms and associated presence of antibiotic resistant genes:

MDRO Gene	Organism	LOD (CFU/mL)
KPC	E. cloacae	84
NDM	K. pneumoniae	93
VIM	S. marcescens, P aeruginosa, E. cloacae	37-154
IMP	K. pneumoniae	13-66
OXA-48	K. pneumoniae	79
OXA-23	A. baumannii	109
OXA-51	A. baumannii	125
CTX-M	K. pneumoniae	79-151
VanA	E. faecium	250

In addition, the CLIA validation study for our Acuitas MDRO Gene Test showed that positive results occurred only when bacteria containing antibiotic resistant genes are present. The CLIA validation study also looked at the reproducibility of test results over time, *i.e.*, will a test that is negative on day one turn to positive on day three. As shown below, our Acuitas MDRO Gene Test results are highly reproducible when testing is performed on three successive days:

Inter and Intra-Assay Reproducibility									
	Day One			Day Two			Day Three		
Assay	High Target Level (Ct)	Mid Target Level (Ct)	Low Target Level (Ct)	High Target Level (Ct)	Mid Target Level (Ct)	Low Target Level (Ct)	High Target Level (Ct)	Mid Target Level (Ct)	Low Target Level (Ct)
Kpc	6	9	13	5	9	12	5	9	12
Ndm	7	10	13	6	8	12	6	9	12
Vim(A)	7	12	15	7	10	14	7	10	14
Vim(B)	7	11	14	7	10	14	7	10	14
Vim(C)	5	7	10	4	6	10	4	6	9
Imp(A)	6	9	13	6	9	13	6	9	12
Imp(B)	9	13	16	9	12	15	9	11	15
Oxa(A)	6	10	13	6	9	12	6	9	13
Oxa(B)	5	7	10	5	7	10	5	7	9
Oxa(C)	7	10	13	6	9	13	7	10	13
Ctx-M(A)	7	10	14	7	10	13	7	10	13
Ctx-M(B)	5	9	12	6	8	12	5	8	12
VanA	11	14	18	10	13	16	11	14	17

Three spiked e-swab at i) low (1-fold above the LOD), ii) medium (2-fold above the LOD) and iii) high (3-fold above the LOD) concentrations of target for each reaction were extracted and tested in duplicate. Each data point on the table represents the average of six results (three extracted tested in duplicate).

With respect to specificity and sensitivity, we performed over 1,600 gene detection tests for MDROs in a blinded study with 42 known MDROs present and 10 clinical isolates without known MDRO genes. As the following table shows, our Acuitas MDRO Gene Test results achieved 100% sensitivity and 99.87% specificity.

Sample Level Accuracy		
	MDRO Pos	MDRO Neg
Acuitas Positive	108	0
Acuitas Negative	0	10
Sensitivity =		100%
Specificity=		100%
Positive Predictive Value =		100%
Negative Predictive Value =		100%

Reaction Level Accuracy		
	MDRO Pos	MDRO Neg
Acuitas Positive	42	2
Acuitas Negative	0	1596
Sensitivity =		100%
Specificity=		99.87%
Positive Predictive Value =		95%
Negative Predictive Value =		100%

Payments and Reimbursement

Our Acuitas MDRO gene tests are, and our Acuitas Lighthouse MDRO Management System and other future products and services will be, sold to hospitals and public health organizations on a fee-for-service basis. We envision selling our Acuitas Lighthouse MDRO Management System to health systems, hospitals and long-term care facilities under capitated, flat-rate contracts. Health systems and hospitals absorb the costs of extended stay from HAIs and poor treatment outcomes. For healthcare providers to support the use of our tests and services, OpGen needs to demonstrate improved outcomes and reduced costs. Various studies have documented increased hospital stays of six days or more for patients infected with MDROs, resulting in increased costs of $14,000 to $33,000 per infected patient. Determining if an infection is hospital-acquired or was originally obtained from another source is an important issue for hospitals. We believe our tests will help adjudicate payment favorably for hospitals. Isolation procedures are also costly to hospitals, so it is critical that isolation/de-isolation decisions are made accurately. Two recent studies documented a daily extra cost of approximately $101 for contact precaution equipment and approximately $57 for nursing time and contact precaution supplies for each infected patient. In addition to costs to individual hospitals, estimates of the economic costs of antibiotic resistance to the U.S. economy range from $20 billion to $35 billion annually.

Our marketing strategy focuses on the rapid turn-around time of our Acuitas MDRO gene test results and the panel of results available from one patient sample. We believe the combination of the Acuitas MDRO gene tests and the Acuitas Lighthouse MDRO Management System differentiates us in the marketplace by offering a single sample process for identification and management of MDROs. Our approach can deliver a number of benefits to healthcare organizations including: (1) reduced lengths of stays; (2) cost savings and improved patient outcomes; and (3) avoidance of penalties by third party payors for hospital-acquired infections.

We employ diverse marketing programs to inform key stakeholders of the value of our solutions in order to drive adoption. As part of our marketing strategy, we educate hospitals, other health care institutions, and healthcare professionals about our value proposition. We intend to expand our marketing efforts using proceeds from this offering to increase these activities by expanding our sales and marketing efforts to microbiology and infection control professionals and hospital executives. We anticipate supporting efforts to advocate for expanded MDRO hospital surveillance, legislation at the state and federal level to encourage best practices for MDRO surveillance, and clinical practice guidelines. Finally, our website serves as a portal for educational material for hospitals, healthcare professionals and patients.

Third Party Payors

We do not currently rely on any third party payors for payment or reimbursement to us for our Acuitas MDRO gene tests. Although we do not anticipate seeking direct reimbursement to us, we do believe that federal healthcare programs and other third party payors may, in the future, reimburse hospitals for implementing institution-wide surveillance, infection control and antibiotic stewardship programs. Our management team has experience seeking reimbursement from federal healthcare programs and other third party payors, and would work to:

- Meet the evidence standards necessary to be consistent with leading clinical guidelines. We believe demonstrating that our solution meets leading clinical practice guidelines plays a critical role in payors' coverage decisions.

- Engage reimbursement specialists to ensure the payor outreach strategy reacts to and anticipates the changing needs of our customer base. A customer service team would be an integral part of our reimbursement strategy, working with hospitals to navigate the claims process.

- Cultivate a network of key opinion leaders. Key opinion leaders are able to influence clinical practice by publishing research and determining whether new tests should be integrated into practice guidelines. We would collaborate with key opinion leaders early in the development process to ensure our clinical studies are designed and executed in a way that clearly demonstrates the benefits of our tests to physicians and payors.

- Compile a library of peer-reviewed studies that demonstrate that the Acuitas MDRO gene test products are effective, accurate and faster than current methods.

Third Party Relationships

Building and fostering relationships with third party companies who provide instrument reagent systems, hospital and DNA analysis software, and expanded distribution is an important business strategy for the Company.

Fluidigm Corporation

In December 2013, we purchased a BioMark HD DNA detection system and related instruments from Fluidigm to use in our Acuitas test development. In March 2014, we entered into a supply agreement with Fluidigm with respect to our purchases of Fluidigm's microfluidic chips, reagents, and other consumables used on the instrument. As we move towards kit-based configurations of our products, we intend to negotiate with Fluidigm to allow OpGen to distribute Fluidigm microfluidic chips as part of our kits for use on Fluidigm instrument systems. As of December 31, 2014, Fluidigm reported an installed base of 1,325 units, including 645 genomics analytical systems (Biomark, Biomark HD and EP1™ systems). We believe that such installed base provides us with potential customers for our Acuitas tests and services. The supply agreement currently has a one-year term, but we intend to request that Fluidigm enter into a new supply agreement. We cannot provide assurances that we will reach agreement with Fluidigm with respect to a new supply agreement or any agreement relating to the distribution of Fluidigm's products with our Acuitas MDRO gene test products.

Hitachi High-Technologies Collaboration

Since September 2013, we have been working with Hitachi to develop the Human Chromosome Explorer, a cloud-based service for human chromosome mapping, analysis and structural variation detection that will be commercialized by Hitachi with OpGen-supported Whole Genome Mapping and sequencing services and bioinformatics. Under contract from Hitachi, we are jointly developing a suite of bioinformatics and data management applications in a cloud-based environment for efficient automated analysis of structural variations of entire human genomes. Collaborations under an early access program are currently underway, and we expect Hitachi to launch their full service in 2015. OpGen is a service provider to Hitachi for their Human Chromosome Explorer and we anticipate jointly developing additional genome assembly and analysis capabilities. In addition to generating revenue for OpGen, the Hitachi relationship is strategically important because it serves as a way for the Company to leverage its expertise and technologies in the human genetics market and simultaneously to strengthen our core technology position in DNA sequence assembly and analysis for microbial genomes.

Laboratory Operations

Our laboratory operations are headquartered at our CLIA-certified laboratory in Gaithersburg, Maryland, where we perform all Acuitas MDRO testing. Once received, samples are processed through our automated accessioning system, prepared for review and analyzed. Specimens that are received by courier by 6 p.m. are analyzed during the night shift and the results are provided the following morning. When culture results are requested, the tests are performed over the next 48 hours.

We believe we have sufficient laboratory capacity to process Acuitas MDRO gene test products for at least the next 24 months.

Quality Assurance

Our quality assurance function oversees the quality of our laboratory as well as the quality systems used in research and development, client services, billing operations and sales and marketing. We have established a quality system across our entire business, including implementation and maintenance, document control, supplier qualification, corrective or preventive actions oversight, and employee training processes. We monitor and seek to improve our quality over time.

Competition

We believe the principal competitive factors in our target market include:

- quality and strength of clinical and analytical validation data;

- confidence in diagnostic results;
- cost-effectiveness; and
- ease of use.

We believe we compete favorably on the factors described above.

Our principal competition comes from traditional methods used by healthcare providers to diagnose and screen for MDROs and from other molecular diagnostic companies creating screening and diagnostic products such Cepheid, Becton-Dickinson, bioMerieux and Nanosphere. We believe our focus on identifying antibiotic-resistant genes, rather than organisms, the genes and associated diseases included in our tests, and the Acuitas Lighthouse MDRO bioinformatics services to come help to distinguish us from such competitors.

We also face competition from commercial laboratories, such as Bio-Reference Laboratories, Inc., Laboratory Corporation of America Holdings and Quest Diagnostics Incorporated, which have strong infrastructure to support the commercialization of diagnostic services.

Competitors may develop their own versions of our solution in countries where we do not have patents or where our intellectual property rights are not recognized.

Many of our potential competitors have widespread brand recognition and substantially greater financial, technical, research and development and selling and marketing capabilities than we do. Others may develop products with prices lower than ours that could be viewed by physicians and payors as functionally equivalent to our solution, or offer solutions at prices designed to promote market penetration, which could force us to lower the list prices of our solutions and affect our ability to achieve profitability. If we are unable to change clinical practice in a meaningful way or compete successfully against current and future competitors, we may be unable to increase market acceptance and sales of our products, which could prevent us from increasing our revenue or achieving profitability and could cause our stock price to decline.

Intellectual Property

In order to remain competitive, we must develop and maintain protection of the proprietary aspects of our technologies. To that end, we rely on a combination of patents, copyrights and trademarks, as well as contracts, such as confidentiality, invention assignment and licensing agreements. We also rely upon trade secret laws to protect unpatented know-how and continuing technological innovation. In addition, we have what we consider to be reasonable security measures in place to maintain confidentiality. Our intellectual property strategy is intended to develop and maintain our competitive position.

As of December 31, 2014, we had license or ownership rights to 73 patents, including 30 pending United States non-provisional patent applications, and 20 issued United States patents. Our issued patents begin to expire in April 2015 and are fully expired by December 2023.

We intend to file additional patent applications in the United States and abroad to strengthen our intellectual property rights; however, our patent applications (including the patent applications listed above) may not result in issued patents in a timely fashion or at all, and we cannot assure investors that any patents that have issued or might issue will protect our technology. We may receive notices of claims of potential infringement from third parties in the future. For additional information, see the section of this prospectus captioned "Risk Factors–Risks Related to Intellectual Property."

We hold registered trademarks in the United States for OpGen®, Argus® and MapIt® and Canadian and European Community registered trademarks for OpGen. We have filed U.S. trademark applications for Acuitas™, Genome-Builder™, Lighthouse™, MapCard™, MapCode™, MapSolver™, Secure™, Secure Elite™ Map Type™ and Whole Genome Mapping™.

We require all employees and technical consultants working for us to execute confidentiality agreements, which provide that all confidential information received by them during the course of the employment, consulting or business relationship be kept confidential, except in specified circumstances. Our agreements with our research employees provide that all inventions, discoveries and other types of intellectual property, whether or not patentable or copyrightable, conceived by the individual while he or she is employed by us are assigned to us. We cannot provide any assurance, however, that employees and consultants will abide by the confidentiality or assignment terms of these agreements. Despite measures taken to protect our intellectual property, unauthorized parties might copy aspects of our technology or obtain and use information that we regard as proprietary.

Near-Term Plan of Operation

We anticipate that our expenditures will increase over the next 18 months in connection with the implementation of our strategy. Specifically, we expect our research and development expenses will increase as we invest in activities related to developing additional products, such as Acuitas Resistome, as well as the continued development and support of Acuitas MDRO Gene Test, Acuitas CR Elite Test and the Acuitas Lighthouse MDRO Management System. Our key strategic initiatives are set forth in "Business—Our Strategy" and our plans for developing additional products can be found in "Business—Commercialization Strategy and Plans." We also expect our selling and marketing expenses will increase as a result of the costs associated with hiring additional internal sales personnel in connection with our planned expansion, and additional marketing and education efforts in order to promote our Acuitas MDRO Gene Test, Acuitas CR Elite Test and the Acuitas Lighthouse MDRO Management System and to educate health care organizations about our products. Additionally, we also expect that our general and administrative expenses will increase as we incur additional expenses related to operating as a public company and expand our billing and client services functions to support anticipated increased demand for our test. We believe that the estimated net proceeds from this offering, together with our existing cash and cash equivalents, will exceed those additional expenditures and our current cash usage rates and will be sufficient to meet our anticipated cash requirements for at least the next 12 months, and as such, we do not expect it will be necessary to raise additional capital during that period.

Our expectations with respect to our near term operating plan and ability to effectively execute on this plan are subject to a number of risks, and many of these risks are outside of our control. If one or more of these events were to occur in the near term, it might become necessary for us to shift our priorities and our plans, abandon or delay one or more of our planned activities, or otherwise adjust our plans. Please see "Risk Factors" for a discussion of these risks and events, and their potential effects on our business.

Regulation

The following is a summary of the regulations materially affecting our business and operations.

Clinical Laboratory Improvement Amendments of 1988, or CLIA

As a clinical reference laboratory, we are required to hold certain federal, state and local licenses, certifications and permits to conduct our business. Under CLIA, we are required to hold a certificate applicable to the type of laboratory examinations we perform and to comply with standards covering personnel, facilities administration, quality systems and proficiency testing.

We have a current certificate under CLIA to perform testing at our Gaithersburg, Maryland laboratory. To renew our CLIA certificate, we are subject to survey and inspection every two years to assess compliance with program standards. The regulatory and compliance standards applicable to the testing we perform may change over time, and any such changes could have a material effect on our business. Our CLIA certificate expires on October 1, 2015.

If our clinical laboratory is out of compliance with CLIA requirements, we may be subject to sanctions such as suspension, limitation or revocation of our CLIA certificate, as well as directed plan of correction, state on-site monitoring, civil money penalties, civil injunctive suit or criminal penalties. We must maintain CLIA compliance and certification in order to perform clinical laboratory tests and report test results. If we were to be found out of compliance with CLIA requirements and subjected to sanction, our business could be harmed.

Federal Oversight of Laboratory Developed Tests and Research Use Only Products

Clinical laboratory tests, like the Acuitas MDRO Gene Test, are regulated under CLIA, as well as by applicable state laws. Historically, most laboratory developed tests, or LDTs, were not subject to FDA regulations applicable to medical devices, although reagents, instruments, software or components provided by third parties and used to perform LDTs may be subject to regulation. FDA defines the term "laboratory developed test" as an *in vitro* diagnostic test that is intended for clinical use and designed, manufactured and used within a single laboratory. We believe that our Acuitas MDRO gene test products are LDTs. Until 2014, the FDA exercised enforcement discretion such that it did not enforce provisions of the Food, Drug and Cosmetic Act with respect to LDTs. In July 2014, due to the increased proliferation of LDTs for complex diagnostic testing, and concerns with several high-risk LDTs related to lack of evidentiary support for claims, erroneous results and falsification of data, the FDA issued guidance that, when finalized, would adopt a risk-based framework that would increase FDA oversight of LDTs. As part of this developing framework, FDA issued draft guidance in October 2014, informing manufacturers of LDTs of its intent to collect information from laboratories regarding their current LDTs and newly developed LDTs through a notification process. The FDA will use this information to classify LDTs and to prioritize enforcement of premarket review requirements for categories of LDTs based on risk, using a public process. Specifically, FDA plans to use advisory panels to provide recommendations to the agency on LDT risks, classification and prioritization of enforcement of applicable regulatory requirements on certain categories of LDTs, as appropriate.

Some products are for research use only, or RUO, or for investigational use only, or IUO. RUO and IUO products are not intended for human clinical use and must be properly labeled in accordance with FDA guidance. Claims for RUOs and IUOs related to safety, effectiveness, or diagnostic utility or that it are intended for human clinical diagnostic or prognostic use are prohibited. In November 2013, the FDA issued guidance titled "Distribution of In Vitro Diagnostic Products Labeled for Research Use Only or Investigational Use Only - Guidance for Industry and Food and Drug Administration Staff." This guidance sets forth the requirements to utilize such designations, labeling requirements and acceptable distribution practices, among other requirements. Mere placement of an RUO or IUO label on an *in vitro* diagnostic product does not render the device exempt from otherwise applicable clearance, approval or other requirements. The FDA may determine that the device is intended for use in clinical diagnosis based on other evidence, including how the device is marketed.

We cannot predict the potential effect the FDA's current and forthcoming guidance on LDTs and IUOs/RUOs will have on our solutions or materials used to perform our diagnostic services. While we qualify all materials used in our diagnostic services according to CLIA regulations, we cannot be certain that the FDA might not promulgate rules or issue guidance documents that could affect our ability to purchase materials necessary for the performance of our diagnostic services. Should any of the reagents obtained by us from vendors and used in conducting our diagnostic services be affected by future regulatory actions, our business could be adversely affected by those actions, including increasing the cost of service or delaying, limiting or prohibiting the purchase of reagents necessary to perform the service.

We cannot provide any assurance that FDA regulation, including premarket review, will not be required in the future for our surveillance and diagnostic services, whether through additional guidance or regulations issued by the FDA, new enforcement policies adopted by the FDA or new legislation enacted by Congress. Legislative proposals addressing oversight of LDTs were introduced in recent years and we expect that new legislative proposals will be introduced from time to time. It is possible that legislation could be enacted into law or regulations or guidance could be issued by the FDA which may result in new or increased regulatory requirements for us to continue to offer our diagnostic services or to develop and introduce new services.

U.S. Food and Drug Administration

Collection systems, like the Copan ESwab we currently purchase and send to customers to procure specimens, and some of our products in development, such as the Acuitas Resistome Test, or specimen collection systems such as Grow on the Go that we develop in the future, may be regulated as medical devices subject to extensive regulation by the FDA and other U.S. federal and state regulatory bodies and comparable authorities in other countries. To ensure that medical products distributed domestically and internationally are safe and effective for their intended use, the FDA and comparable authorities in other countries have imposed regulations that govern, among other things, the following activities that we or our partners perform or could perform: product design and development; product testing; product manufacturing; product labeling; product storage; premarket clearance or approval; advertising and promotion; product marketing, sales and distribution; and post-market surveillance reporting death or serious injuries and medical device reporting. Generally, establishments that manufacture or distribute devices, including manufacturers, repackagers and relabelers, specification developers, and initial importers, are required to register their establishments with the FDA and provide the FDA with a list of the devices that they handle at their facilities. We may need to comply with these requirements in the future.

After a medical device is placed on the market, numerous regulatory requirements apply. These include: all of the relevant elements of the Quality System Regulation, or QSR, labeling regulations, restrictions on promotion and advertising, the Medical Device Reporting, or MDR, regulations (which requires the manufacturer to report to the FDA if its device may have caused or contributed to a death or serious injury or malfunctioned in a way that would likely cause or contribute to a death or serious injury if it were to recur), and the Reports of Corrections and Removals regulations (which requires manufacturers to report certain recalls and field actions to the FDA).

FDA's Premarket Clearance and Approval Requirements

The FDA classifies medical devices into one of three classes. Devices deemed to pose lower risk are placed in either class I or II, which requires the manufacturer to submit to the FDA a premarket notification requesting permission for commercial distribution. This process is known as 510(k) clearance. Some low risk devices are exempt from this requirement. Devices deemed by the FDA to pose the greatest risk, such as life-sustaining, life-supporting or implantable devices, or devices deemed not substantially equivalent to a previously cleared 510(k) device, are placed in class III, requiring premarket approval. Our current products are Class II devices marketed under FDA 510(k) premarket clearance. Both premarket clearance and premarket approval, or PMA, applications are subject to the payment of user fees, paid at the time of submission for FDA review.

The FDA has issued a regulation outlining specific requirements for "specimen transport and storage containers." "Specimen transport and storage containers" are medical devices "intended to contain biological specimens, body waste, or body exudate during storage and transport" so that the specimen can be used effectively for diagnostic examination. A specimen transport and storage container is a Class I device. It is subject to MDR requirements, the reporting of corrections and removals, registration and listing. It is exempt from premarket review, and from QSR labeling requirements except for recordkeeping and complaint handling requirements, so long as no sterility claims are made. If the FDA were to determine that our sample collection container is a Class II medical device, the manufacturer would be required to obtain FDA clearance to use the container.

510(k) Clearance Pathway

If required to obtain 510(k) clearance for our future products, such as Acuitas Resistome Test, or conversion of our Acuitas MDRO gene test products to diagnostic kits, such tests would be classified as medical devices and we would have to submit a premarket notification demonstrating that the proposed device is substantially equivalent to a previously cleared 510(k) device or a device that was in commercial distribution before May 28, 1976, for which the FDA has not yet called for the submission of premarket approval applications. FDA's 510(k) clearance pathway usually takes from three to twelve months, but it can take significantly longer. The FDA may require additional information, including clinical data, to make a determination regarding substantial equivalence.

After a device receives 510(k) clearance, any modification that could significantly affect its safety or effectiveness, or that would constitute a new or major change in its intended use, will require a new 510(k) clearance or, depending on the modification, require premarket approval. The FDA requires each manufacturer to determine whether the proposed change requires submission of a 510(k) notice, or a premarket approval, but the FDA can review any such decision and can disagree with a manufacturer's determination. If the FDA disagrees with a manufacturer's determination, the FDA can require the manufacturer to cease marketing and/or recall the modified device until 510(k) clearance or premarket approval is obtained. If the FDA requires us to seek 510(k) clearance or premarket approval for any modifications to a previously cleared product, we may be required to cease marketing or recall the modified device until we obtain this clearance or approval. Also, in these circumstances, we may be subject to significant regulatory fines or penalties. We have made and plan to continue to make additional product enhancements to products that we believe do not require new 510(k) clearances.

Premarket Approval Pathway

A premarket approval application must be submitted if a device cannot be cleared through the 510(k) process. The premarket approval application process is generally more costly and time consuming than the 510(k) process. A premarket approval application must be supported by extensive data including, but not limited to, technical, preclinical, clinical trials, manufacturing and labeling to demonstrate to the FDA's satisfaction the safety and effectiveness of the device for its intended use.

After a premarket approval application is sufficiently complete, the FDA will accept the application and begin an in-depth review of the submitted information. By statute, the FDA has 180 days to review the "accepted application," although, generally, review of the application can take between one and three years, but it may take significantly longer. During this review period, the FDA may request additional information or clarification of information already provided. Also during the review period, an advisory panel of experts from outside the FDA may be convened to review and evaluate the application and provide recommendations to the FDA as to the approvability of the device. In addition, the FDA will conduct a preapproval inspection of the manufacturing facility to ensure compliance with quality system regulations. New premarket approval applications or premarket approval application supplements are required for modifications that affect the safety or effectiveness of the device, including, for example, certain types of modifications to the device's indication for use, manufacturing process, labeling and design. Premarket approval supplements often require submission of the same type of information as a premarket approval application, except that the supplement is limited to information needed to support any changes from the device covered by the original premarket approval application, and may not require as extensive clinical data or the convening of an advisory panel. None of our products are currently approved under a premarket approval.

Clinical Trials

Clinical trials are almost always required to support a premarket approval application and are sometimes required for a 510(k) premarket notification. Clinical trials may also be required to support certain marketing claims. If the device presents a "significant risk," as defined by the FDA, to human health, the FDA requires the device sponsor to file an investigational device exemption, or IDE, application with the FDA and obtain IDE approval prior to commencing the human clinical trials. The investigational device exemption application must be supported by appropriate data, such as animal and laboratory testing results, showing that it is safe to test the device in humans and that the testing protocol is scientifically sound. The investigational device exemption application must be approved in advance by the FDA for a specified number of patients, unless the product is deemed a "non-significant risk" device and eligible for more abbreviated investigational device exemption requirements. Clinical trials for a significant risk device may begin once the investigational device exemption application is approved by the FDA and the appropriate institutional review boards at the clinical trial sites. Future clinical trials of our motion preservation designs will require that we obtain an investigational device exemption from the FDA prior to commencing clinical trials and that the trial be conducted under the oversight of an institutional review board at the clinical trial site. Our clinical trials must be conducted in accordance with FDA regulations and federal and state regulations concerning human subject protection, including informed consent and healthcare privacy. A clinical trial may be suspended by the FDA or the investigational review board at any time for various reasons, including a belief that the risks to the study participants outweigh the benefits of participation in the study. Even if a study is completed, the results of our clinical testing may not demonstrate the safety and efficacy of the device, or may be equivocal or otherwise not be sufficient to obtain approval of our product. Similarly, in Europe the clinical study must be approved by the local ethics committee and in some cases, including studies of high-risk devices, by the Ministry of Health in the applicable country.

Pervasive and Continuing FDA Regulation

If any of our products classified as devices are placed on the market, numerous regulatory requirements would continue to apply. These include:

- product listing and establishment registration, which helps facilitate FDA inspections and other regulatory action;

- Quality System Regulation, which requires manufacturers, including third-party manufacturers, to follow stringent design, testing, control, documentation and other quality assurance procedures during all aspects of the manufacturing process;

- labeling regulations and FDA prohibitions against the promotion of products for uncleared, unapproved or off-label use or indication;
- clearance of product modifications that could significantly affect safety or efficacy or that would constitute a major change in intended use of one of our cleared devices;
- approval of product modifications that affect the safety or effectiveness of one of our approved devices;
- medical device reporting regulations, which require that manufacturers comply with FDA requirements to report if their device may have caused or contributed to a death or serious injury, or has malfunctioned in a way that would likely cause or contribute to a death or serious injury if the malfunction of the device or a similar device were to recur;
- post-approval restrictions or conditions, including post-approval study commitments;
- post-market surveillance regulations, which apply when necessary to protect the public health or to provide additional safety and effectiveness data for the device;
- the FDA's recall authority, whereby it can ask, or under certain conditions order, device manufacturers to recall from the market a product that is in violation of governing laws and regulations;
- regulations pertaining to voluntary recalls; and
- notices of corrections or removals.

We and any third-party manufacturers of such devices would need to register with the FDA as medical device manufacturers and obtain all necessary state permits or licenses to operate our business. We and any third-party manufacturers would be subject to announced and unannounced inspections by the FDA to determine our compliance with quality system regulation and other regulations. We have not yet been inspected by the FDA.

Failure to comply with applicable regulatory requirements could result in enforcement action by the FDA, which might include any of the following sanctions: (1) untitled letters, warning letters, fines, injunctions, consent decrees and civil penalties; (2) unanticipated expenditures to address or defend such actions; (3) customer notifications for repair, replacement and refunds; (4) recall, detention or seizure of our products; (5) operating restrictions or partial suspension or total shutdown of production; (6) refusing or delaying our requests for 510(k) clearance or premarket approval of new products or modified products; (7) operating restrictions; (8) withdrawing 510(k) clearances or PMA approvals that have already been granted; (9) refusal to grant export approval for our products; or (10) criminal prosecution.

Health Insurance Portability and Accountability Act

Under the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, the Department of Health and Human Services, or HHS, has issued regulations to protect the privacy and security of protected health information used or disclosed by health care providers, such as us, and by certain vendors of ours, also known as our business associates. The regulations include limitations on the use and disclosure of protected health information and impose notification requirements in the event of a breach of protected health information. HIPAA also regulates standardization of data content, codes and formats used in health care transactions and standardization of identifiers for health plans and providers. Penalties for violations of HIPAA regulations include civil and criminal penalties.

We have developed and implemented policies and procedures designed to comply with these regulations. The requirements under these regulations may change periodically and could have an effect on our business operations if compliance becomes substantially more costly than under current requirements.

In addition to federal privacy regulations, there are a number of state laws governing confidentiality of health information that are applicable to our business. If our business expands internationally, we would be subject to compliance with other laws regarding confidentiality of health information and privacy.

New laws governing privacy may be adopted in the future as well. We have taken steps to comply with health information privacy requirements to which we are aware that we are subject. However, we can provide no assurance that we are or will remain in compliance with diverse privacy requirements in all of the jurisdictions in which we do business. Failure to comply with privacy requirements could result in civil or criminal penalties, which could have a materially adverse effect on our business.

Federal and State Physician Self-referral Prohibitions

As a clinical laboratory, we are subject to the federal physician self-referral prohibitions, commonly known as the Stark Law, and to similar restrictions under the Maryland Physician Self-Referral Law. Together these restrictions generally prohibit us from billing a patient or any governmental or private payor for any clinical laboratory services when the physician ordering the service, or any member of such physician's immediate family, has an investment interest in or compensation arrangement with us, unless the arrangement meets an exception to the prohibition.

Both the Stark Law and the Maryland Physician Self-Referral Law contain an exception for compensation paid to a physician for personal services rendered by the physician. We have compensation arrangements with a number of physicians for personal services, such as speaking engagements and consulting activities. We have structured these arrangements with terms intended to comply with the requirements of the personal services exception to Stark and Maryland Physician Self-Referral Law.

However, we cannot be certain that regulators would find these arrangements to be in compliance with Stark, the Maryland Physician Self-Referral Law, or similar state laws. We would be required to refund any payments we receive pursuant to a referral prohibited by these laws to the patient, the payor or the Medicare program, as applicable.

Sanctions for a violation of the Stark Law include the following:

- denial of payment for the services provided in violation of the prohibition;
- refunds of amounts collected by an entity in violation of the Stark Law;
- a civil penalty of up to $15,000 for each service arising out of the prohibited referral;
- possible exclusion from federal healthcare programs, including Medicare and Medicaid; and
- a civil penalty of up to $100,000 against parties that enter into a scheme to circumvent the Stark Law's prohibition.

These prohibitions apply regardless of the reasons for the financial relationship and the referral. No finding of intent to violate the Stark Law is required for a violation. In addition, knowing violations of the Stark Law may also serve as the basis for liability under the Federal False Claims Act.

Further, if we submit claims in violation of the Maryland Physician Self-Referral Law, we can be held liable to the payor for any reimbursement received for the services by us. Finally, other states have self-referral restrictions with which we have to comply that differ from those imposed by federal and Maryland law. While we have attempted to comply with the Stark Law and the Maryland Physician Self-Referral Law, it is possible that some of our financial arrangements with physicians could be subject to regulatory scrutiny at some point in the future, and we cannot provide assurance that we will be found to be in compliance with these laws following any such regulatory review.

Federal and State Anti-Kickback Laws

The Federal health care program Anti-Kickback Law makes it a felony for a person or entity, including a laboratory, to knowingly and willfully offer, pay, solicit or receive remuneration, directly or indirectly, in order to induce business that is reimbursable under any federal health care program. A violation of the Anti-Kickback Law may result in imprisonment for up to five years and fines of up to $250,000 in the case of individuals and $500,000 in the case of organizations. Convictions under the Anti-Kickback Law result in mandatory exclusion from federal health care programs for a minimum of five years. In addition, HHS has the authority to impose civil assessments and fines and to exclude health care providers and others engaged in prohibited activities from Medicare, Medicaid and other federal health care programs. Actions which violate the Anti-Kickback Law also incur liability under the Federal False Claims Act, which prohibits knowingly presenting, or causing to be presented, a false or fraudulent claim for payment to the U.S. Government.

Although the Anti-Kickback Law applies only to federal health care programs, a number of states, including Maryland, have passed statutes substantially similar to the Anti-Kickback Law pursuant to which similar types of prohibitions are made applicable to all other health plans and third-party payors. Violations of Maryland's anti-kickback law are punishable by tiered criminal penalties based on the crime with a maximum penalty of life imprisonment and fines of up to $200,000, or both. Civil penalties include three times the amount of any overpayment made in violation of the statute.

Federal and state law enforcement authorities scrutinize arrangements between health care providers and potential referral sources to ensure that the arrangements are not designed as a mechanism to induce patient care referrals or induce the purchase or prescribing of particular products or services. The law enforcement authorities, the courts and Congress have also demonstrated a willingness to look behind the formalities of a transaction to determine the underlying purpose of payments between health care providers and actual or potential referral sources. Generally, courts have taken a broad interpretation of the scope of the Anti-Kickback Law, holding that the statute may be violated if merely one purpose of a payment arrangement is to induce referrals or purchases.

In addition to statutory exceptions to the Anti-Kickback Law, regulations provide for a number of safe harbors. If an arrangement meets the provisions of a safe harbor, it is deemed not to violate the Anti-Kickback Law. An arrangement must fully comply with each element of an applicable safe harbor in order to qualify for protection. There are no regulatory safe harbors to the Maryland Anti-Kickback Law.

Among the safe harbors that may be relevant to us is the discount safe harbor. The discount safe harbor potentially applies to discounts provided by providers and suppliers, including laboratories, to physicians or institutions. If the terms of the discount safe harbor are met, the discounts will not be considered prohibited remuneration under the Anti-Kickback Law. Maryland does not have a discount safe harbor.

The personal services safe harbor to the Anti-Kickback Law provides that remuneration paid to a referral source for personal services will not violate the Anti-Kickback Law provided all of the elements of that safe harbor are met. One element is that if the agreement is intended to provide for the services of the physician on a periodic, sporadic or part-time basis, rather than on a full-time basis for the term of the agreement, the agreement specifies exactly the schedule of such intervals, their precise length, and the exact charge for such intervals. Our personal services arrangements with some physicians may not meet the specific requirement of this safe harbor that the agreement specify exactly the schedule of the intervals of time to be spent on the services because the nature of the services, such as speaking engagements, does not lend itself to exact scheduling and therefore meeting this element of the personal services safe harbor is impractical. Failure to meet the terms of the safe harbor does not render an arrangement illegal. Rather, the government may evaluate such arrangements on a case-by-case basis, taking into account all facts and circumstances.

While we believe that we are in compliance with the Anti-Kickback Law and the Maryland Anti-Kickback Law, there can be no assurance that our relationships with physicians, academic institutions and other customers will not be subject to investigation or challenge under such laws. If imposed for any reason, sanctions under the Anti-Kickback Law and the Maryland Anti-Kickback Law could have a negative effect on our business.

Other Federal and State Fraud and Abuse Laws

In addition to the requirements discussed above, several other health care fraud and abuse laws could have an effect on our business. For example, provisions of the Social Security Act permit Medicare and Medicaid to exclude an entity that charges the federal health care programs substantially in excess of its usual charges for its services. The terms "usual charge" and "substantially in excess" are ambiguous and subject to varying interpretations.

Further, the Federal False Claims Act prohibits a person from knowingly submitting a claim, making a false record or statement in order to secure payment or retaining an overpayment by the federal government. In addition to actions initiated by the government itself, the statute authorizes actions to be brought on behalf of the federal government by a private party having knowledge of the alleged fraud, also known as *qui tam* lawsuits. Because the complaint is initially filed under seal, the action may be pending for some time before the defendant is even aware of the action. If the government is ultimately successful in obtaining redress in the matter or if the plaintiff succeeds in obtaining redress without the government's involvement, then the plaintiff will receive a percentage of the recovery. It is not uncommon for *qui tam* lawsuits to be filed by employees, competitors or consultants. Finally, the Social Security Act includes its own provisions that prohibit the filing of false claims or submitting false statements in order to obtain payment. Violation of these provisions may result in fines, imprisonment or both, and possible exclusion from Medicare or Medicaid programs. Maryland has an analogous state false claims act applicable to state health plans and programs, as do many other states.

Maryland Laboratory Licensing

Maryland requires that any site that performs clinical laboratory testing located in the state of Maryland, with limited exceptions, must be licensed by the state, in addition to meeting federal CLIA requirements. As such, our laboratory in Gaithersburg, Maryland holds a current Maryland license and is subject to on site surveys by Maryland's Office of Health Care Quality. Our license is due to be renewed in June 2016.

Other States' Laboratory Licensing

In addition to Maryland, other states including California, Florida, New York, Pennsylvania, Rhode Island, and the District of Columbia, require licensing of out-of-state laboratories under certain circumstances. We have obtained, or will obtain, licenses from states and jurisdictions where we believe we are required to be licensed, and believe we are in compliance with applicable licensing laws.

From time to time, we may become aware of other states that require out-of-state laboratories to obtain licensure in order to accept specimens from the state, and it is possible that other states do have such requirements or will have such requirements in the future. If we identify any other state with such requirements or if we are contacted by any other state advising us of such requirements, we intend to comply with such requirements.

International Regulation

Sales of diagnostic tests like our Acuitas MDRO gene tests outside the United States would be subject to foreign government regulations, which vary substantially from country to country. In order to market our products in other countries, we would need to obtain regulatory approvals and comply with extensive safety and quality regulations in other countries. The time required to obtain approval by a foreign country may be longer or shorter than that required by for FDA clearance or approval, and the requirements may differ significantly. If we elect to, or are required to, seek clearance of or approval for any of our products from the FDA, we may be able to commercialize such products with shorter lead time in international markets, but would need to establish international operations in order to do so.

Employees

As of December 31, 2014, we had 29 employees, of which 10 work in laboratory operations, 7 in research and development and clinical development, 5 in selling and marketing, and 7 in general and administrative. None of our employees are the subject of collective bargaining arrangements, and our management considers its relationships with employees to be good.

Facilities

We lease 20,713 square feet of office and laboratory space at our headquarters in Gaithersburg, Maryland under a lease that expires in the second quarter of 2015. In 2015, we anticipate renewing our lease or entering into a new lease for office and laboratory space in the Gaithersburg, Maryland area. We believe that our existing facilities are, or any such new facilities will be, adequate to meet our business requirements for at least the next 18 months and that additional space will be available on commercially reasonable terms, if required.

Environmental Matters

Our operations require the use of hazardous materials (including biological materials) which subject us to a variety of federal, state and local environmental and safety laws and regulations. Some of these regulations provide for strict liability, holding a party potentially liable without regard to fault or negligence. We could be held liable for damages and fines as a result of our, or others', business operations should contamination of the environment or individual exposure to hazardous substances occur. We cannot predict how changes in laws or new regulations will affect our business, operations or the cost of compliance.

Raw Materials and Suppliers

We procure reagents, equipment, chips and other materials we use to perform the Acuitas MDRO Gene Test from sole suppliers such as Fluidigm. We also purchase our collection kits from sole-source suppliers. Some of these items are unique to these suppliers and vendors. While we have developed alternative sourcing strategies for these materials and vendors, we cannot be certain whether these strategies will be effective or whether alternative sources will be available when we need them. If these suppliers can no longer provide us with the materials we need to perform the Acuitas MDRO Gene Test, if the materials do not meet our quality specifications, or if we cannot obtain acceptable substitute materials, our business would be negatively affected.

Legal Proceedings

From time to time, we may be party to lawsuits in the ordinary course of business. We are currently not a party to any legal proceedings.

Glossary

The following scientific, healthcare, regulatory and OpGen-specific terms are used throughout this prospectus:

"2015 convertible notes" means the $1.5 million aggregate of convertible notes offered to certain of our existing investors in February 2015.

"ACOs" means accountable care organizations, a voluntary combination of doctors, hospitals and other health care providers and other health care system participants, including insurers, formed under the PPACA, to provide coordinated health care to patients.

"Acuitas CR Elite" is our culture test designed for culture-based confirmation of CRE resistance with the Acuitas MDRO Gene Test.

"Acuitas Lighthouse MDRO Management System" is our product being internally developed to provide real-time information on the MDRO colonization status for patients and hospitals. We combine our molecular test information and microbiology test results from our customized CLIA-based tests to create Acuitas Lighthouse MDRO profiles for hospitals. Acuitas Lighthouse MDRO profiling facilitates MDRO tracking and results can be aggregated with hospital data to provide customized reports including alerts, prevalence, trend analysis and transmission information.

"Acuitas MDRO Gene Test" means our internally developed test that detects ten critical MDRO genes, including CRE (7 genes), ESBL (2 genes) and VRE resistant organisms, from one patient swab.

"Acuitas Resistome Test" means our rapid, high resolution test that includes additional resistant genes for carbapenems, ESBLs and AmpC.

"antibiotic stewardship" has been defined by the CDC to mean hospital-based programs dedicated to improving use of antibiotic therapy with the goal of optimizing the treatment of infections and reducing the adverse events associated with antibiotic use.

"Argus System" means OpGen's proprietary system used to perform Whole Genome Mapping.

"bioinformatics" refers to methods, algorithms and processes for the collection, classification, storage and analysis of biochemical and biological data and information using computers, especially as applied in molecular genetics and genomics. Our focus is on acquiring such data and information related to MDROs to assist in diagnosis and screening of patients and antibiotic stewardship initiatives by acute care hospitals. When we use the term "advanced bioinformatics," we mean bioinformatics combined with higher levels of complexity, sophistication and subject matter expertise related to MDROs, diagnostics, antibiotic stewardship, and the development of associated analysis tools, or the novel application of existing bioinformatics in future products or services. In this prospectus, we also sometimes use the phrase "bioinformatics products and services," often interchangeably with "bioinformatics platform," to describe the Company's focus on the use of bioinformatics and advanced bioinformatics in its current and future product and service offerings.

"bioinformatics platform" means a combination of software tools and analytical processes that streamline the production and analysis of bioinformatics data. When we use the term "bioinformatics platform," we are primarily referring to our Acuitas Lighthouse MDRO Management System.

"CDC" means the U.S. Centers for Disease Control and Prevention.

"*C. difficile*" means clostridium difficile, an MDRO that causes intestinal tract infections that can lead to sepsis.

"CLIA lab" means a clinical or reference laboratory meeting the requirements of the Clinical Laboratory Improvements Act of 1988, as amended.

"CRE" means Carbapenem-resistant Enterobactercaceae, an MDRO.

"DNA probe analysis" is a test where an agent binds directly to a predefined or labeled sequence of nucleotides in a DNA molecule in order to detect unique nucleotide sequences within the molecule.

"DNA sequencing" is the process of determining the precise order of nucleotides within a DNA molecule.

"epidemiologically linked" means situations where it is shown that one person is the source of an infection that spreads through contact to one or more other persons.

"ESBL" means extended spectrum beta lactamase bacteria.

"FDA" means the U.S. Food and Drug Administration.

"Grow on the Go" is our proprietary specimen transport solution that allows a specimen to be cultured during transport to allow for overnight shipping and immediate analysis on receipt at the OpGen CLIA lab .

"HAIs" means hospital acquired infections. Such infections could arise first in the hospital or other healthcare setting, or could result from a patient, colonized with an organism, developing an active infection once admitted to the hospital or other healthcare setting.

"HIPAA" means the federal Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH Act. HIPAA and HITECH are federal laws mandating security and privacy of protected personal health information of patients.

"ICU" means an intensive care unit in a health care facility.

"KPC" means Klebsiella pneumonia carbapenemase, an MDRO.

"LIMS" means a laboratory information management system.

"MDR" means multi-drug resistant.

"MDR-GNB" means gram negative bacteria that are resistant to multiple antibiotic treatment alternatives. MDR-GNBs include the following organisms – MDR-Klebsiella pneumonia, MDR-Pseudomonas aeruginosa, MDR-Acinetobacter baumannii and Enterobacterceaceae producing extended-spectrum β-lactamases (ESBL) and carbapenemases.

"MDRO" means a multi-drug-resistant organisms.

"microfluidic" means devices or processes that are designed, manufactured or formulated to accommodate applications that require very small volumes of fluid, on the order of nanoliters or picoliters.

"nosocomial" means hospital acquired.

"Partner-Pilot-Program" is the Company's program of partnering with hospitals and healthcare systems to demonstrate the performance of our products and that implementation will result in more accurate and timely patient isolation, isolation decisions and infection control procedures, and demonstrate the potential for improved antibiotic stewardship by appropriate antibiotic selection.

"PPACA" means the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act.

"production genomics" is the market application of technologies that apply DNA testing methodologies and bioinformatics to sequence, assemble and analyze the function and structure of genomes. Specifically, these technologies are used in settings that demand high throughput and high accuracy.

"sensitivity" of a clinical laboratory test reflects the probability that a patient with a specific bacterial organism present will have a positive test result.

"specificity" of a clinical laboratory test reflects the probability that a patient without the specific bacterial organism will have a negative test result.

"WHO" means the World Health Organization.

"Whole Genome Mapping" means OpGen's proprietary technology that provides a customer with a high resolution, ordered, whole genome restriction map generated from single DNA molecules extracted from organisms, such as bacteria, yeast or other fungi, plants or animals and humans. Whole Genome Mapping compliments genome assembly and enables scientist to identify highly repetitive regions, tandem repeats and translocations that are difficult to identify and clarify with sequencing alone.

MANAGEMENT

Directors and Executive Officers

Our executive officers and directors and their respective ages and positions as of January 31, 2015 are set forth below:

Name	Age	Position
Executive officers:		
Evan Jones (1)	57	President, Chief Executive Officer and Chair of the Board
C. Eric Winzer	58	Senior Vice President, Finance and Chief Financial Officer
G. Terrance Walker, Ph.D.	55	Senior Vice President, Research and Development
Vadim Sapiro	43	Chief Information Officer
David Hoekzema	52	Vice President, Business Development and Operations
Consultant:		
Robert McG. Lilley	69	Chief Commercial Officer
Non-management directors:		
Brian G. Atwood (2)	61	Director
Timothy Howe (1)(2)	57	Director
Laurence R. McCarthy Ph.D.(1)(2)	70	Director
Misti Ushio, Ph.D.(1)(2)	43	Director

(1) Member of the Compensation Committee.
(2) Member of the Audit Committee.

Executive Officers

Evan Jones has served as our President, Chief Executive Officer and Chair of the Board since October 2013. Prior thereto he served as Executive Chair of our board of directors from September 2010 to October 2013. Since 2007, Mr. Jones has served as managing member of jVen Capital, LLC (jVen), a life sciences investment company. Previously, he co-founded Digene Corporation, or Digene, a publicly traded biotechnology company focused on women's health and molecular diagnostic testing that was sold to QIAGEN NV (NASDAQ: QGEN) in 2007. He served as chairman of Digene's board of directors from 1995 to 2007, as Digene's chief executive officer from 1990 to 2006, and as Digene's president from 1990 to 1999. Mr. Jones served as a member of the board of directors of CAS Medical Systems, Inc. (NASDAQ: CASM), a developer of patient vital signs monitoring products and technologies, from June 2008 to October 2013. Mr. Jones has served on the boards of directors of Fluidigm Corporation (NASDAQ: FLDM), a provider of life science analytical and preparatory systems for markets such as single cell biology and production genomics, since March 2011, Foundation Medicine, Inc. (NASDAQ: FMI), a cancer testing molecular informatics company since 2013, and Veracyte, Inc. (NASDAQ: VCYT), a molecular cytology company, since 2008. Mr. Jones received a B.A. from the University of Colorado and an M.B.A. from The Wharton School at the University of Pennsylvania. We believe that Mr. Jones' qualifications to serve as President and Chief Executive Officer and as Executive Chairman of our board of directors include his extensive experience in the molecular diagnostic testing industry, including as chief executive officer of a public company focused on molecular diagnostic testing, as well as his service as a board member with other public and private companies. The Board believes that Mr. Jones' more than 30 years' leadership experience in the life science and healthcare industries, his extensive board experience at both privately held and publicly traded companies and his investment expertise, coupled with his deep understanding of our technologies, product candidates, market and history make him an essential contributor to our Board, including his service as Chair of the Board.

C. Eric Winzer joined OpGen as Chief Financial Officer in June 2009. Mr. Winzer brings almost thirty years of experience in addressing diverse financial issues including raising capital, financial reporting, investor relations, banking, taxation, mergers and acquisitions, financial planning and analysis, and accounting operations. Prior to joining OpGen, Mr. Winzer served as Executive Vice President and Chief Financial Officer for Avalon Pharmaceuticals, Inc. (Avalon) from July 2007 to May 2009, a biotechnology company developing targeted therapeutics for oncology. Prior to Avalon, from March 1986 to April 2006, Mr. Winzer was with Life Technologies (formerly Invitrogen Corporation), a provider of life science technologies for disease research and drug discovery, where he served as Senior VP and Chief Financial Officer, Executive Sponsor for their ERP implementation, and as the VP of Finance. Previously held positions also include various financial positions at Genex Corporation. Currently, Mr. Winzer serves as director and audit committee chair at NUO Therapeutics, Inc. (OTCQX: NUOT). Mr. Winzer received his B.A. in Economics and Business Administration from McDaniel College and an M.B.A. from Mount Saint Mary's University.

G. Terrance Walker, Ph.D. joined OpGen in June 2013 as Vice President, Research and Development and was promoted to Senior Vice President, Research and Development in October 2014. Dr. Walker's responsibilities include leading the development of genomic technologies and new products supporting molecular diagnostics for infectious diseases. Prior to OpGen, Dr. Walker led drug target validation, biomarker discovery and clinical diagnostic development across most disease areas and stages of development from discovery through late clinical trials at Pfizer Inc. (NYSE: PFE), from January 2011 to April 2012, at Duke University and The Biomarker Factory, from February 2009 to December 2010, at GlaxoSmithKline plc (NYSE: GSK), from January 2001 to September 2009, and at Becton, Dickinson and Company (NYSE: BDX), from March 1998 to December 2000. Dr. Walker received his Ph.D. in Biophysical Chemistry from the University of Rochester with postdoctoral training in Biophysical Chemistry at the University of California, Berkeley.

Vadim Sapiro joined OpGen in December 2011 as Chief Information Officer. Mr. Sapiro is responsible for leading the development of the Company's bioinformatics applications, software, databases and information technology operations. Prior to OpGen, Mr. Sapiro was senior vice president at SAIC-Frederick, or SAIC, from June 2008 to December 2011, overseeing the Information Systems Program for the National Cancer Institute at Frederick with responsibility for information technology, scientific computing and bioinformatics. Among Mr. Sapiro's projects were technical program management and operations for the cancer Biomedical Informatics Grid (caBIG™), the cancer Human Biobank (caHUB) and The Cancer Genome Atlas (TCGA). Prior to SAIC, from July 1999 to May 2008, Mr. Sapiro was Vice President for Information Technology with the J. Craig Venter Institute. Mr. Sapiro is active in the regional and national technology and research communities, having served on many life sciences and biotech focused advisory boards and review committees. Mr. Sapiro holds a B.S. in Mathematics and Computer Science from the University of Maryland.

David Hoekzema joined OpGen in July 2012 as Vice President, Business Development and Operations. Mr. Hoekzema's responsibilities include the expansion of technology and assay development partnerships in clinical diagnostics and life sciences. Mr. Hoekzema is also responsible for OpGen's production and service operations. He has over twenty-five years of experience in global biotechnology markets, with leadership and management roles spanning business development, sales and marketing, and commercial and technical operations, including at SAIC, where he was Vice President, Business Development from April 2008 to July 2012 and led the formation of technology partnerships for Frederick National Laboratory for Cancer Research, at QIAGEN NV (NASDAQ: QGEN), from October 2005 to January 2008, at Cambrex Corporation (NYSE: CBM) from November 2001 to September 2005, at Life Technologies, from April 1999 to January 2001, and at Advanced Biotechnologies Inc., from May 1985 to April 1999. Mr. Hoekzema holds a B.S. in Biology from Frostburg State University and an M.B.A. from the University of Maryland, Robert H. Smith School of Business.

Consultant

Robert McG. Lilley was retained by OpGen in October 2014 as our Chief Commercial Officer. Mr. Lilley is currently non-executive Chairman of the Board of Directors of Immunexpress, Inc., a Seattle-based molecular diagnostic company focused on developing diagnostic tests for patients at risk of sepsis. Mr. Lilley previously served as Senior Vice President, Global Sales and Marketing, for Digene Corporation from June 1999 until its sale to QIAGEN NV in 2007. He had held prior sales executive positions with Digene from March 1997 to June 1999. Mr. Lilley worked for QIAGEN NV as Senior Advisor, Molecular Diagnostics from August 2007 until September 2009. Mr. Lilley previously served as Head of Europe, Middle East, and Africa (EMEA) Sales and Marketing for TDS Healthcare Information Systems, as well as Senior Vice President and General Manager EMEA of Alltel Healthcare Systems.

Non-Management Directors

Brian G. Atwood has been a member of our board of directors since July 2007 and is currently chair of our audit committee. Mr. Atwood specializes in biotechnology investing at Versant Ventures. He is a co-founder of Versant Ventures and before this spent four years at Brentwood Venture Capital where, as a general partner, he led investments in biotechnology, pharmaceuticals, and bioinformatics. He also has more than fifteen years of operating experience in the biotechnology industry, with emphasis on therapeutic products, devices, diagnostics, and research instrumentation. Prior to launching his career in venture capital, Mr. Atwood was founder, President, and CEO of Glycomed Incorporated (Glycomed), a publicly traded biotechnology company. At Glycomed, Mr. Atwood concentrated on business development and strategic alliances, closing deals with Eli Lilly & Company, Millipore, Genentech and Sankyo, before leading the sale of Glycomed to Ligand Pharmaceuticals Incorporated. Prior to Glycomed, he co-founded and served as director of Perkin Elmer/Cetus Instruments, a joint venture for robotics automation and genomics research instruments and products later acquired by Perkin Elmer. Under Mr. Atwood's management, the venture developed and launched the GeneAmp® Polymerase Chain Reaction (PCR) system, the fundamental DNA amplification innovation responsible for fueling the explosive growth of genomics research. He currently serves as a board member at the private companies PhaseRx, Inc., Groove BioPharma, Inc., Acumen Diagnostics, and Atreca, Inc., as well as the public companies, Clovis Oncology, Inc. (NASDAQ: CLVS), FivePrime Therapeutics, Inc. (NASDAQ: FPRX), Veracyte, Inc. (NASDAQ: VCYT), and Immune Design Corp. (NASDAQ: IMDZ). Mr. Atwood had previously served on the board of Pharmion Corporation (sold to Celgene Corporation in 2008); Cadence Pharmaceuticals (acquired), Trius Therapeutics (acquired). Mr. Atwood received a B.S. in Biological Sciences from the University of California, Irvine; an M.S. from the University of California, Davis, and an M.B.A. from Harvard Business School. Mr. Atwood's extensive biotechnology, bioinformatics and investing experience, and his familiarity with privately held companies in our industry, position him to provide valuable insight and make substantial contributions to our Board and to our Audit Committee.

Timothy Howe has been a director of OpGen since July 2013. Mr. Howe is a co-founder of Collinson Howe Venture Partners, Inc. (CHVP), the predecessor firm to CHL Medical Partners, which manages $340 million in committed capital focused on early stage investing across the entire spectrum of healthcare. Prior to co-founding CHVP in 1990, Mr. Howe was a Partner at Schroder Ventures in the United States, responsible for co-managing several venture capital and private equity funds since joining Schroder Ventures in 1984. Mr. Howe has been an active investor and board member responsible for numerous private investments in the biotechnology, diagnostics, medical device and services areas, including Innotech, Inc. (sold to Johnson & Johnson), Camitro Corporation (sold to ArQule, Inc.), Medicus Insurance Holdings (sold to NORCAL Mutual), RxCentric, Inc. (sold to Allscripts, Inc.), Alexion Pharmaceuticals, Inc. (NASDAQ: ALXN), and still private companies Care Management Technologies, Inc., and Medmark Services, Inc. Mr. Howe is a graduate of Columbia College and the Columbia Graduate School of Business, where he has also been an Adjunct Assistant Professor since 1995, teaching venture capital management. The Board believes that Mr. Howe's qualifications, attributes and skills for service on our Board include his experience with venture-backed companies, his corporate governance experience and venture capital management experience.

Laurence R. McCarthy, Ph.D. has been a director of OpGen since July 2013. Dr. McCarthy joined Ampersand Capital Partners in 2007 as an Operating Partner and serves as Executive Chairman of Bako Pathology Services, and as a Director of Dynex and Magellan. He has served as Executive Chairman of Viracor-IBT, Executive Chairman of PrimeraDx, and as a member of the Board of Directors of Genoptix and ATS. As the President and CEO through 2004, and later as Chairman and Chief Technology Officer of Focus Diagnostics, Inc. (Focus), he built Focus from a $2 million business to a leading esoteric lab with over $80 million in revenues by the time of its acquisition by Quest Diagnostics Incorporated in 2006. Prior to Focus, Dr. McCarthy served in various positions at Boehringer Mannheim GmbH and Becton Dickinson & Co. He holds a Ph.D. in Microbiology from the University of New Hampshire and served on the faculties of Johns Hopkins, the University of North Carolina and Cornell University. Dr. McCarthy's greater than 40 years' experience in healthcare, his background in building and growing companies in biotechnology, microbiology, laboratory services and healthcare industries, his technical expertise in infectious disease, as well as his senior management experience, faculty positions and board service at diagnostic and infectious disease-focused companies and academic institutions allow him to play an integral role as a member of our Board. His experience in many biotechnology and life science companies gives him an understanding and appreciation of the many regulatory and developmental issues confronting diagnostic laboratory and biotechnology companies. Dr. McCarthy is not affiliated with any of our significant investors.

Misti Ushio, Ph.D. has been a director of OpGen since March 2012. Dr. Ushio is a Managing Director at Harris & Harris Group, Inc., or Harris & Harris. Prior to joining Harris & Harris in 2007, Dr. Ushio worked at Merck & Co. (NYSE: MRK) for over ten years in bioprocess research & development focused on vaccines and biologics, and was a Technology Licensing Officer at Columbia University. Dr. Ushio currently serves on the board of Accelerator-NYC, TARA Biosystems, AgBiome, Senova Systems, SynGlyco and ProMuc. Her past investments include BioVex Group, Inc. (acquired by Amgen Inc. (NASDAQ: AMGN)), TetraVitae (acquired by Eastman) and Ancora Pharmaceutrial (acquired by Corden Pharma). She also serves as founding CEO of TARA Biosystems. Dr. Ushio holds a B.S. in Chemical Engineering from Johns Hopkins University, an M.S. in Chemical Engineering from Lehigh University, and a Ph.D. in Biochemical Engineering from University College London. Dr. Ushio's board, management and operational leadership experience, her familiarity with both private and publicly traded companies in our industry and her scientific background make Dr. Ushio a valuable contributor to our Board and to our Compensation Committee, of which she is Chair.

The Company and the Company's preferred stock investors are parties to a Third Amended and Restated Voting Agreement, dated as of December 18, 2013, as amended, or the Voting Agreement, pursuant to which such preferred stock investors have agreed to vote their shares to elect to the board of directors one individual designated by each of Versant Ventures, CHL Medical Partners, Harris & Harris and jVen. Versant Ventures has designated Mr. Atwood, CHL Medical Partners has designated Mr. Howe, and Harris & Harris has designated Dr. Ushio. The Voting Agreement further provides that the preferred stock investors shall vote their shares to elect the Company's Chief Executive Officer to the board of directors.

No director, executive officer or control person of the Company has been involved in any legal proceeding listed in Item 401(f) of Regulation S-K in the past 10 years.

Clinical and Scientific Advisory Board

We leverage the expertise of our Clinical and Scientific Advisory Board to assist us in evaluation and strategic planning regarding the development and commercialization of our products and products in development. We also harness the clinical experience of our Clinical and Scientific Advisory Board members in the areas of MDROs, diagnosis and surveillance of antibiotic resistant organisms, and strategies for gaining acceptance among healthcare providers for our products.

Timothy J.R. Harris, Ph.D. is a science and business leader with over thirty-two years of experience guiding and leading laboratory work and scientists in a range of research areas. He is a molecular biologist and biochemist, and currently serves as the Senior Vice President for Translational Medicine and Technology at Biogen Idec Inc. (NASDAQ: BIIB). He was the Chief Technology Officer and Director of the Advanced Technology Program at SAIC-Frederick, Inc. in Maryland, which operates the National Cancer Institute's leading center for cancer and AIDS research (now Frederick National Laboratory operated by Leidos Biomedical Research, Inc.). He has served as President and Chief Executive Officer of Novasite Pharmaceuticals, Inc., and founded SGX Pharmaceuticals, Inc. (formerly Structural GenomiX Inc.) (SGX) in 1999, where he built the company to more than 130 employees, raised $85M in capital, and generated more than $20M in revenue during six years as CEO before it was sold to Eli Lilly. Before founding SGX, Dr. Harris was Senior Vice President, Research and Development at Axys Pharmaceuticals Inc. (formerly Sequana Therapeutics Inc.). He began his career working on animal viruses such as that causing foot-and-mouth disease and was one of the first molecular biologists at Celltech Ltd. (now UCB Pharma S.A.) in the United Kingdom. He subsequently spent five years at Glaxo Group Research Ltd. as Director of Biotechnology from 1989 to 1993. Dr. Harris received a Ph.D. and M.S. in General Virology and a B.Sc. in Biochemistry from the University of Birmingham in England and has an honorary doctorate (D.Sc.) from the University of Birmingham, UK awarded in July 2010.

Attila Lorincz, Ph.D. is Director of the Molecular Epidemiology Laboratory at the Wolfson Institute of Preventive Medicine where his research interests include the epigenomics of prostate, breast and cervical cancers. Recently his team has developed a set of new diagnostic and prognostic cancer biomarkers based on DNA methylation assays. He is leading a new discovery initiative in next-generation deep sequencing and in elucidating the comparative epigenomic systems of human cancers. While a research fellow at the University of California, Santa Barbara, he was the first to report that yeast cdc28 is a protein kinase and the prototype of the human cell cycle cdk genes. His human papillomavirus studies began in collaboration with Nobel Laureate Harald zurHausen and this work produced clones of many novel carcinogenic HPV types. In 1990, Dr. Lorincz co-founded Digene Corp. (now QIAGEN Inc.) as Chief Scientific Officer. His research led to the Hybrid Capture (HC) series of tests. HC2 was the first HPV test to be FDA-approved for cervical pre-cancer screening and is widely regarded as the international reference standard. His subsequent research work includes the development of a simple robust HPV test for resource-limited regions and a randomized clinical trial to validate self-sampling as an efficient screening approach to prevent cervical cancer. Dr. Lorincz has written more than 240 peer-reviewed papers and is an inventor on 45 patents related to diagnostic and prognostic testing. He was the recipient of several prestigious prizes including the 1994 American Venereal Disease Association Achievement Award and THE TIMES Award 2012 for UK research project of the year. Currently he serves as the Editor-in-Chief of Expert Reviews in Molecular Diagnostics. Dr. Lorincz received a doctorate in genetics from Trinity College, University of Dublin, Ireland.

Laurence R. McCarthy, Ph.D. – see Dr. McCarthy's biography above .

James W. Snyder, Ph.D., D(ABMM), F(AAM) is the Chief of Microbiology at the University of Louisville Hospital, and Professor of Pathology, Department of Pathology, Division of Laboratory Medicine at the University of Louisville School of Medicine. He is the recipient of the 2009 American Society for Microbiology (ASM) TREK Diagnostic ABMM/ABMLI Professional Recognition Award, for outstanding contributions to the professional recognition of clinical microbiologists and/or immunologists. He authored the ASM Cumitech publication, "Laboratory Safety, Management, and Diagnosis of Biological Agents Associated with Bioterrorism," in 2000, and the American Academy of Microbiology colloquium report, "Bioterrorism Threats to our Future." He is a charter member of the Laboratory Response Network (LRN) that was created by the Centers for Disease Control and Prevention (CDC), the Association of Public Health Laboratories (APHL), and the Federal Bureau of Investigation (FBI), to prepare the laboratory for bioterrorism events and emerging infectious diseases. His research interests include product and instrument evaluation, *in vitro* activity of new antibiotics, fungal physiology, molecular diagnostics, and ophthalmic infections and effectiveness of antibiotics. Dr. Snyder received his Ph.D. from the University of Dayton. He is a Fellow of the American Academy of Microbiology and a Colonel in the U.S. Army Reserves. The University of Louisville Hospital is one of the acute care hospitals that participated in our Partner-Pilot Program in 2014.

Richard P. Wenzel, M.D., M.Sc. is a professor and former chairman of the Department of Internal Medicine at Virginia Commonwealth University School of Medicine. In 2014, he received the International Federation of Infection Control's Martin S. Favero Award for lifetime achievements and significant contributions made to the field of infection prevention and control worldwide. Considered to be one of the founders of hospital epidemiology, his writings and the individuals who trained under him have had a profound impact on infection control and prevention across the globe. He has authored more than 500 scientific publications and six textbooks. He is also the first editor-at-large of The New England Journal of Medicine and the founding editor of the journals Infection Control and Hospital Epidemiology and Clinical Performance and Quality Health Care. He is a member of the American Society of Clinical Investigation (ASCI), the Association of American Physicians (AAP) and a charter member of the Surgical Infections Society. Dr. Wenzel is a former president of the Society of Healthcare Epidemiology of America (SHEA) and former councilor of the Infectious Diseases Society of America (IDSA). In March 2004, he was named President-Elect (2004-06) of the International Society for Infectious Diseases, and in 2006-08 he was the President. From 2003 to 2008, he served as President of MCV Physicians, the clinical practice plan for more than 600 physicians. Dr. Wenzel was educated at Jefferson Medical College (Thomas Jefferson University) in Philadelphia and at London University, London School of Hygiene and Tropical Medicine (Epidemiology).

Board Leadership Structure and Board's Role in Risk Oversight

Our board of directors oversees the management of risks inherent in the operation of our business and the implementation of our business strategies. Our board of directors performs this oversight role by using several different levels of review. In connection with its reviews of the operations and corporate functions of our Company, our board of directors addresses the principal risks associated with those operations and corporate functions. In addition, our board of directors reviews the risks associated with our Company's business strategies periodically throughout the year as part of its consideration of undertaking any such business strategies.

Each of our board committees also oversees the management of our risk that falls within the committee's areas of responsibility. In performing this function, each committee has full access to management, as well as the ability to engage advisors. Our Chief Financial Officer is responsible for identifying, evaluating and implementing risk management controls and methodologies to address any identified risks and reporting the same to the audit committee. In connection with its risk management role, our audit committee meets privately with representatives from our independent registered public accounting firm, and privately with our Chief Financial Officer. The audit committee oversees the operation of our risk management program, including the identification of the principal risks associated with our business and periodic updates to such risks, and reports to our board of directors regarding these activities.

Board Committees

Our board of directors has established an audit committee and a compensation committee, each of which operates pursuant to a separate charter adopted by our board of directors. The composition and functioning of all of our committees will comply with all applicable requirements of the Sarbanes-Oxley Act of 2002, the NASDAQ Stock Market and the SEC rules and regulations.

Audit Committee

Brian Atwood, Timothy Howe, Laurence McCarthy and Misti Ushio currently serve on the audit committee, which is chaired by Brian Atwood. Our board of directors has determined that each member of the audit committee is "independent" and "financially literate" for audit committee purposes as such terms are defined in the rules of the SEC and the applicable NASDAQ Stock Market rules. No Audit Committee member is currently identified as an "audit committee financial expert" as defined in the rules of the SEC. The audit committee's responsibilities include:

- appointing, approving the compensation of, and assessing the independence of our independent registered public accounting firm;
- approving auditing and permissible non-audit services, and the terms of such services, to be provided by our independent registered public accounting firm;
- reviewing the audit plan with the independent registered public accounting firm and members of management responsible for preparing our financial statements;
- reviewing and discussing with management and the independent registered public accounting firm our annual and quarterly financial statements and related disclosures as well as critical accounting policies and practices used by us;
- reviewing the adequacy of our internal control over financial reporting;
- establishing policies and procedures for the receipt and retention of accounting-related complaints and concerns;
- reviewing the Company's periodic reports to be filed with the SEC;
- recommending, based upon the audit committee's review and discussions with management and the independent registered public accounting firm, whether our audited financial statements shall be included in our Annual Report on Form 10-K;
- monitoring the integrity of our financial statements and our compliance with legal and regulatory requirements as they relate to our financial statements and accounting matters;
- preparing the audit committee report required by SEC rules to be included in our annual proxy statement;
- overseeing our compliance with applicable legal and regulatory requirements;
- reviewing all related person transactions for potential conflict of interest situations and approving all such transactions; and
- reviewing quarterly earnings releases.

Compensation Committee

Misti Ushio, Timothy Howe, Laurence McCarthy, and Evan Jones currently serve on the compensation committee, which is chaired by Misti Ushio. Under NASDAQ Stock Market rules, we are permitted to phase in our compliance with the independent compensation committee requirements set forth in NASDAQ Marketplace Rule 5605(d). Our board of directors has determined that each of its members is "independent" as that term is defined in the applicable NASDAQ Stock Market rules, except for Evan Jones who is our Chief Executive Officer. We anticipate that Mr. Jones will not remain on the compensation committee upon the closing of the offering contemplated by this prospectus. The compensation committee's responsibilities include:

- annually reviewing and recommending to our board of directors corporate goals and objectives, and determination of the achievement thereof, relevant to the compensation of our Chief Executive Officer and other executive officers;

- evaluating the performance of our Chief Executive Officer in light of such corporate goals and objectives and recommending to our board of directors the compensation of our Chief Executive Officer;

- determining, or reviewing and recommending to our board of directors for approval, the compensation of our other executive officers;

- reviewing and establishing our overall management compensation philosophy and policy;

- overseeing and administering our compensation and similar plans;

- evaluating and assessing potential current compensation advisors in accordance with the independence standards identified in the applicable NASDAQ Stock Market rules;

- retaining and approving the compensation of any compensation advisors;

- reviewing and approving, or reviewing and recommending to our board of directors for approval, our policies and procedures for the grant of equity-based awards;

- determining or reviewing and making recommendations to our board of directors with respect to director compensation;

- preparing the compensation committee report required by SEC rules to be included in our annual proxy statement;

- reviewing and discussing with management the compensation discussion and analysis to be included in our annual proxy statement or Annual Report on Form 10-K; and

- reviewing and discussing with our board of directors corporate succession plans for the Chief Executive Officer and other key officers.

Compensation Committee Interlocks and Insider Participation

None of the members of our compensation committee has at any time during the prior three years been one of our officers or employees. None of our executive officers currently serves, or in the past fiscal year has served, as a member of the board of directors or compensation committee of any entity that has one or more executive officers serving on our board of directors or compensation committee.

Corporate Governance

We have adopted a written code of business conduct and ethics that applies to our directors, officers and employees, including our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions. A current copy of the code is posted on the Corporate Governance section of our website, which is located at www.opgen.com. If we make any substantive amendments to, or grant any waivers from, the code of business conduct and ethics for any officer, we will disclose the nature of such amendment or waiver on our website or in a current report on Form 8-K.

Limitation of Liability

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to our directors, officers, or controlling persons, we have been informed that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

Compensation Tables

Summary Compensation Table—2014 and 2013

The following table presents information regarding the total compensation awarded to, earned by, and paid during the years ended December 31, 2014 and December 31, 2013 to our chief executive officer and the two most highly-compensated executive officers (other than the chief executive officer) who were serving as executive officers at the end of the year ended December 31, 2014. These individuals are our named executive officers for 2014.

Name and Principal Position	Year	Salary	Bonus	Stock Awards	Option Awards (1)	NonEquity Incentive Plan Compensation	All Other Compensation	Total
Evan Jones	2014	$ 95,000	—	$ 6,532 (2)	$ 74,698	$ —	$ —	$ 176,230
President and Chief Executive Officer (2)	2013	$ 12,500	—	$ —	$ —	$ —	$ —	$ 12,500
C. Eric Winzer,	2014	$ 260,000	—	$ —	$ 36,967	$ —	$ —	$ 296,967
Executive Vice President, Chief Financial Officer (3)	2013	$ 260,000	—	$ 21,667 (3)	$ 6,235	$ —	$ 1,600 (4)	$ 289,502
Vadim Sapiro,	2014	$ 237,260	—	$ —	$ 17,523	$ —	$ —	$ 254,783
Chief Information Officer (3)	2013	$ 232,740	—	$ 19,583 (3)	$ 4,530	$ —	$ 1,446 (4)	$ 258,299

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(1) Reflects the aggregate grant date fair value computed in accordance with FASB ASC Topic 718. Assumptions made in the calculation of these amounts are described in Note 8 to the Company's audited consolidated financial statements, included in this prospectus.

(2) Mr. Jones has served as our President, Chief Executive Officer and Chair of the Board since October 25, 2013. Previously he served as Executive Chair of the board of directors from September 2011 to October 2013. During the first quarter of 2013, he received compensation for serving as our Executive Chair. When he assumed the role of Chief Executive Officer, he agreed to receive base compensation for all of his positions through the issuance of restricted stock units, in lieu of cash salary, for the period from October 25, 2013 to June 30, 2014. The restricted stock units were issued to him in March 2014 and vested on October 24, 2014. In addition, in 2014, Mr. Jones was awarded stock options to acquire 374,235 shares of common stock.

(3) Represents restricted preferred stock units awarded to each of Mr. Winzer and Mr. Sapiro as compensation for revising his change in control and severance arrangement in November 2013. Mr. Winzer and Mr. Sapiro each relinquished his award of restricted preferred stock units in December 2014.

(4) Represents a 401(k) match for the periods indicated.

Employment Agreements with Our Named Executive Officers

We have entered into an employment agreement with each of our named executive officers. These employment agreements provide for "at will" employment.

Evan Jones – On March 3, 2014, we entered into an amended and restated employment agreement with Evan Jones, our President and Chief Executive Officer. The agreement provides that Mr. Jones will serve as our President and Chief Executive Officer at the equivalent of seventy percent (70%) of a full-time commitment. His initial base salary of $190,000 reflected that pro rata adjustment. When he assumed the role of Chief Executive Officer, he agreed to receive base compensation for all of his positions through the issuance of restricted stock units, in lieu of cash salary, for the period from October 25, 2013 to June 30, 2014. Mr. Jones receives annual bonus opportunities based on performance goals determined by our board, with a maximum target of thirty-five percent (35%) of annual base salary. Mr. Jones agreed to accept, in lieu of payment of his base salary in cash, restricted stock units to acquire shares of the Company's common stock as compensation for his services from October 25, 2013 until June 30, 2014. In addition, Mr. Jones received an award of stock options to acquire three and one-half percent (3.5%) of the fully diluted equity of the Company following the closing of the 2014 Series A Convertible Preferred Stock offering, completed in February, April and May 2014. Under the agreement, Mr. Jones waived his rights to participate in any fringe benefit plans offered to the Company's employees, except for participation in the Company's 401(k) plan. Our agreement with Mr. Jones also includes standard confidentiality, general release and other provisions.

C. Eric Winzer and *Vadim Sapiro* – On January 19, 2011 and December 19, 2011, respectively, we entered into an executive change in control and severance benefits agreement with each of Eric Winzer, our Chief Financial Officer, and Vadim Sapiro, our Chief Information Officer, respectively, each, an Executive. Each agreement was amended on November 1, 2013. Under each agreement, as amended, upon any termination of the employment of the Executive without "cause" that constitutes a "separation from service" under Section 409A of the Internal Revenue Code, the Executive will receive severance compensation equal to his base salary at the time of termination for six months. Each agreement provided for the acceleration, in whole or in part, of stock option awards made to the Executive prior to December 31, 2011 in the event of a change in control or termination in connection with a change in control, however all such stock options are fully vested as of the date of this prospectus. In addition, the Executive can terminate his agreement for "good reason" within 12 months after a change in control and be entitled to his severance payments. Each agreement, as amended, continues in full force and effect unless and until the Company terminates the agreement by providing the Executive with 60 days prior written notice. Each agreement, as amended, includes standard confidentiality, general release and other provisions.

Definitions

For purposes of the employment and severance agreements, the following terms have the following meanings (where applicable):

- "cause" means mean: (i) the executive's commission of a felony; (ii) any act or omission of executive constituting dishonesty, fraud, immoral or disreputable conduct that causes material harm to the Company; (iii) executive's violation of Company policy that causes material harm to the Company; (iv) executive's material breach of any written agreement between the executive and the Company which, if curable, remains uncured after notice; or (v) executive's breach of fiduciary duty. The termination of executive's employment as a result of the death or disability is not deemed to be a termination without cause.

- "change in control" means (a) a merger or consolidation in which (i) the Company is a constituent party, or (ii) a subsidiary of the Company is a constituent party and the Company issues shares of its capital stock pursuant to such merger or consolidation, except any such merger or consolidation involving the Company or a subsidiary in which the shares of capital stock of the Company outstanding immediately prior to such merger or consolidation continue to represent, or are converted into or exchanged for shares of capital stock that represent, immediately following such merger or consolidation, at least a majority, by voting power, of the capital stock of (1) the surviving or resulting corporation or (2) if the surviving or resulting corporation is a wholly owned subsidiary of another corporation immediately following such merger or consolidation, the parent corporation of such surviving or resulting corporation (taking into account all equity on a fully diluted and converted basis); or (b) the sale, lease, transfer, exclusive license or other disposition, in a single transaction or series of related transactions, by the Company or any subsidiary of the Company of all or substantially all the assets of the Company and its subsidiaries taken as a whole, or the sale or disposition (whether by merger or otherwise) of one or more subsidiaries of the Company if substantially all of the assets of the Company and its subsidiaries taken as a whole are held by such subsidiary or subsidiaries, except where such sale, lease, transfer, exclusive license or other disposition is to a wholly owned subsidiary of the Company; provided that to the extent necessary for compliance with Section 409A of the Internal Revenue Code, no transaction will be a Change in Control for these purposes unless such transaction is also a change in the ownership or effective control of the Company, or a change in the ownership of a substantial portion of the Company's assets as described in Treasury Regulation Section 1.409A-3(i)(5).

· "good reason" means any of the following, without the executive's consent: (i) material diminution of executive's responsibilities or duties (provided that the acquisition of the Company and subsequent conversion of the Company to a division or unit of the acquiring company will not by itself be deemed to be a diminution of executive's responsibilities or duties); (ii) material reduction in the level of executive's base salary (and any such reduction will be ignored in determining executive's base salary for purposes of calculating the amount of severance pay); (iii) relocation of the office at which executive is principally based to a location that is more than fifty (50) miles from the location at which executive performed his or her duties immediately prior to the effective date of a Change in Control; (iv) failure of a successor in a Change in Control to assume the agreement; or (v) the Company's material breach of any written agreement between executive and the Company. Notwithstanding the foregoing, any actions taken by the Company to accommodate a disability of executive or pursuant to the Family and Medical Leave Act shall not be a good reason for purposes of the agreement. Additionally, before executive may terminate employment for a good reason, executive must notify the Company in writing within thirty (30) days after the initial occurrence of the event, condition or conduct giving rise to good reason, the Company must fail to remedy or cure the alleged good reason within the thirty (30) day period after receipt of such notice if capable of being cured within such thirty-day period, and, if the Company does not cure the good reason (or it is incapable of being cured within such thirty-day period), then executive must terminate employment by no later than thirty (30) days after the expiration of the last day of the cure period (or, if the event condition or conduct is not capable of being cured within such thirty-day period, within thirty (30) days after initial notice to the Company of the violation). Transferring executive's employment to a successor is not itself good reason to terminate employment under the agreement, provided, however, that subparagraphs (i) through (v) above shall continue to apply to executive's employment by the successor. This definition is intended to constitute a "substantial risk of forfeiture" as defined under Treasury Regulation 1.409A-1(d).

Outstanding Equity Awards at Fiscal Year-End Table—2014

The following table summarizes, for each of the named executive officers, the number of shares of common stock underlying outstanding stock options held as of December 31, 2014. On December 18, 2013, we effected a 1 for 790.5407 reverse stock split of our common stock. All references in this table have been adjusted to reflect such reverse stock split.

OUTSTANDING EQUITY AWARDS AT FISCAL YEAR-END 2014

	OPTION AWARDS					STOCK AWARDS			
Name	(1) Number of Securities Underlying Unexercised Options Exercisable	(1) Number of Securities Underlying Unexercised Options Unexercisable	Equity Incentive Plan Awards: Number of Securities Underlying Unexercised Unearned Options	(2) Option Exercise Price ($)	Option Expiration Date	Number of Shares of Stock that have not Vested	Market Value of Shares of Stock that have not Vested ($)	Equity Incentive Plan Awards: Number of Unearned Shares, Units or Other Rights that have not Vested	Equity Incentive Plan Awards: Market or Payout Value of Unearned Shares, Units or other Rights that have not Vested
Evan Jones	89	—	—	79.05	07/23/2018	—	—	—	—
(3)	1,847	—	—	110.68	09/21/2020	—	—	—	—
	—	174,235	—	0.05	04/24/2024	—	—	—	—
	—	200,000	—	0.61	10/23/2024	—	—	—	—
C. Eric Winzer	253	—	—	79.05	06/15/2019	—	—	—	—
(4)	190	—	—	79.05	04/15/2020	—	—	—	—
	137	—	—	110.68	02/15/2021	—	—	—	—
	318	30	—	110.68	02/15/2021	—	—	—	—
	278	134	—	7.91	03/23/2022	—	—	—	—
	191	252	—	7.91	02/12/2023	—	—	—	—
	296	653	—	7.91	07/25/2023	—	—	—	—
	3,338	10,014	—	0.05	04/24/2024	—	—	—	—
	—	105,000	—	0.61	10/23/2024	—	—	—	—
Vadim Sapiro	64	—	—	7.91	03/23/2022	—	—	—	—
(5)	628	290	—	7.91	03/23/2022	—	—	—	—
	108	145	—	7.91	02/12/2023	—	—	—	—
	127	—	—	7.91	02/12/2023	—	—	—	—
	197	436	—	7.91	07/25/2023	—	—	—	—
	897	2,692	—	0.05	04/24/2024	—	—	—	—
	—	50,000	—	0.61	10/23/2024	—	—	—	—

(1) The standard vesting schedule for all stock option grants is vesting over four years with twenty-five percent (25%) vesting on the first anniversary of the date of grant and six and one-quarter percent (6.25%) vesting on the last day of the next whole fiscal quarter over three years.

(2) On October 23, 2014, the Board of Directors granted stock options, establishing all terms, including the exercise price (the fair market value determined as of the date of grant). The determination of the exercise price was subject to finalization upon receipt of a third party valuation report. The Board approved the report and the fair market value determination after December 31, 2014.

(3) The stock option awards made to Mr. Jones have the vesting schedule set forth in footnote (1) and were awarded on July 23, 2008 (89 shares), February 15, 2011 (1,847 shares), April 24, 2014 (174,235 shares) and October 23, 2014 (200,000 shares).

(4) The stock option awards made to Mr. Winzer have the vesting schedule set forth in footnote (1), except as described below, and were awarded on June 15, 2009 (253 shares), April 15, 2010 (190 shares), February 15, 2011 (two awards, 137 and 348 shares, respectively), March 23, 2012 (412 shares), February 12, 2013 (443 shares), July 25, 2013 (949 shares), April 24, 2014 (13,352 shares) and October 23, 2014 (105,000 shares). The stock options award made to Mr. Winzer on April 24, 2014 had its vesting commence on December 31, 2013.

(5) The stock option awards made to Mr. Sapiro have the vesting schedule set forth in footnote (1), except as described below, and were awarded on March 23, 2012 (two awards, 64 and 918 shares, respectively), February 12, 2013 (two awards, 253 shares and 127 shares, respectively), July 25, 2013 (633 shares), April 24, 2014 (3,589 shares) and October 23, 2014 (50,000 shares). The stock options award made to Mr. Sapiro on April 24, 2014 had its vesting commence on December 31, 2013.

Director Compensation

The following table presents the total compensation for each person who served as a member of our board of directors during 2014, other than Mr. Jones. Other than as set forth in the table and described more fully below, we did not pay any compensation, make any equity awards or non-equity awards to, or pay any other compensation to any of the non-employee members of our board of directors in 2014. Compensation paid to Mr. Jones, who is also our President and Chief Executive Officer, is described above under "Summary Compensation Table—2014 and 2013." The board of directors intends to approve a director compensation policy to be effective following the consummation of this offering.

Director Compensation

Name	Fees Earned or Paid in Cash	Stock Awards	Option Awards ($)	Non-Equity Incentive Plan Compensation	Nonqualified Deferred Compensation Earnings	All Other Compensation	Total($)
Brian G. Atwood	—	—	—	—	—	—	—
Timothy Howe	—	—	—	—	—	—	—
Laurence R. McCarthy, Ph.D.	$ 25,000	—	$ 5,658	—	—	—	$ 30,658
Misti Ushio, Ph.D.	—	—	—	—	—	—	—

(1) In addition to serving on our board of directors, Dr. McCarthy serves on our Clinical and Scientific Advisory Board. Pursuant to his consulting agreement, he receives compensation of $10,000 per year for service on our Scientific Advisory Board. On April 24, 2014, Dr. McCarthy received a grant of stock options to acquire 15,001 shares of common stock. Under his consulting agreement, we awarded him stock options sufficient to maintain his ownership of our capital stock at 0.33% on a fully diluted basis. The option value was $432, the exercise price was $0.05 per share and the options will vest in December 2017. On October 23, 2014, Dr. McCarthy received a stock option to acquire 15,000 shares of common stock. The option value was $5,226, the exercise price was $0.61 per share and the options will vest in December 2018. In addition, as of the date of this prospectus, Dr. McCarthy holds stock options to acquire an aggregate of 31,610 shares of our common stock.

Compensation Risk Assessment

We believe that although a portion of the compensation provided to our executive officers and other employees is performance-based, our executive compensation program does not encourage excessive or unnecessary risk taking. This is primarily due to the fact that our compensation programs are designed to encourage our executive officers and other employees to recognize and support both short-term and long-term strategic goals, in particular in connection with our pay-for-performance compensation philosophy. As a result, we do not believe that our compensation programs are reasonably likely to have a material adverse effect on us.

Employee Incentive Plans

2008 Plan

Our 2008 Plan was approved by our board of directors and stockholders in April 2008; subsequent increases in the number of shares available for awards under the 2008 Plan were approved by our board and stockholders in January 2009, February 2011, March 2012, December 2012, April 2014 and October 2014. A total of 1,447,791 shares of our common stock are reserved for issuance under the 2008 Stock Option Plan. As of December 31, 2014, 1,230,772 of these shares were subject to outstanding option awards and 217,019 of these shares remain available for future issuance.

The compensation committee of our board of directors administers the 2008 Plan. Subject to the terms of the 2008 Plan, the committee has the discretionary authority to interpret the 2008 Plan; determine eligibility for and grant awards; determine, modify or waive the terms and conditions of any award; prescribe forms, rules and procedures; and otherwise do all things necessary to carry out the purposes of the 2008 Plan. Awards under the 2008 Plan may be granted to key employees of, consultants to and advisors to the Company or its affiliates. Awards may also be made to members of our board of directors.

The 2008 Plan provides for the grant of stock options and restricted stock awards. The committee determines the time or times at which a stock option will vest or become exercisable and the terms on which such option will remain exercisable. The committee determines the conditions and restrictions and purchase price, if any, for grants or sales or restricted stock to plan participants. The committee may also at any time accelerate the vesting or exercisability of an award.

Under the 2008 Plan, in the event of any dissolution or liquidation of the Company, the sale of all or substantially all of the Company's assets, or the merger or consolidation of the Company where the Company is not the surviving entity or which results in the acquisition of all or substantially all of the Company's then outstanding common stock, the committee may: (a) provide for the assumption or substitution of some or all of the outstanding awards; (b) provide for a cash-out payment; or (c) in the case there is no assumption, substitution or cash-out, provide that all awards not exercised or awards providing for the future delivery of common stock will terminate upon the closing of the transaction.

The committee may amend the 2008 Plan or any outstanding award at any time for any purpose permitted by law, and may at any time terminate the 2008 Plan as to any future grants of awards; provided, that otherwise expressly provided in the 2008 Plan, no amendment may impair the rights of a participant without the affected participant's consent unless the committee expressly reserved the right to do so at the time of an award.

Bonus Plan

The board of directors approves a cash-based incentive compensation bonus plan for management within the first 90 days of each fiscal year. The Board, upon the recommendations of management, selects Company-specific performance goals that must be achieved in order for such bonuses to be payable. In 2013, the incentive compensation bonus plan consisted of time-specific performance goals related to the sale of Argus Systems and MapIt Services, establishment of a clinical laboratory meeting CLIA lab requirements, entry into collaboration arrangements with third parties and initial development of our MDRO assays and bioinformatics capabilities. The board of directors determined that the performance goals for 2013 were not achieved, therefore no named executive officer received a bonus for 2013. In 2014, the incentive compensation bonus plan consisted of time-specific performance goals related to the early commercialization of the Acuitas MDRO Gene Test, achieving program development milestones under the collaboration with Hitachi and financial performance goals, including fundraising. The board of directors has not yet determined whether the performance goals for 2014 were achieved, in whole or in part.

401(k) Plan

We maintain a tax-qualified retirement plan that provides eligible employees with an opportunity to save for retirement on a tax-advantaged basis. All participants' interests in their contributions are 100% vested when contributed. Pre-tax contributions are allocated to each participant's individual account and are then invested in selected investment alternatives according to the participants' directions. Until April 2013, the Company made discretionary matching contributions to the 401(k) plan. In April 2013, the Company match was discontinued. The retirement plan is intended to qualify under Section 401(a) of the Code.

CERTAIN RELATIONSHIPS AND RELATED PERSON TRANSACTIONS

Other than compensation arrangements, we describe below the transactions and series of similar transactions, during our last three fiscal years, to which we were a party or will be a party, in which:

- the amounts involved exceeded or will exceed the lesser of $120,000 or one percent of the average of the Company's total assets at year end for the past two completed fiscal years; and

- any of our directors, executive officers or holders of more than 5% of our capital stock, or any member of the immediate family of the foregoing persons, had or will have a direct or indirect material interest.

Compensation arrangements for our directors and named executive officers are described elsewhere in this prospectus.

Contractual Relationships

In December 2013, we purchased a BioMark HD DNA detection system and related instruments from Fluidigm for a purchase price of $221,000. In March 2014, we entered into a supply agreement with Fluidigm under which Fluidigm supplies us with its microfluidic test platform for use in manufacturing our Acuitas MDRO Gene Test. The supply agreement terminates in March 2015. Evan Jones, our Chief Executive Officer and Chair of the Board, is a director of Fluidigm. The approximate dollar value of the amount involved in the transaction with Fluidigm under the supply agreement during 2014 was $121,000. We believe that our transactions with Fluidigm were on commercially reasonable terms no less favorable to us than could have been obtained from unaffiliated third parties. The terms of our transactions with Fluidigm have been ratified and approved by the Board, without the participation of Mr. Jones. We intend that any future transactions with Fluidigm will be approved by the Board without the participation of Mr. Jones. Mr. Jones has no direct or indirect financial or pecuniary interest in these ordinary course business transactions between OpGen and Fluidigm.

Sales and Purchases of Securities

In February 2011, as part of a continuation of an offering that began in 2010, the Company sold 7,042,253 shares of its Series B Convertible Preferred Stock, or Prior Series B Preferred Stock, to existing and new investors at a purchase price of $0.355 per share. Investors participating in the February 2011 offering included affiliates of Evan Jones and Brian Atwood, who were, at the time, members of the Company's board of directors.

In November and December 2011, the Company issued convertible notes in an aggregate principal amount of $2,132,651 and related warrants to purchase common stock to existing investors. Investors participating in the offering included affiliates of Evan Jones and Brian Atwood, each of whom was at the time a member of the Company's board of directors.

In March, April, October and December 2012, the Company sold an aggregate of 126,802,946 shares of its Series C Convertible Preferred Stock, or Prior Series C Preferred Stock, to existing and new investors at a purchase price of $0.138 per share. Investors participating in the offering included affiliates of Evan Jones, Misti Ushio and Brian Atwood, each of whom was at the time a member of the Company's board of directors.

In December 2013, the Company effected a recapitalization whereby all of the then existing preferred stock was converted into common stock, all accrued and unpaid cumulative dividends on prior series of preferred stock were cancelled, and a 1 for 790.5407 reverse stock split was effected on all outstanding shares of common stock. In connection with the recapitalization, the Company issued to existing investors convertible notes in an aggregate principal amount of $2,000,000 that were convertible into new Series A Preferred Stock. Investors participating in the offering included affiliates of Evan Jones, Brian Atwood, Tim Howe and Misti Ushio, each of whom was at the time a member of the Company's board of directors. These convertible notes were converted into shares of Series A Preferred Stock by all of the investors in December 2013.

In February and April 2014, the Company sold 2,000,000 shares of its Series A Preferred Stock to existing investors at a purchase price of $1.00 per share. Investors participating in the offering included affiliates of Evan Jones, Brian Atwood, Misti Ushio and Timothy Howe, each of whom was at the time a member of the Company's board of directors.

In July, August and September 2014, the Company issued to existing investors convertible notes in an aggregate principal amount of $1,500,000 that are convertible into Series A Preferred Stock. Investors participating in the offering included affiliates of Evan Jones, Brian Atwood and Misti Ushio, each of whom was at the time a member of the Company's board of directors.

In October 2014, the board of directors authorized the Company to raise bridge funding up to an aggregate of $2.0 million pursuant to the issuance and sale of secured demand notes to existing investors. There was no firm commitment on the part of any investor to participate in such bridge funding. The secured demand notes each have a term of up to four months. The Company drew down an aggregate of $1.8 million of such bridge funding between October 2014 and January 2015. Investors participating in the bridge funding included an affiliate of Evan Jones (subscribed for $1.0 million of the demand notes), affiliates of Brian Atwood (subscribed for $0.2 million of the demand notes) and an affiliate of Misti Ushio (subscribed for $0.55 million of the demand notes) each of whom was at the time a member of the Company's board of directors.

In February 2015, the Company issued to existing investors $1.2 million principal amount of convertible notes, or 2015 convertible notes, that are convertible into shares of either common stock or Series A Preferred Stock, depending on whether the public offering contemplated by this prospectus is consummated by June 30, 2015. The 2015 convertible notes were issued pursuant to a Notes Purchase Agreement, dated as of February 11, 2015. Following the initial closing, the Company offered an additional $0.3 million principal of 2015 convertible notes, on the same terms, as a participation offering to existing investors in the Company who are party to the Company's Third Amended and Restated Investors' Rights Agreement, as amended. The 2015 convertible note holders were, or will, also be issued an aggregate of 225,013 warrants, exercisable for shares of common stock at 110% of the initial public offering price and exercisable only if the offering contemplated by this prospectus is consummated. There was no firm commitment on the part of any investor to participate in the 2015 convertible notes offering. In this prospectus all references to the shares of common stock underlying the 2015 convertible notes and warrants assume full participation by the existing investors participating in the offering. Investors participating in the offering included affiliates of Evan Jones (subscribed for approximately $0.54 million, including tendering the $0.3 million demand note issued in January 2015), Brian Atwood (subscribed for approximately $0.4 million) and Misti Ushio (subscribed for approximately $0.2 million), each of whom was at the time a member of the Company's board of directors.

Holders of our Series A Preferred Stock and convertible notes are entitled to certain registration rights following this offering with respect to the common stock issued or issuable upon conversion of the Series A Preferred Stock and convertible notes, respectively, which conversion will occur automatically upon the closing of this offering if the offering meets the "QPO" definition in our charter. See "Description of Capital Stock–Investor Rights Agreement" for additional information.

Consulting Arrangements

Dr. McCarthy, in addition to serving on our board of directors, provides consulting services as a member of our Clinical and Scientific Advisory Board. Pursuant to a July 2013 agreement between Dr. McCarthy and the Company, Dr. McCarthy advises the Company in the areas of Whole Genome Mapping, DNA sequence analysis and the Company's surveillance and diagnostic products for hospital acquired infections. Dr. McCarthy's term on the Clinical and Scientific Advisory Board is for one (1) year, commencing on July 1, 2013, and automatically renews for additional one-year periods unless written notice of termination is provided by either party at least forty-five (45) days prior to the termination date. In consideration for such services, we pay Dr. McCarthy an annual fee of $10,000, payable in equal quarterly installments of $2,500 on the last day of each calendar quarter for his service on the Clinical and Scientific Advisory Board and $25,000 annually for his service on our board of directors. Under this agreement, Dr. McCarthy earned $35,000 during the year ended December 31, 2014.

Indemnification Agreements

We have entered into agreements to indemnify our directors and executive officers to the maximum extent allowed under Delaware law. Subject to the provisions of these agreements, these agreements, among other things, provide for indemnification of these individuals for certain expenses (including attorneys' fees), judgments, fines and settlement amounts reasonably incurred by such person in any action or proceeding, including any action by or in our right, on account of any services undertaken by such person on behalf of us or that person's status as a member of our board of directors.

Policies for Approval of Related Person Transactions

We have adopted a written policy that transactions with directors, officers and holders of 5% or more of our voting securities and their affiliates, each, a related person, must be approved by our Audit Committee.

PRINCIPAL STOCKHOLDERS

The following table and footnotes set forth certain information known to us regarding beneficial ownership of our capital stock as of February 18, 2015, as adjusted to reflect the sale of common stock offered by us in this offering, for:

- each person known by us to be the beneficial owner of more than 5% of our capital stock;
- our named executive officers;
- each of our directors; and
- all executive officers and directors as a group.

Beneficial ownership is determined in accordance with the rules of the SEC and generally includes voting or investment power with respect to securities. Except as noted by footnote, and subject to community property laws where applicable, we believe based on the information provided to us that the persons and entities named in the table below have sole voting and investment power with respect to all common stock shown as beneficially owned by them.

On December 18, 2013, we effected a 1 for 790.5407 reverse stock split of our common stock. All references below to shares, stock options and warrants outstanding have been adjusted to reflect such reverse stock split. The table lists applicable percentage ownership based on 7,237,346 shares of common stock outstanding as of February 18, 2015 and also lists applicable percentage ownership based on shares of common stock assumed to be outstanding after the closing of this offering and assuming no exercise of the underwriters' over-allotment option. Options and warrants to purchase shares of common stock that are exercisable within 60 days of February 18, 2015 are deemed to be beneficially owned by the persons holding these options for the purpose of computing percentage ownership of that person, but are not treated as outstanding for the purpose of computing any other person's ownership percentage.

Name and Address of Beneficial Owner[1]	Number of Shares Beneficially Owned	Percentage of Outstanding Common Stock	
		Before Offering	After Offering
5% Stockholders			
jVen Capital, LLC[2]	2,350,575	32.5%	
Entities affiliated with Versant Ventures[3]	2,046,582	28.3%	
Harris & Harris Group, Inc.[4]	1,056,955	14.6%	
Entities affiliated with CHL Medical Partners[5]	383,155	5.3%	
Entities affiliated with Mason Wells[6]	341,069	4.7%	
Directors and Executive Officers			
Evan Jones[7]	2,371,572	32.8%	
Brian G. Atwood[8]	2,046,582	28.3%	
Timothy Howe[9]	383,155	5.3%	
Laurence R. McCarthy, Ph.D.[10]	5,388	*	*
Misti Ushio, Ph.D.[11]	1,056,955	14.6%	
C. Eric Winzer[12]	6,103	*	
Vadim Sapiro[13]	2,356	*	*
Directors and Executive Officers as a group (11 persons)[14]	5,982,928	81.1%	

*Less than 1%

(1) Unless otherwise noted, the business address of each beneficial owner is c/o OpGen, Inc., 708 Quince Orchard Road, Suite 160, Gaithersburg, Maryland 20878.

(2) Includes 1,059,213 shares of common stock issuable upon the conversion of 1,059,213 shares of Series A Preferred Stock, 1,289,809 shares of common stock issuable upon the conversion of convertible notes in the aggregate principal amount of $1,289,809 and warrants to purchase 1,553 shares of common stock. As the managing member of jVen Capital, LLC, Evan Jones has voting and investment authority over the shares held by that entity.

(3) Includes 72,166 shares of common stock, 1,153,229 shares of common stock issuable upon the conversion of 1,153,229 shares of Series A Preferred Stock, 802,800 shares of common stock issuable upon conversion of convertible notes in the principal amount of $802,800 and warrants to purchase 6,368 shares of common stock owned by Versant Venture Capital III, L.P. Also includes 427 shares of common stock, 6,810 shares of common stock issuable upon the conversion of 6,810 shares of Series A Preferred Stock, 4,743 shares of common stock issuable upon conversion of convertible notes in the principal amount of $4,743 and warrants to purchase 39 shares of common stock owned by Versant Side Fund III, L.P. The address for the Versant Venture funds is One Sansome Street, Suite 3630, San Francisco, CA 94104. As the managing directors of Versant Ventures III, LLC, Brian G. Atwood; Bradley J. Bolzon, Ph.D.; Samuel D. Colella; Ross A. Jaffe, M.D.; William J. Link, Ph.D.; Barbara N. Lubash; Donald B. Milder; Rebecca B. Robertson; and Charles H. Warden share voting and investment authority over the shares held by both Versant Venture Capital III, L.P. and Versant Side Fund III, L.P.

(4) Includes 29,883 shares of common stock, 610,017 shares of common stock issuable upon the conversion of 610,017 shares of Series A Preferred Stock, and 417,055 shares of common stock issuable upon conversion of convertible notes in the principal amount of $417,055. The address for Harris & Harris Group, Inc. is 1450 Broadway, 24th Floor, New York, NY 10018. As the managing directors of Harris & Harris Group, Inc., Douglas W. Jamison; Daniel B. Wolfe, Ph.D.; Alexei A. Andreev, Ph.D.; and Misti Ushio, Ph.D. share voting and investment authority over the shares held by Harris & Harris Group, Inc.

(5) Includes 51,163 shares of common stock, 294,506 shares of common stock issuable upon the conversion of 294,506 shares of Series A Preferred Stock and warrants to purchase 6,713 shares of common stock owned by CHL Medical Partners III, L.P. Also includes 4,654 shares of common stock, 25,505 shares of common stock issuable upon the conversion of 25,505 shares of Series A Preferred Stock and warrants to purchase 614 shares of common stock owned by CHL Medical Partners III Side Fund, L.P. The address for the CHL Medical Partners funds is 1055 Washington Boulevard, 6th Floor, Stamford, CT 06901. Voting and investment authority over the shares held by CHL Medical Partners III, L.P. and CHL Medical Partners III Side Fund, L. P. is exercised by Collinson Howe & Lennox II, LLC in its role as general partner and investment advisor to the limited partnerships. The members of Collinson Howe & Lennox II, LLC are Jeffrey J. Collinson; Myles D. Greenberg, M.D.; Timothy F. Howe; Ronald W. Lennox; and Gregory M. Weinhoff, M.D.

(6) Includes 17,805 shares of common stock and warrants to purchase 3,264 shares of common stock owned by Mason Wells Biomedical Fund I, Limited Partnership. Also includes 320,000 shares of common stock issuable upon conversion of 320,000 shares of Series A Preferred Stock owned by Mason Wells OpGen Holdings, Inc. The address of Mason Wells is 411 East Wisconsin Avenue, Suite 1280, Milwaukee, WI 53202. As the managing director of the Mason Wells Biomedical Fund I, Limited Partnership and Mason Wells OpGen Holdings, Inc., John Byrnes has voting and investment authority over the shares held by the Mason Wells Biomedical Fund I, Limited Partnership and Mason Wells OpGen Holdings, Inc.

(7) Includes vested stock options to purchase 1,936 shares of common stock. Also includes 19,011 shares of common stock issuable upon the conversion of 19,011 shares of Series A Preferred Stock and warrants to purchase 50 shares of common stock owned by his wife. Also includes an aggregate of 2,350,575 shares of common stock, on an as converted and as exercised basis, beneficially owned by jVen Capital, LLC, of which Mr. Jones is managing member (see footnote 2 above).

(8) Consists of 2,046,582 shares of common stock, on an as converted and as exercised basis, beneficially owned by affiliates of Versant Ventures, of which Mr. Atwood is a Managing Director (see footnote 3 above).

(9) Consists of 383,155 shares of common stock, on an as converted and as exercised basis, beneficially owned by affiliates of CHL Medical Partners, of which Mr. Howe is a Partner (see footnote 5 above).

(10) Consists of vested options to purchase 5,388 shares of common stock.

(11) Consists of 1,056,955 shares of common stock, on an as converted and as exercised basis, beneficially owned by Harris & Harris Group, Inc. of which Dr. Ushio is a Managing Director (see footnote 4 above).

(12) Includes 127 shares of common stock and vested options to purchase 5,976 shares of common stock.

(13) Consists of vested options to purchase 2,356 shares of common stock.

(14) In addition to the beneficial ownership described in footnotes (2) through (13), includes vested stock options to purchase 110,817 shares of common stock held by other executive officers.

DESCRIPTION OF CAPITAL STOCK

The following descriptions are summaries of the material terms of our current certificate of incorporation as in effect on the date of this prospectus, and summaries of the material terms of our amended and restated certificate of incorporation and amended and restated bylaws that will be in effect upon the closing of the offering contemplated by this prospectus.

General

Prior to this offering, there has not been an established public trading market for our common stock.

Current Certificate of Incorporation

Pursuant to our current certificate of incorporation, our authorized capital stock consists of 10,000,000 shares of common stock, par value $0.01 per share, and 7,500,000 shares of preferred stock, par value $0.01 per share, all of which shares of preferred stock are designated as Series A Preferred Stock. As of December 31, 2014, 5,993,042 shares of our common stock (including shares to be acquired on the conversion of outstanding shares of Series A Preferred Stock and the conversion of the 2014 convertible notes), were outstanding and held by 83 stockholders of record. In addition, as of December 31, 2014, we had outstanding options to purchase 1,230,772 shares of our common stock, at a weighted average exercise price of $0.78 per share, 55,670 of which were exercisable.

Our current certificate of incorporation provides that, upon the closing of a "Qualified IPO" - a firm commitment underwritten public offering with net cash proceeds to us (after underwriting discount, commissions and fees) of at least $30.0 million, and a purchase price of at least $4.00 per share, each share of Series A Preferred Stock will automatically convert into shares of common stock at the then-effective conversion price, which is $1.00 per share for the Series A Preferred Stock. Regardless of whether the offering contemplated by this prospectus will constitute a Qualifed IPO, the holders of 70% of our Series A Preferred Stock, voting as a separate class, have approved a conversion of all outstanding shares of Series A Preferred Stock into common stock, and the holders of 67% of the principal amount of the 2014 convertible notes have approved conversion of such notes into Series A Preferred Stock, and therefore, into common stock upon the closing of the offering contemplated by this prospectus. Accordingly, upon the closing of this offering, each outstanding share of our Series A Preferred Stock, including those underlying the 2014 convertible notes and the 2015 convertible notes (assuming full subscription of the 2015 convertible notes), will be converted into one share of common stock, or an aggregate of 6,999,864 shares of common stock. Our 2015 convertible notes can only be converted at the election of each holder if the offering is not a Qualified IPO.

The holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of the stockholders. The holders of our common stock do not have any cumulative voting rights. Holders of our common stock are entitled to receive ratably any dividends declared by the board of directors out of funds legally available for that purpose, subject to any preferential dividend rights of any outstanding preferred stock. Our common stock has no preemptive rights, conversion rights or other subscription rights or redemption or sinking fund provisions.

Our Series A Preferred Stock has the following principal terms: (1) non-cumulative dividends, at the rate of 8% per annum accrue when and if declared by the board of directors; (2) a preference upon liquidation, dissolution or winding up, or in defined corporate transactions, such a merger, consolidation or sale of substantially all of our assets, equal to two times the Series A issue price of $1.00 per share; (3) the right to vote on an as converted basis with the common stockholders as a single class and the right to vote as a separate class on designated matters, with an approval requirement of 70% of the outstanding Series A Preferred Stock on a per-preferred share basis; (4) the optional and mandatory conversion rights described above; and (5) redemption rights, which take effect at any time after the sixth anniversary of the date shares of Series A Preferred Stock were issued, which was December 30, 2013.

Amended and Restated Certificate of Incorporation and Bylaws

The following is a summary of the rights of our common stock and preferred stock and certain provisions of our amended and restated certificate of incorporation and amended and restated bylaws, as they will be in effect upon the closing of this offering. For more detailed information, please see our amended and restated certificate of incorporation and amended and restated bylaws, which are filed as exhibits to the registration statement of which this prospectus is a part.

Upon the closing of this offering, we will amend and restate our certificate of incorporation and bylaws to make certain changes to our capital stock, including the deletion of all references to the Series A Preferred Stock. Immediately following the closing of this offering, our authorized capital stock will consist of shares of common stock, par value of $0.01 per share, and 5,000,000 shares of preferred stock, par value $0.01. We will have 7,493,347 shares of common stock issued and outstanding from the conversion of the outstanding shares of Series A Preferred Stock, the 2014 convertible notes and the 2015 convertible notes (assuming the 2015 convertible notes offering is fully subscribed and is all converted by the holders thereof). No shares of preferred stock will be outstanding.

Common Stock

The holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of the stockholders. The holders of our common stock do not have any cumulative voting rights. Holders of our common stock are entitled to receive ratably any dividends declared by the board of directors out of funds legally available for that purpose, subject to any preferential dividend rights of any outstanding preferred stock. Our common stock has no preemptive rights, conversion rights or other subscription rights or redemption or sinking fund provisions.

In the event of our liquidation, dissolution or winding up, holders of our common stock will be entitled to share ratably in all assets remaining after payment of all debts and other liabilities and any liquidation preference of any outstanding preferred stock. The shares to be issued by us in this offering will be, when issued and paid for, validly issued, fully paid and non-assessable.

Preferred Stock

Our board of directors will have the authority, without further action by our stockholders, to issue from time to time up to 5,000,000 shares of preferred stock in one or more series. Our board of directors will have the authority to establish the number of shares to be included in each series and fix the powers, preferences and rights of the shares of each wholly unissued series and any of its qualifications, limitations or restrictions. Our board of directors will also be able to increase or decrease the number of shares of any series, but not below the number of shares of that series then outstanding, without any further vote or action by the stockholders.

The issuance of preferred stock could decrease the amount of earnings and assets available for distribution to the holders of common stock or adversely affect the rights and powers, including voting rights, of the holders of common stock. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions and other corporate purposes, could, among other things, have the effect of delaying, deferring or preventing a change in control of our Company, which could depress the market price of our common stock. We have no current plans to issue any shares of preferred stock.

Registration Rights

The holders of our registrable shares, as described in the Third Amended and Restated Investors' Rights Agreement, or the investors' rights agreement, between us and the holders of these shares, or their permitted transferees, are entitled to rights with respect to the registration of these shares under the Securities Act of 1933, as amended, or the Securities Act. These rights are provided under the terms of the investors' rights agreement, and include demand registration rights, short-form registration rights and piggyback registration rights. All fees, costs and expenses of underwritten registrations will be borne by us and all selling expenses, including underwriting discounts and selling commissions, will be borne by the holders of the shares being registered. For purposes of this description, we have included information regarding all shares of common stock outstanding after conversion of all shares of Series A Preferred Stock and all convertible notes, including the 2015 convertible notes on a fully subscribed basis, but have not included any shares of common stock underlying outstanding stock options and warrants.

Demand Registration Rights

As of February 18, 2015, the holders of 7,217,580 shares of our common stock or their permitted transferees are entitled to demand registration rights. Under the terms of the investors' rights agreement, we will be required, upon the written request of holders of at least 20% of the then outstanding registrable shares, to use our commercially reasonable efforts to effect the registration of all or a portion of these shares for public resale. We are required to effect only two registrations pursuant to this provision of the investors' rights agreement. A demand for registration may not be made until 180 days after the completion of this offering.

Short-Form Registration Rights

As of February 18, 2015, the holders of 7,217,580 shares of our common stock or their permitted transferees are also entitled to short form registration rights. If we are eligible to file a registration statement on Form S-3, upon the written request of these holders to sell registrable securities at an aggregate price of at least $2.0 million, we will be required to use our best efforts to effect a registration of such shares. We are required to effect only two registrations in any 12-month period pursuant to this provision of the investors' rights agreement.

Piggyback Registration Rights

As of February 18, 2015, the holders of 7,217,580 shares of our common stock or their permitted transferees are entitled to piggyback registration rights. If we register any of our securities either for our own account or for the account of other security holders, the holders of these shares are entitled to include their shares in the registration. Subject to certain exceptions, we and the underwriters may limit the number of shares included in the underwritten offering if the underwriters believe that including these shares would adversely affect the offering.

Indemnification

Our investors' rights agreement contains customary cross-indemnification provisions, under which we are obligated to indemnify holders of registrable shares in the event of material misstatements or omissions in the registration statement attributable to us, and they are obligated to indemnify us for material misstatements or omissions attributable to them.

Expiration of Registration Rights

The registration rights granted under the investors' rights agreement will terminate at the earlier of the closing of a deemed liquidation event and when all of the holders of registrable securities are eligible to be sold without restrictions under Rule 144 promulgated under the Securities Act within any 90-day period.

Anti-Takeover Effects of Our Certificate of Incorporation, Bylaws and Delaware Law

Our certificate of incorporation and bylaws include a number of provisions that may have the effect of delaying, deferring or preventing another party from acquiring control of us and encouraging persons considering unsolicited tender offers or other unilateral takeover proposals to negotiate with our board of directors rather than pursue non-negotiated takeover attempts. These provisions include the items described below.

No Written Consent of Stockholders

Our certificate of incorporation provides that all stockholder actions are required to be taken by a vote of the stockholders at an annual or special meeting, and that stockholders may not take any action by written consent in lieu of a meeting. This limit may lengthen the amount of time required to take stockholder actions and would prevent the amendment of our bylaws or removal of directors by our stockholders without holding a meeting of stockholders.

Meetings of Stockholders

Our certificate of incorporation and bylaws provide that only a majority of the members of our board of directors then in office may call special meetings of stockholders and only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of stockholders. Our bylaws limit the business that may be conducted at an annual meeting of stockholders to those matters properly brought before the meeting.

Advance Notice Requirements

Our bylaws establish advance notice procedures with regard to stockholder proposals relating to the nomination of candidates for election as directors or new business to be brought before meetings of our stockholders. These procedures provide that notice of stockholder proposals must be timely given in writing to our corporate secretary prior to the meeting at which the action is to be taken. Generally, to be timely, notice must be received at our principal executive offices not less than 90 days nor more than 120 days prior to the first anniversary date of the annual meeting for the preceding year. Our bylaws specify the requirements as to form and content of all stockholders' notices. These requirements may preclude stockholders from bringing matters before the stockholders at an annual or special meeting.

Amendment to Certificate of Incorporation and Bylaws

Any amendment of our certificate of incorporation must first be approved by a majority of our board of directors, and if required by law or our certificate of incorporation, must thereafter be approved by a majority of the outstanding shares entitled to vote on the amendment and a majority of the outstanding shares of each class entitled to vote thereon as a class, except that the amendment of the provisions relating to stockholder action, board composition, limitation of liability and the amendment of our certificate of incorporation must be approved by not less than 75% of the outstanding shares entitled to vote on the amendment, and not less than 75% of the outstanding shares of each class entitled to vote thereon as a class. Our bylaws may be amended by the affirmative vote of a majority of the directors then in office, subject to any limitations set forth in the bylaws; and may also be amended by the affirmative vote of at least 75% of the outstanding shares entitled to vote on the amendment, or, if our board of directors recommends that the stockholders approve the amendment, by the affirmative vote of the majority of the outstanding shares entitled to vote on the amendment, in each case voting together as a single class.

Undesignated Preferred Stock

Our certificate of incorporation upon the closing of this offering will provide for 5,000,000 authorized shares of preferred stock. The existence of authorized but unissued shares of preferred stock may enable our board of directors to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise. For example, if in the due exercise of its fiduciary obligations, our board of directors were to determine that a takeover proposal is not in the best interests of our stockholders, our board of directors could cause shares of preferred stock to be issued without stockholder approval in one or more private offerings or other transactions that might dilute the voting or other rights of the proposed acquirer or insurgent stockholder or stockholder group. In this regard, our certificate of incorporation grants our board of directors broad power to establish the rights and preferences of authorized and unissued shares of preferred stock. The issuance of shares of preferred stock could decrease the amount of earnings and assets available for distribution to holders of shares of common stock. The issuance may also adversely affect the rights and powers, including voting rights, of these holders and may have the effect of delaying, deterring or preventing a change in control of us.

Exclusive Jurisdiction for Certain Actions

Our certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (iii) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law, our certificate of incorporation or our bylaws, or (iv) any action asserting a claim against us governed by the internal affairs doctrine. Although we believe this provision benefits us by providing increased consistency in the application of Delaware law in the types of lawsuits to which it applies, the provision may have the effect of discouraging lawsuits against our directors and officers. The enforceability of similar exclusive forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that a court could rule that this provision in our certificate of incorporation is inapplicable or unenforceable.

Section 203 of the Delaware General Corporation Law

We are subject to the provisions of Section 203 of the Delaware General Corporation Law. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a three-year period following the time that this stockholder becomes an interested stockholder, unless the business combination is approved in a prescribed manner. Under Section 203, a business combination between a corporation and an interested stockholder is prohibited unless it satisfies one of the following conditions:

- before the stockholder became interested, our board of directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;

- upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, shares owned by persons who are directors and also officers, and employee stock plans, in some instances, but not the outstanding voting stock owned by the interested stockholder; or

- at or after the time the stockholder became interested, the business combination was approved by our board of directors and authorized at an annual or special meeting of the stockholders by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

Section 203 defines a business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder;

- any sale, transfer, lease, pledge or other disposition involving the interested stockholder of 10% or more of the assets of the corporation;

- subject to exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;

- subject to exceptions, any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; and

- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

In general, Section 203 defines an interested stockholder as any entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by the entity or person.

Exchange Listing

We are applying to list our common stock on the NASDAQ Capital Market under the symbol "OPGN."

SHARES ELIGIBLE FOR FUTURE SALE

Future sales of our common stock in the public market, or the availability of such shares for sale in the public market, could adversely affect market prices prevailing from time to time. As described below, the sale of a portion of our shares will be limited after this offering due to contractual and legal restrictions on resale. Nevertheless, sales of our common stock in the public market after such restrictions lapse, or the perception that those sales may occur, could adversely affect the prevailing market price at such time and our ability to raise equity capital in the future.

Based on the number of shares outstanding as of February 18, 2015, upon the completion of this offering, shares of our common stock will be outstanding, assuming no exercise of the underwriters' option to purchase additional shares and no exercise of outstanding options. Except for approximately 7,316,000 shares subject to lock-up agreements, all of our outstanding shares will be freely tradable, except that any shares held by our affiliates, as that term is defined in Rule 144 under the Securities Act, may only be sold in compliance with the limitations described below.

Rule 144

In general, a person who has beneficially owned restricted stock for at least six months would be entitled to sell their securities provided that such person is not deemed to have been one of our affiliates at the time of, or at any time during the 90 days preceding, a sale. Persons who have beneficially owned restricted shares for at least six months but who are our affiliates at the time of, or any time during the 90 days preceding, a sale, would be subject to additional restrictions, by which such person would be entitled to sell within any three-month period only a number of securities that does not exceed the greater of either of the following:

- 1% of the number of shares then outstanding, which will equal approximately shares immediately after this offering assuming no exercise of the underwriters' option to purchase additional shares, based on the number of shares outstanding as of December 31, 2014; or

- the average weekly trading volume of our common stock on The NASDAQ Capital Market during the four calendar weeks preceding the filing of a notice on Form 144 with respect to the sale.

Provided, in each case, that we are subject to the Exchange Act periodic reporting requirements for at least 90 days before the sale. Such sales both by affiliates and by non-affiliates must also comply with the manner of sale, current public information and notice provisions of Rule 144.

Rule 701

Rule 701 under the Securities Act, as in effect on the date of this prospectus, permits resales of shares in reliance upon Rule 144 but without compliance with certain restrictions of Rule 144, including the holding period requirement. Most of our employees, executive officers or directors who purchased shares under a written compensatory plan or contract may be entitled to rely on the resale provisions of Rule 701.

Lock-Up Agreements

In connection with this offering we and our officers, directors, and the holders of 1% or more of our common stock have agreed to enter into lock-up agreements with the underwriters. See "Underwriting" for more information.

Registration Rights

As of February 18, 2015, the holders of 7,217,580 shares of common stock or their transferees are entitled to various rights with respect to registration of these shares under the Securities Act. Registration of these shares under the Securities Act would result in these shares becoming fully tradable without restriction under the Securities Act immediately upon the effectiveness of the registration. See "Description of Capital Stock—Registration Rights" for additional information.

Stock Option Plans

We intend to file a registration statement on Form S-8 under the Securities Act covering all of the shares of common stock subject to options outstanding or reserved for issuance under our stock plans. We expect to file this registration statement as soon as practicable after this offering. However, none of the shares registered on Form S-8 that are subject to lock-up agreements will be eligible for resale until the expiration of the lock-up period to which they are subject.

CERTAIN MATERIAL U.S. FEDERAL INCOME TAX CONSIDERATIONS

The following is a summary of certain material U.S. federal income tax considerations relating to the acquisition, ownership and disposition of shares of our common stock issued pursuant to this offering. This summary deals only with shares of our common stock acquired by a stockholder in this offering and that are held as a capital asset within the meaning of Section 1221 of the Internal Revenue Code of 1986, as amended, or the Code. This summary does not address the U.S. federal income tax considerations applicable to a stockholder that is subject to special treatment under U.S. federal income tax laws, including: a dealer in securities or currencies; a financial institution; a regulated investment company; a real estate investment trust; a tax- exempt organization; an insurance company; a person holding our common stock as part of a hedging, integrated, conversion or straddle transaction or a person deemed to sell our common stock under the constructive sale provisions of the Code; a trader in securities that has elected the mark-to-market method of accounting; an entity that is treated as a partnership for U.S. federal income tax purposes; a person that received our common stock in connection with services provided to the Company or any of its affiliates; a U.S. person whose "functional currency" is not the U.S. dollar; a "controlled foreign corporation"; a "passive foreign investment company"; or a U.S. expatriate.

This summary is based upon provisions of the Code, and applicable Treasury regulations promulgated or proposed thereunder, rulings and judicial decisions, all as in effect as of the date hereof. Those authorities may be changed, perhaps with retroactive effect, or may be subject to differing interpretations, which could result in U.S. federal income tax consequences different from those discussed below. This summary does not address all aspects of U.S. federal income tax, does not address all tax considerations that may be relevant to stockholders in light of their personal circumstances and does not address any state, local, foreign, gift, estate or alternative minimum tax considerations.

For purposes of this discussion, a "U.S. holder" is a beneficial holder of our common stock that is: an individual citizen or resident of the United States for U.S. federal income tax purposes; a corporation (or any other entity treated as a corporation for U.S. federal income tax purposes) created or organized in or under the laws of the United States, any state thereof or the District of Columbia; an estate the income of which is subject to U.S. federal income taxation regardless of its source; or a trust if it (1) is subject to the primary supervision of a court within the United States and one or more U.S. persons (as defined in the Code) have the authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable U.S. Treasury regulations to be treated as a U.S. person.

For purposes of this discussion, a "non-U.S. holder" is a beneficial holder of our common stock that is for U.S. federal income tax purposes an individual, corporation, estate or trust and is not a U.S. holder.

If a partnership (or an entity or arrangement that is treated as a partnership for U.S. federal income tax purposes) holds our common stock, the tax treatment of a person treated as a partner in the partnership for U.S. federal income tax purposes generally will depend upon the status of the partner and the activities of the partnership. Partnerships and other entities that are treated as partnerships for U.S. federal income tax purposes and persons holding our common stock through a partnership or other entity treated as a partnership for U.S. federal income tax purposes are urged to consult their own tax advisors.

This summary is for general information only and is not intended to be tax advice. Holders of our common stock are urged to consult their own tax advisors concerning the tax considerations related to the acquisition, ownership and disposition of our common stock in light of their particular circumstances, as well as any tax considerations arising under the laws of any other jurisdiction, including any state, local and foreign income and other tax laws.

U.S. Holders

The following discussion is a summary of certain U.S. federal income tax considerations relevant to a U.S. holder of our common stock.

Distributions

Distributions with respect to our common stock, if any, generally will be includible in the gross income of a U.S. holder as ordinary dividend income to the extent of our current or accumulated earnings and profits, as determined for U.S. federal income tax purposes. Any portion of a distribution in excess of current and accumulated earnings and profits will be treated as a non-taxable return of capital, up to the U.S. holder's adjusted tax basis in its shares of our common stock with respect to which the distribution was made. Any such distribution in excess of the U.S. holder's adjusted tax basis in its shares will be treated as capital gain and as long-term capital gain if the U.S. holder's holding period exceeds one year. If certain requirements are met (including certain holding period requirements), distributions constituting dividends paid to non-corporate U.S. holders generally will qualify for the reduced tax rate on qualified dividend income.

Distributions constituting dividends for U.S. federal income tax purposes that are paid to U.S. holders that are corporations may qualify for the 70% dividends received deduction, or DRD, which is generally available to corporations that own less than 20% of the voting power or value of the outstanding stock of the distributing corporation. A U.S. holder that is a corporation holding 20% or more of the distributing corporation (by vote and value) may be eligible for an 80% DRD with respect to any such dividends. No assurance can be given that we will have sufficient earnings and profits (as determined for U.S. federal income tax purposes) to cause any distributions to be treated as dividends eligible for a DRD. In addition, a DRD is available only if certain other requirements (including certain holding period requirements) are satisfied, and a DRD may be subject to limitations in certain circumstances, which are not discussed herein.

Sale, Exchange, Redemption or Certain Other Taxable Dispositions of Our Common Stock

A U.S. holder of shares of our common stock generally will recognize gain or loss on the taxable sale, exchange, redemption (provided the redemption is treated as a sale or exchange), or other taxable disposition of such shares in an amount equal to the difference between such U.S. holder's amount realized on such disposition and such U.S. holder's adjusted tax basis in its shares of our common stock disposed of. A U.S. holder's amount realized generally will equal the amount of cash and the fair market value of any property received in consideration for the shares of common stock disposed of. Such gain or loss will be capital gain or loss, and will be long-term capital gain or loss if the U.S. holder's holding period for the shares of our common stock disposed of exceeds one year at the time of disposition. The deductibility of capital losses is subject to certain limitations. U.S. holders should consult their tax advisors regarding the treatment of capital gains and capital losses.

Medicare Tax on Net Investment Income

An additional 3.8% Medicare tax will be imposed on certain net investment income of certain U.S. holders that are individuals, estates or trusts. Such tax applies to the lesser of (i) the U.S. holder's net investment income for the relevant taxable year and (ii) the excess of the U.S. holder's adjusted gross income (with certain adjustments) over a specified threshold amount. Net investment income generally includes dividends and net gains from the disposition of shares of our common stock. U.S. holders that are individuals, estates or trusts should consult their tax advisors regarding the effect, if any, of the Medicare tax on their ownership and disposition of our common stock.

Information Reporting and Backup Withholding Tax

In general, information reporting will apply to payments of dividends on shares of our common stock and proceeds of a disposition of shares of our common stock to U.S. holders, other than certain exempt recipients such as corporations. Under U.S. federal income tax law, dividends and proceeds from the sale of shares of our common stock paid to a U.S. holder (other than an exempt recipient) may be subject to "backup" withholding at the then applicable rate. Backup withholding generally applies to a U.S. holder if the holder (i) fails to furnish to us or our paying agent a correct social security number or other taxpayer identification number, or TIN, or fails to furnish a certification of exempt status, (ii) has been notified by the IRS that it is subject to backup withholding as a result of the failure to properly report payments of interest or dividends or (iii) under certain circumstances, fails to provide a certified statement, signed under penalty of perjury, that the TIN provided is its correct number and that it is a U.S. person that is not subject to backup withholding. Backup withholding is not an additional tax. Any amounts withheld from payments to a U.S. holder under the backup withholding rules will be allowed as a credit against such holder's U.S. federal income tax liability and may entitle the holder to a refund, provided that the required information is timely furnished to the IRS. Certain U.S. persons are exempt from backup withholding, including corporations, provided that their exemptions from backup withholding are properly established.

Non-U.S. Holders

The following is a summary of certain U.S. federal tax considerations applicable to a non-U.S. holder of our common stock.

Distributions

Distributions treated as dividends for U.S. federal income tax purposes (as described above under "—U.S. Holders— Distributions"), if any, that are paid to a non-U.S. holder with respect to shares of our common stock will be subject to U.S. federal withholding tax at a 30% rate (or a lower rate prescribed by an applicable income tax treaty) unless the dividends are effectively connected with the non-U.S. holder's conduct of a trade or business in the United States (and, if required by an applicable income tax treaty, is attributable to a permanent establishment or fixed base maintained in the U.S.). To claim the exemption from withholding with respect to any such effectively connected income, the non-U.S. holder must furnish to us or our paying agent a properly executed IRS Form W-8ECI (or applicable successor form), certifying under penalties of perjury that a dividend paid on our common stock is not subject to withholding tax. The certification requirement also may require a non-U.S. holder to provide its U.S. taxpayer identification number.

If a non-U.S. holder is engaged in a trade or business in the United States and dividends with respect to our common stock are effectively connected with the conduct of such trade or business and, if required by an applicable income tax treaty, are attributable to a U.S. permanent establishment or fixed base, then the non-U.S. holder generally will be subject to U.S. federal income tax on such dividends on a net income basis in the same manner as if received by a U.S. holder (although the dividends will be exempt from the 30% U.S. federal withholding tax, provided the certification requirements are satisfied). In addition, if the non- U.S. holder is a corporation for U.S. federal income tax purposes, such holder may, under certain circumstances, be subject to an additional branch profits tax equal to 30% (or a lower rate prescribed by an applicable income tax treaty) of its effectively connected earnings and profits for the taxable year.

A non-U.S. holder who wishes to claim the benefit of an exemption or reduced rate of U.S. federal withholding tax under an applicable income tax treaty must furnish to us or our paying agent a valid IRS Form W-8BEN (or applicable successor form) certifying, under penalties of perjury, such non-U.S. holder's qualification for the exemption or reduced rate. If a non-U.S. holder is eligible for an exemption or a reduced rate of U.S. federal withholding tax pursuant to an applicable income tax treaty, it may obtain a refund of any excess amounts withheld by filing an appropriate claim for refund with the IRS.

If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a non-taxable return of capital, up to the non-U.S. holder's adjusted tax basis in its shares of our common stock. Any remaining excess will be treated as capital gain, subject to the tax treatment described below in "—Sale, Exchange, Redemption or Certain Other Taxable Dispositions of Our Common Stock." If we are not able to determine whether or not a distribution will exceed current and accumulated earnings and profits at the time a distribution is made, we may withhold tax on the entire amount of such distribution at the same rate as we would withhold on a dividend. However, a non-U.S. holder may obtain a refund of any excess withholding by filing an appropriate claim for refund with the IRS.

Any distribution described in this section would also be subject to the discussion below in "Foreign Account Tax Compliance Act."

Sale, Exchange, Redemption or Certain Other Taxable Dispositions of Our Common Stock

Subject to the discussions below regarding backup withholding and the Foreign Account Tax Compliance Act, a non-U.S. holder generally will not be subject to U.S. federal income tax or withholding tax on gain realized upon a sale, exchange or other taxable disposition of shares of our common stock unless: (i) the gain is effectively connected with the conduct of a trade or business in the United States (and, if required by an applicable income tax treaty, is attributable to a U.S. permanent establishment or a fixed base), of the non-U.S. holder; (ii) the non-U.S. holder is a non-resident alien individual who is present in the United States for 183 days or more in the taxable year of that disposition, and certain other conditions are met; or (iii) we are or have been a "U.S. real property holding corporation", or a USRPHC, for U.S. federal income tax purposes at any time within the shorter of the five-year period preceding the disposition and the non-U.S. holder's holding period for our common stock, or the relevant period.

If the first exception applies, the non-U.S. holder generally will be subject to U.S. federal income tax on a net basis with respect to such gain in the same manner as if such holder were a resident of the United States. In addition, if the non-U.S. holder is a corporation for U.S. federal income tax purposes, such gains may, under certain circumstances, also be subject to the branch profits tax at a rate of 30% (or at a lower rate prescribed by an applicable income tax treaty).

If the second exception applies, the non-U.S. holder generally will be subject U.S. federal income tax at a rate of 30% tax on the gain from a disposition of our common stock, which may be offset by capital losses allocable to U.S. sources during the taxable year of disposition (even though the non-U.S. holder is not considered a resident of the United States).

With respect to the third exception above, we believe we currently are not, and we do not anticipate becoming, a USRPHC for U.S. federal income tax purposes. Because the determination of whether we are a USRPHC depends on the fair market value of our U.S. real property interests relative to the fair market value of our other trade or business assets and our foreign real property interests, there can be no assurances that we will not become a USRPHC in the future. Generally, a corporation is a USRPHC only if the fair market value of its U.S. real property interests (as defined in the Code) equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. Even if we are or become a USRPHC, a non-U.S. holder would not be subject to U.S. federal income tax on a sale, exchange or other taxable disposition of our common stock by reason of our status as a USRPHC so long as (i) our common stock continues to be regularly traded on an established securities market (within the meaning of Section 897(c)(3) of the Code) during the calendar year in which such disposition occurs and (ii) such non-U.S. holder does not own and is not deemed to own (directly, indirectly, or constructively) more than 5% of our common stock at any time during the relevant period. If we are a USRPHC and the requirements of (i) or (ii) are not met, gain on the disposition of shares of our common stock generally will be taxed in the same manner as gain that is effectively connected with the conduct of a U.S. trade or business, except that the branch profits tax will not apply.

Information Reporting and Backup Withholding Tax

We must report annually to the IRS and to each non-U.S. holder the gross amount of the distributions on our common stock paid to such holder and the tax withheld, if any, with respect to such distributions, regardless of whether withholding was required. This information also may be made available under a specific treaty or agreement with the tax authorities in the country in which the non-U.S. holder resides or is established. A non-U.S. holder will generally be subject to backup withholding at the then applicable rate for dividends paid to such holder unless such holder furnishes a valid IRS Form W-8BEN (or such other applicable form and documentation as required by the Code or the Treasury regulations) certifying under penalties of perjury that it is a non-U.S. holder (and the payor does not have actual knowledge or reason to know that such holder is a United States person as defined under the Code), or otherwise establishes an exemption. Dividends paid to non-U.S. holders subject to U.S. federal withholding tax, as described above in "Distributions," generally will be exempt from U.S. backup withholding.

Information reporting and, depending on the circumstances, backup withholding will apply to the payment of the proceeds of a sale or other disposition of shares of our common stock by a non-U.S. holder effected by or through the U.S. office of any broker, U.S. or foreign, unless the holder certifies that it is not a United States person (as defined under the Code) and satisfies certain other requirements, or otherwise establishes an exemption. Generally, information reporting and backup withholding will not apply to a payment of disposition proceeds to a non-U.S. holder where the transaction is effected outside the U.S. through a non-U.S. office of a broker. However, for information reporting purposes, dispositions effected through a non-U.S. office of a broker with substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a broker. Prospective investors should consult their own tax advisors regarding the application of the information reporting and backup withholding rules to them.

Copies of the information returns may be made available to the tax authorities in the country in which the non-U.S. holder resides or is incorporated under the provisions of an applicable treaty or agreement.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules may be allowed as a credit against a non-U.S. holder's U.S. federal income tax liability, if any, and may entitle such holder to a refund, provided that an appropriate claim is timely filed with the IRS.

Foreign Account Tax Compliance Act

Under the Foreign Account Tax Compliance Act, or FATCA, a 30% withholding tax will apply to dividends on, or gross proceeds from the sale or other disposition of, shares of our common stock paid to certain non-U.S. entities (including financial intermediaries) unless various information reporting and due diligence requirements, which are different from and in addition to the certification requirements described elsewhere in this discussion, have been satisfied (generally relating to ownership of by U.S. persons of interests in or accounts with those entities). The withholding rules applicable to payments of dividends on our common stock will be phased in beginning January 1, 2014. The withholding rules will apply to payments of gross proceeds from dispositions of U.S. common stock beginning January 1, 2017.

Holders of our common stock should consult their tax advisors regarding the possible impact of FATCA on their investment in our common stock, including, without limitation, the process and deadlines for meeting the applicable requirements to prevent the imposition of the 30% withholding tax under FATCA.

UNDERWRITING

We have entered into an underwriting agreement with Maxim Group LLC, acting as the sole book-running manager of this offering and the sole representative of the underwriters named below. Subject to the terms and conditions of the underwriting agreement, the underwriters named below have agreed severally to purchase, and we have agreed to sell to them, the number of shares of common stock indicated below, at the public offering price less the underwriting discount and commissions described below:

Underwriter	Shares of Common Stock
Maxim Group LLC	
Total	

The underwriting agreement provides that the obligations of the underwriters to pay for and accept delivery of the shares offered by this prospectus are subject to the approval of certain legal matters by their counsel and to other conditions. The underwriters are obligated to take and pay for all of the shares offered by this prospectus if any such shares are taken, other than those shares covered by the over-allotment option described below.

Over-Allotment Option

We have granted to the underwriters an option, exercisable no later than 45 calendar days after the date of the underwriting agreement, to purchase from us additional shares, at the public offering price less the underwriting discount set forth on the cover page of this prospectus and for the commissions described below. The underwriters may exercise this option in part or in full, only to cover over-allotments, if any, made in connection with this offering. To the extent the option is exercised and the conditions of the underwriting agreement are satisfied, we will be obligated to sell to the underwriters, and the underwriters will be obligated to purchase, the additional shares as to which the option has been exercised.

Discount and Commissions

We have agreed to pay the underwriters (i) an underwriting discount equal to 7% of the aggregate gross proceeds raised in this offering from new investors and 5% of the aggregate gross proceeds raised in this offering from current stockholders, and (ii) warrants to purchase the number of shares of our common stock equal to 4.0% of all the shares of common stock sold in this offering (including shares in the over-allotment option, to the extent exercised). Such underwriters' warrants shall have an exercise price equal to $ per share of common stock underlying such warrants, which is 110% of the public offering price, and shall expire five years after the effective date of the registration statement of which this prospectus forms a part. Such underwriters' warrants will not be subject to redemption by the Company, and will entitle the holder thereof to unlimited "piggyback" registration rights with respect to the shares of common stock underlying such warrants for a period of seven years from the effective date of the registration statement of which this prospectus forms a part at the Company's expense, and one demand registration right at the Company's expense and additional demand registration rights at the warrant holder's expense for a period of five years from the effective date of the registration statement of which this prospectus forms a part. Such underwriters' warrants will be subject to FINRA Rule 5110(g)(1) in that, except as otherwise permitted by FINRA rules, for a period of 180 days following the effective date of the registration statement of which this prospectus forms a part, such underwriters' warrants shall not be (A) sold, transferred, assigned, pledged or hypothecated or (B) the subject of any hedging, short sale, derivative, put, or call transaction that would result in the effective economic disposition of the securities by any person.

The representative has advised us that the underwriters propose to offer the shares directly to the public at the public offering price set forth on the cover of this prospectus. In addition, the representative may offer some of the shares to other securities dealers at such price less a concession of up to $ per share. After the offering to the public, the offering price and other selling terms may be changed by the representative without changing the Company's proceeds from the underwriters' purchase of the shares.

The following table summarizes the public offering price per share, the underwriting discount and commissions and the proceeds, before expenses, to us, assuming both no exercise and the full exercise of the underwriters' over-allotment option.

	Per Share	Total Without Over-Allotment	Total With Over-Allotment in Full
Public offering price	$	$	$
Underwriting discount and commissions (1)	$	$	$
Proceeds, before expenses, to us	$	$	$

(1) Does not include the warrants to be issued to the underwriters at closing.

We estimate that the total expenses of this offering, including registration, filing and listing fees, printing fees and legal and accounting expenses, but excluding the underwriting discount and commissions, will be approximately $, all of which will be payable by us.

Determination of Public Offering Price

Before this offering, there has been no public market for our securities. The public offering price will be determined through negotiations between us and the representative. In addition to prevailing market conditions, the factors to be considered in determining the public offering price include:

- the valuations of publicly traded companies in the United States that the underwriters believe to be comparable to us;
- our financial information;
- the history of, and the prospects for, our Company and the industry in which we compete;
- an assessment of our management, our past and present operations, and the prospects for, and timing of, our future revenues;
- the present state of our development; and
- various valuation measures of other companies engaged in activities similar to ours.

An active trading market for our securities may not develop. It is also possible that after this offering, our securities will not trade in the public market at or above the public offering price.

Lock-Up Agreements

We and each of our officers, directors and stockholders who own in the aggregate 1.0% or more of our outstanding shares have agreed, subject to certain exceptions, not to offer, sell, agree to offer or sell, solicit offers to purchase, grant any call option or purchase any put option with respect to, pledge, encumber, assign, borrow or otherwise dispose of or transfer any shares of our common stock, warrants to purchase our common stock or any other security of ours or any other entity that is convertible into, or exercisable or exchangeable for, our common stock or any other equity security of ours, for a period of six (6) months after the date set forth on the front cover of the final prospectus used in connection with this offering, without the prior written consent of the representative.

The representative may in its discretion consent to release some or all of the shares subject to lock-up agreements prior to the expiration of the lock-up period. When determining whether or not to release shares subject to lock-up agreements, the representative will consider, among other factors, the security holder's reasons for requesting the release, the number of shares for which release is being requested and market conditions at the time.

Price Stabilization, Short Positions and Penalty Bids

In connection with this offering, the underwriters may engage in transactions that stabilize, maintain or otherwise affect the price of our common stock. Specifically, the underwriters may over-allot in connection with this offering by selling more shares than are set forth on the cover page of this prospectus. This creates a short position in our securities for the underwriters' own accounts. The short position may be either a covered short position or a naked short position. In a covered short position, the number of securities over-allotted by the underwriters is not greater than the number of securities they may purchase in the over-allotment option. In a naked short position, the number of securities over-allotted by the underwriters is greater than the number of securities they may purchase in the over-allotment option. To close out a short position, the underwriters may elect to exercise all or part of the over-allotment option. The underwriters may also elect to stabilize the price of our common stock, or reduce any short position by bidding for, and purchasing, common stock in the open market.

The underwriters may also impose a penalty bid. This occurs when a particular underwriter or dealer repays selling concessions allowed to it for distributing a security in this offering because the underwriter repurchases that security in stabilizing or short-covering transactions.

Finally, the underwriters may bid for, and purchase, our securities in market making transactions, including "passive" market making transactions as described below.

These activities may stabilize or maintain the market price of our common stock at a price that is higher than the price that might otherwise exist in the absence of these activities. The underwriters are not required to engage in these activities, and may discontinue any of these activities at any time without notice. These transactions may be effected on NASDAQ, in the over-the-counter market or otherwise.

In connection with this offering, the underwriters and selling group members, if any, or their affiliates may engage in passive market making transactions in our common stock immediately prior to the commencement of sales in this offering, in accordance with Rule 103 of Regulation M under the Exchange Act. Rule 103 generally provides that:

- a passive market maker may not effect transactions or display bids in excess of the highest independent bid price by persons who are not passive market makers;

- net purchases by a passive market maker on each day are generally limited to 30% of the passive market maker's average daily trading volume during a specified two-month prior period or ___ shares, whichever is greater, and must be discontinued when that limit is reached; and

- passive market making bids must be identified as such.

Other Terms

We have agreed to bear the cost of all actual expenses related to this offering, including without limitation all filing fees and communication expenses relating to the registration of the shares to be sold in this offering. We have paid Maxim Group LLC an advance of $30,000 for its anticipated out-of-pocket accountable expenses. Maxim Group LLC will reimburse us for any remaining portion of the advance to the extent such monies were not used for out-of-pocket accountable expenses actually incurred if this offering is not completed. If this offering is completed, we will reimburse Maxim Group LLC for certain out-of-pocket actual expenses related to the offering, including legal fees, expenses incurred to clear the offering with FINRA, background searches of our officers and directors, and roadshow expenses up to a maximum aggregate reimbursement of $125,000, including the $30,000 advance already paid (of which a maximum of $75,000 can be allocated to legal expenses and $50,000 to non-legal expenses).

We have granted Maxim Group LLC a right of first refusal to act as a co-lead manager and book runner for all future public equity, equity-linked and debt financings (excluding commercial bank debt and credit facilities) for a period of 12 months from the commencement of sales of the offering contemplated by this prospectus.

Indemnification

We have agreed to indemnify the underwriters against liabilities relating to the offering arising under the Securities Act and the Exchange Act and liabilities arising from breaches of some or all of the representations and warranties contained in the underwriting agreement, and to contribute to payments that the underwriters may be required to make for these liabilities.

Electronic Distribution

A prospectus in electronic format may be made available on a website maintained by the representatives and may also be made available on a website maintained by other underwriters. The underwriters may agree to allocate a number of shares to underwriters for sale to their online brokerage account holders. Internet distributions will be allocated by the representative to underwriters that may make Internet distributions on the same basis as other allocations. In connection with this offering, the underwriters or syndicate members may distribute prospectuses electronically. No forms of electronic prospectus other than prospectuses that are printable as Adobe® PDF will be used in connection with this offering.

The underwriters have informed us that they do not expect to confirm sales of shares offered by this prospectus to accounts over which they exercise discretionary authority.

Other than the prospectus in electronic format, no information on any underwriter's website and no information contained in any other website maintained by an underwriter is part of this prospectus or the registration statement of which this prospectus forms a part, has not been approved or endorsed by us or any underwriter in its capacity as underwriter and should not be relied upon by investors.

Selling Restrictions

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a "Relevant Member State"), from and including the date on which the European Union Prospectus Directive (the "EU Prospectus Directive") was implemented in that Relevant Member State (the "Relevant Implementation Date") an offer of securities described in this prospectus may not be made to the public in that Relevant Member State prior to the publication of a prospectus in relation to the shares which has been approved by the competent authority in that Relevant Member State or, where appropriate, approved in another Relevant Member State and notified to the competent authority in that Relevant Member State, all in accordance with the EU Prospectus Directive, except that, with effect from and including the Relevant Implementation Date, an offer of securities described in this prospectus may be made to the public in that Relevant Member State at any time:

- to any legal entity which is a qualified investor as defined under the EU Prospectus Directive;

- to fewer than 100 or, if the Relevant Member State has implemented the relevant provision of the 2010 PD Amending Directive, 150 natural or legal persons (other than qualified investors as defined in the EU Prospectus Directive); or

- in any other circumstances falling within Article 3(2) of the EU Prospectus Directive, provided that no such offer of securities described in this prospectus shall result in a requirement for the publication by us of a prospectus pursuant to Article 3 of the EU Prospectus Directive.

For the purposes of this provision, the expression an "offer of securities to the public" in relation to any securities in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and the securities to be offered so as to enable an investor to decide to purchase or subscribe for the securities, as the same may be varied in that Member State by any measure implementing the EU Prospectus Directive in that Member State. The expression "EU Prospectus Directive" means Directive 2003/71/EC (and any amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State) and includes any relevant implementing measure in each Relevant Member State, and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

Each underwriter has represented and agreed that:

(a) it has only communicated or caused to be communicated and will only communicate or cause to be communicated an invitation or inducement to engage in investment activity (within the meaning of Section 21 of the FSMA) received by it in connection with the issue or sale of the shares in circumstances in which Section 21(1) of the FSMA does not apply to us; and

(b) it has complied and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the shares in, from or otherwise involving the United Kingdom.

The shares may not be offered or sold by means of any document other than (i) in circumstances which do not constitute an offer to the public within the meaning of the Companies Ordinance (Cap.32, Laws of Hong Kong), or (ii) to "professional investors" within the meaning of the Securities and Futures Ordinance (Cap.571, Laws of Hong Kong) and any rules made thereunder, or (iii) in other circumstances which do not result in the document being a "prospectus" within the meaning of the Companies Ordinance (Cap.32, Laws of Hong Kong), and no advertisement, invitation or document relating to the shares may be issued or may be in the possession of any person for the purpose of issue (in each case whether in Hong Kong or elsewhere), which is directed at, or the contents of which are likely to be accessed or read by, the public in Hong Kong (except if permitted to do so under the laws of Hong Kong) other than with respect to shares which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" within the meaning of the Securities and Futures Ordinance (Cap. 571, Laws of Hong Kong) and any rules made thereunder.

This prospectus has not been registered as a prospectus with the Monetary Authority of Singapore. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the shares may not be circulated or distributed, nor may the shares be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Singapore other than (i) to an institutional investor under Section 274 of the Securities and Futures Act, Chapter 289 of Singapore (the "SFA"), (ii) to a relevant person, or any person pursuant to Section 275(1A), and in accordance with the conditions, specified in Section 275 of the SFA or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA.

Where the shares are subscribed or purchased under Section 275 by a relevant person which is: (a) a corporation (which is not an accredited investor) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or (b) a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary is an accredited investor, shares, debentures and units of shares and debentures of that corporation or the beneficiaries' rights and interest in that trust shall not be transferable for 6 months after that corporation or that trust has acquired the shares under Section 275 except: (1) to an institutional investor under Section 274 of the SFA or to a relevant person, or any person pursuant to Section 275(1A), and in accordance with the conditions, specified in Section 275 of the SFA; (2) where no consideration is given for the transfer; or (3) by operation of law.

The securities have not been and will not be registered under the Financial Instruments and Exchange Law of Japan (the Financial Instruments and Exchange Law) and each underwriter has agreed that it will not offer or sell any securities, directly or indirectly, in Japan or to, or for the benefit of, any resident of Japan (which term as used herein means any person resident in Japan, including any corporation or other entity organized under the laws of Japan), or to others for re-offering or resale, directly or indirectly, in Japan or to a resident of Japan, except pursuant to an exemption from the registration requirements of, and otherwise in compliance with, the Financial Instruments and Exchange Law and any other applicable laws, regulations and ministerial guidelines of Japan.

LEGAL MATTERS

The validity of the shares of common stock offered by this prospectus will be passed upon for us by Ballard Spahr LLP, Philadelphia, Pennsylvania. The underwriters are being represented by Ellenoff Grossman & Schole LLP.

EXPERTS

The financial statements as of December 31, 2014 and 2013 and for the years then ended included in this prospectus have been audited by CohnReznick LLP, an independent registered public accounting firm, as stated in their report, which includes an explanatory paragraph relating to our ability to continue as a going concern, appearing elsewhere in this prospectus. Such financial statements are included in reliance upon the report of such firm given on the authority of said firm as experts in accounting and auditing.

WHERE YOU CAN FIND ADDITIONAL INFORMATION

We have filed with the SEC a registration statement on Form S-1 under the Securities Act with respect to the shares of common stock offered by this prospectus. This prospectus, which constitutes a part of the registration statement, does not contain all of the information set forth in the registration statement or the exhibits and schedules to the registration statement. Please refer to the registration statement, exhibits and schedules for further information with respect to the common stock offered by this prospectus. Statements contained in this prospectus regarding the contents of any contract or other document are only summaries. With respect to any contract or document that is filed as an exhibit to the registration statement, you should refer to the exhibit for a copy of the contract or document, and each statement in this prospectus regarding that contract or document is qualified by reference to the exhibit. You may read and copy the registration statement and its exhibits and schedules at the SEC's public reference room, located at 100 F Street, N.E., Room 1580, Washington D.C. You may obtain information on the operation of the public reference room by calling the SEC at 1-800-SEC-0330. The SEC also maintains a website that contains reports, proxy and information statements and other information regarding companies, such as ours, that file documents electronically with the SEC. The address of that website is www.sec.gov. The information on the SEC's website is not part of this prospectus, and any references to this website or any other website are inactive textual references only.

Upon the closing of this offering, we will become subject to the information and reporting requirements of the Securities Exchange Act of 1934 and, in accordance with this law, will be required to file periodic reports, proxy statements and other information with the SEC. These periodic reports, proxy statements and other information will be available for inspection and copying at the SEC's public reference facilities and the website of the SEC referred to above.

REFERENCES

The following documents are referenced in this prospectus related to our business:

- "*Antibiotic Resistance Threats in the United States, 2013*," report of the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Dr. Tom Frieden, M.D., MPH, Director (Apr 23, 2013).

- "*Containment of a Country-wide Outbreak of Carbapenem-Resistant Klebsiella pneumonia in Israeli Hospitals via a Nationally Implemented Intervention*" by Mitchell J. Schwaber, Boaz Lev, Avi Israeli, Ester Solter, Gill Smollan, Bina Rubinovitch, Itamar Shalit, Yehuda Carmeli and the Israel Carbapenem-Resistant Enterobacteriaceae Working Group, **Clinical Infectious Diseases**, volume 52, pages 848-55 (Apr 1, 2011).

- "*Combating Antibiotic-Resistant Bacteria*," Executive Order of The White House, issued September 18, 2014.

- "*Fact Sheets: CMS to Improve Quality of Care during Hospital Inpatient Stays*," www.cms.gov/Newsroom (Aug. 4, 2014).

- "*Global Spread of Carbapenemase-producing Enterobacteriaceae, by Patrice Nordmann*," Thierry Naas and Laurent Poirel, Emerging Infectious Diseases, volume 17, no. 10, www.cdc.gov/eid (Oct 2011).

- "*The Last Resort*" by Maryn McKenna, **Nature**, volume 499, pages 394-96 (Jul 25, 2013)

- "*10 x '20 Progress-Development of New Drugs Active Against Gram-Negative Bacilli: An Update from the Infectious Diseases Society of America*," by Helen W. Boucher, George H. Talbot, Daniel K. Benjamin Jr., John Bradley, Robert J. Guidos, Ronald N. Jones, Barbara E. Murray, Robert A. Bonomo and David Gilbert, **Clinical Infectious Diseases**, volume 56, pages 1685-94 (Jun 15, 2013), or Boucher et al.

- "*Updated ECDC risk assessment on the spread of new Delhi metallo-β-lactamase and its variants within Europe*," Technical Report of the European Centre for Disease Prevention and Control, http://ecdc.europa.eu/en/publications/Publications/Forms/ECDC_DispForm.aspx?ID=740 (Sept 13, 2011).

OPGEN, INC.
Index to Audited Financial Statements

Years Ended December 31, 2014 and 2013

Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders
OpGen, Inc.

We have audited the accompanying balance sheets of OpGen, Inc. as of December 31, 2014 and 2013, and the related statements of operations, stockholders' deficit and cash flows for the years then ended. OpGen, Inc.'s management is responsible for these financial statements. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. Our audits included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of OpGen, Inc. as of December 31, 2014 and 2013, and the results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in the Note 1 to the financial statements, the Company has incurred cumulative net losses since inception and will need additional capital to fund future operations. These conditions raise substantial doubt about its ability to continue as a going concern. The accompanying financial statements do not include any adjustments that might result from the outcome of this uncertainty.

/s/ CohnReznick LLP

Vienna, Virginia
March 2, 2015

OpGen, Inc.
Balance Sheets
December 31,

	2014	2013
Assets		
Current assets		
Cash and cash equivalents	$ 749,517	$ 1,400,345
Accounts receivable, net	503,983	241,897
Inventory, net	369,742	175,713
Prepaid expenses and other current assets	90,233	146,438
Total current assets	**1,713,475**	**1,964,393**
Property and equipment, net	587,956	1,079,423
Licensed technology and other intangible assets, net	-	57,594
Deferred IPO issuance costs	296,041	-
Other noncurrent assets	57,459	57,459
Total assets	**$ 2,654,931**	**$ 3,158,869**
Liabilities, Preferred Stock and Stockholders' Deficit		
Current liabilities		
Accounts payable	$ 1,160,081	$ 869,172
Accrued compensation and benefits	423,099	517,250
Accrued liabilities	993,657	743,767
Deferred revenue	339,171	509,728
Current portion of long-term debt	5,000	10,000
Current maturities of long-term capital lease obligation	100,499	105,967
Convertible notes	1,500,000	-
Secured demand notes	1,500,000	-
Total current liabilities	**6,021,507**	**2,755,884**
Long-term capital lease obligation, less current maturities	134,149	234,562
Total liabilities	**6,155,656**	**2,990,446**
Commitments and contingencies (note 10)		
Redeemable convertible preferred stock		
Series A redeemable convertible preferred stock, $.01 par value; 6,000,000 shares authorized; 3,999,864 and 1,999,864 shares issued and outstanding at December 31, 2014 and 2013, respectively; aggregate liquidation preference of $7,999,728 and $3,999,728 at December 31, 2014 and 2013, respectively	4,564,899	1,999,864
Total redeemable convertible preferred stock	**4,564,899**	**1,999,864**
Stockholders' deficit		
Common stock, $.01 par value; 7,500,000 shares authorized; 493,178 and 362,537 shares issued and outstanding at December 31, 2014 and 2013, respectively	4,932	3,625
Additional paid-in capital	88,701,737	89,265,757
Accumulated deficit	(96,772,293)	(91,100,823)
Total stockholders' deficit	**(8,065,624)**	**(1,831,441)**
Total liabilities, preferred stock and stockholders' deficit	**$ 2,654,931**	**$ 3,158,869**

See accompanying notes to financial statements.

OpGen, Inc.
Statements of Operations
Years ended December 31,

	2014	2013
Revenue		
Product sales	$ 1,236,349	$ 1,735,517
Laboratory services	478,909	630,851
Collaborations revenue	2,411,120	44,239
Total revenue	**4,126,378**	**2,410,607**
Operating expenses		
Cost of products sold	425,541	1,501,648
Cost of services	526,196	320,938
Argus™ Whole Genome obsolescence	-	950,881
Research and development	4,368,302	4,151,936
General and administrative	2,312,935	2,762,205
Sales and marketing	2,058,085	3,053,394
Total operating expenses	**9,691,059**	**12,741,002**
Operating loss	**(5,564,681)**	**(10,330,395)**
Other income (expense)		
Interest income	156	1,222
Interest expense	(111,345)	(31,598)
Change in fair value of derivative financial instruments	-	134,560
Other income (expense)	4,400	91,390
Total other income (expense)	**(106,789)**	**195,574**
Net loss	**$ (5,671,470)**	**$ (10,134,821)**
Preferred stock dividends	(627,133)	(5,372,978)
Net loss available to common stockholders	**$ (6,298,603)**	**$ (15,507,799)**
Net loss per common share - basic and diluted	**$ (16.25)**	**$ (896.09)**
Weighted average shares outstanding - basic and diluted	387,590	17,306
Pro forma net loss per common share, basic and diluted (unaudited) (note 16)	**$ (1.20)**	
Pro forma weighted average shares outstanding – basic and diluted (unaudited) (note 16)	**4,687,713**	

See accompanying notes to financial statements.

OpGen, Inc.
Statements of Stockholders' Deficit
Years ended December 31, 2014 and 2013

	Common Stock				
	Number of Shares	Amount	Additional Paid-in Capital	Accumulated Deficit	Total
Balances at January 1, 2013	**3,517**	**$ 35**	**$ -**	**$ (75,593,024)**	**$ (75,592,989)**
Stock option exercises	46	-	1,217	-	1,217
Stock compensation expense	-	-	152,753	-	152,753
Accrued dividends, Prior Senior Preferred Stock	-	-	-	(5,058,786)	(5,058,786)
Accretion of Prior Senior Preferred Stock	-	-	-	(314,192)	(314,192)
Conversion of Prior Preferred Stock to common stock	358,974	3,590	89,111,787	-	89,115,377
Net loss	-	-	-	(10,134,821)	(10,134,821)
Balances at December 31, 2013	**362,537**	**3,625**	**89,265,757**	**(91,100,823)**	**(1,831,441)**
Stock option exercises	1	-	8		8
Restricted stock unit vesting	130,640	1,307	(1,307)		-
Stock compensation expense			64,412)		64,412
Accretion of Series A Preferred Stock			(627,133)		(627,133)
Net loss				(5,671,470)	(5,671,470)
Balances at December 31, 2014	**493,178**	**$ 4,932**	**$ 88,701,737**	**$ (96,772,293)**	**$ (8,065,624)**

See accompanying notes to financial statements.

OpGen, Inc.
Statements of Cash Flows
Years Ended December 31,

	2014	2013
Cash flows from operating activities		
Net loss	$ (5,671,470)	$ (10,134,821)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	573,918	661,807
Amortization of deferred financing costs	19,036	5,406
Non-cash interest expense	65,132	6,334
Bad debt expense	4,000	7,301
Recovery of bad debt	(8,400)	(49,050)
Loan forgiveness	-	(36,811)
Stock compensation expense	64,412	152,753
Inventory obsolescence expense	21,877	924,285
Change in fair value of derivative financial instruments	-	(134,560)
Other non-cash items	14,681	1,639
Changes in operating assets and liabilities:		
Accounts receivable	(257,686)	938,174
Inventory	(215,906)	(506,088)
All other assets	76,554	163,493
Accounts payable	198,177	271,460
Accrued compensation and other liabilities	(99,310)	(112,002)
Deferred revenue	(170,557)	352,858
Net cash used in operating activities	**(5,385,542)**	**(7,487,822)**
Cash flows from investing activities		
Purchases of property and equipment	(39,537)	(109,871)
Net cash used in investing activities	**(39,537)**	**(109,871)**
Cash flows from financing activities		
Proceeds from issuance of preferred stock, net of issuance costs	1,937,902	(2,670)
Proceeds from issuance of convertible notes, net of issuance costs	1,472,386	969,864
Proceeds from issuance of demand notes, net of issuance costs	1,488,229	1,030,000
Proceeds from exercise of stock options and warrants	8	1,217
Payments on debt	(5,000)	(75,000)
Payments on capital lease obligations	(105,881)	(43,087)
Deferred IPO issuance costs	(13,393)	-
Net cash provided by financing activities	**4,774,251**	**1,880,324**
Net decrease in cash and cash equivalents	(650,828)	(5,717,369)
Cash and cash equivalents at beginning of year	1,400,345	7,117,714
Cash and cash equivalents at end of year	**$ 749,517**	**$ 1,400,345**
Supplemental disclosure of cash flow information		
Cash paid during the year for interest	$ 32,296	$ 26,088
Supplemental disclosure of noncash investing and financing activities:		
Acquisition of equipment purchased through capital leases	$ -	$ 312,105
Conversion of convertible notes to Series A Preferred Stock	$ -	$ 1,999,864
Deferred IPO issuance costs included in accounts payable and accrued compensation and other liabilities	$ 282,648	$ -

See accompanying notes to financial statements.

Note 1 - Organization

OpGen, Inc. (OpGen or the Company) was incorporated in Delaware on January 22, 2001. OpGen is an early-stage company using rapid molecular testing and bioinformatics to assist healthcare providers to combat multi-drug-resistant infections, as well as providing products and services for Whole Genome Mapping and analysis of microbial, plant, animal and human genomes for life sciences applications. The Company's lead MDRO product is the Acuitas™ MDRO Gene Test, a CLIA lab-based test that provides a profile of MDRO resistant genes from patients screened for colonization or infection. In addition, the Company has more than ten years of experience mapping microbial and other genomes using its proprietary Whole Genome Mapping technology and providing related products and services to customers.

The Company's headquarters and principal operations are in Gaithersburg, Maryland. The Company operates in one business segment.

The Company's operations are subject to certain risks and uncertainties. The risks include rapid technology changes, the need to manage growth, the need to retain key personnel, the need to protect intellectual property and the need to raise additional capital financing on terms acceptable to the Company. The Company's success depends, in part, on its ability to develop and commercialize its novel technology as well as raise additional capital.

Note 2 - Going Concern and Management’s Plans

The accompanying financial statements have been prepared on a going-concern basis, which contemplates the realization of assets and satisfaction of liabilities in the normal course of business. Since inception, the Company has incurred, and continues to incur, significant losses from operations, and has negative operating cash flows and a deficit in stockholders' equity.

As more fully described in Notes 5 and 6, the Company raised the following from existing stockholders of the Company: (i) $4.0 million in two Series A Preferred Stock offerings during the fourth quarter of 2013 and early 2014, (ii) $1.5 million through the issuance of convertible notes in the third quarter of 2014, and (iii) $1.5 million of secured 2014 demand notes in the fourth quarter of 2014. In the first quarter of 2015, the Company raised an additional $0.3 million from a stockholder and officer through the issuance of a secured demand note which was paid in full in conjunction with participation in the $1.5 million 2015 convertible notes offering. The Company raised $1.2 million in the 2015 convertible notes offering from existing stockholders, which closed in February 2015, and is offering $0.3 million of additional 2015 convertible notes to other investors with participation rights (see Note 15). Management is actively engaged in efforts to raise additional capital. The Company's current operating assumptions, which include management's best estimate of future revenue and operating expenses, indicate that current cash on hand will not be sufficient to fund operations as currently configured through the end of the second quarter of 2015. In the event the Company is unable to successfully raise additional capital, the Company will not have sufficient cash flows and liquidity to finance its business operations as currently contemplated. Accordingly, in such circumstances the Company would be compelled to reduce general and administrative expenses and delay research and development projects including the purchase of scientific equipment and supplies until it is able to obtain sufficient financing.

These conditions raise substantial doubt as to the Company’s ability to continue as a going concern. The financial statements do not include any adjustments relating to recoverability and classification of recorded asset amounts or the amounts and classification of liabilities that might be necessary should the Company be unable to continue in existence.

Note 3 - Summary of Significant Accounting Policies

Use of Estimates

In preparing financial statements in conformity with accounting principles generally accepted in the United States ("US GAAP"), management is required to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. In the accompanying financial statements, estimates are used for, but not limited to, stock-based compensation; allowances for doubtful accounts and inventories; valuation of derivative financial instruments; deferred tax assets and liabilities and related valuation allowance; and depreciation and amortization and estimated useful lives of long-lived assets. Actual results could differ from those estimates.

Cash and Cash Equivalents

The Company considers all highly liquid instruments with original maturities of three months or less to be cash equivalents.

The Company has cash and cash equivalents deposited in financial institutions in which the balances occasionally exceed the federal government agency (FDIC) insured limits of $250,000. The Company has not experienced any losses in such accounts and management believes it is not exposed to any significant credit risk.

The Company has certificates of deposit totaling $57,459, which are required as collateral for a letter of credit benefiting the landlord for its facility lease and by a credit card processor. These certificates of deposits are reflected in other long-term assets on the accompanying balance sheets.

Fair Value

The Company’s balance sheets include various financial instruments (primarily accounts receivable, accounts payable and accrued expenses and other current liabilities) that are carried at cost, which approximates fair value due to the short-term nature of the instruments. Notes payable are reflective of fair value based on market comparable instruments with similar terms.

For additional fair value disclosures, see Note 13.

Accounts Receivable

The Company’s accounts receivable result from revenues earned but not collected from customers. Credit is extended based on an evaluation of a customer’s financial condition and, generally, collateral is not required. Accounts receivable are due within 30 to 45 days and are stated at amounts due from customers. The Company evaluates if an allowance is necessary by considering a number of factors, including the length of time accounts receivable are past due, the Company’s previous loss history and the customer’s current ability to pay its obligation. If amounts become uncollectible, they are charged to operations when that determination is made. The Company charged $4,000 and $7,301 as bad debt expense within other expense in 2014 and 2013, respectively, for accounts it considered uncollectible. The allowance for doubtful accounts was $79,697 and $88,097 as of December 31, 2014 and 2013, respectively. Approximately $8,400 and $49,050 was collected from an international distributor during 2014 and 2013, respectively, on the bad debt written off in 2012.

At December 31, 2014, the Company had accounts receivable from two customers which individually represent 79% and 15% of total accounts receivable. At December 31, 2013, the Company had accounts receivable from three customers which individually represent 24%, 20%, and 10% of total accounts receivable. For the year ended December 31, 2014 one individual customer represented 59% of revenues. For the year ended December 31, 2013 four individual customers represented 12%, 12%, 10% and 10% of revenues.

Inventories
Inventories are valued using the first-in, first-out method and stated at the lower of cost or market and consist of the following:

	December 31, 2014	December 31, 2013
Raw materials and supplies	$ 40,749	$ 51,005
Work-in-process	135,625	63,917
Finished goods	193,368	60,791
Total inventories	$ 369,742	$ 175,713

Inventories include the Argus™ Whole Genome Mapping Systems, reagents and supplies used for Argus™ consumable kits, and cards used for the Argus™ Whole Genome Mapping System as well as in the sales of the Company's laboratory services. Inventory reserve for obsolescence and expirations was $867,816 and $1,024,006 at December 31, 2014 and 2013, respectively.

Based on actual and anticipated sales levels of Argus™ Whole Genome Mapping Systems, in 2013 management conducted a thorough review of its inventory position for this product line. As a result, a provision for inventory losses of approximately $950,000 was charged against operations in 2013 to write down inventory to its expected net realizable value.

Software Development Costs
The cost to produce software that is sold as a separate product is capitalized when the software reaches technical feasibility in the development process. Technical feasibility begins when the product design is completed, which is typically when the final product specifications are determined. Costs incurred prior to technical feasibility are expensed as incurred as research and development. Capitalized costs are included in other assets when deferred and are included in cost of product sales as the software is sold.

In 2012, the Company capitalized $20,138 in software production costs related to software the Company was developing for its Whole Genome Mapping product offering. An additional $183,720 of software production costs were incurred in 2013. Development of this software was terminated in April 2013 when the Company restructured its operations and accelerated its planned strategic re-positioning into the clinical diagnostics market. At that time, the Company charged the $203,858 of costs incurred since inception of the software development to operations as research and development expense. As a result, there are no capitalized software costs at December 31, 2014 and 2013, respectively.

Product Warranty
A warranty reserve is established upon the sale of any product that is covered by warranty based on the estimated cost of replacement parts during the warranty period. Warranty periods are twelve months. The reserve is adjusted during the warranty period to reflect the remaining estimated costs under the warranty.

The following table presents the accrued warranty reserve, the warranty expense and cost of replacement parts:

	December 31, 2014	December 31, 2013
Balance at beginning of year	$ 6,500	$ 19,750
Warranty expense	4,077	8,298
Cost of replacement parts and related delivery	(7,827)	(21,548)
Balance at end of year	$ 2,750	$ 6,500

Licensed Technology and Other Intangible Assets
Licensed technology and other intangible assets consist primarily of costs related to patents and licensed technology. These costs were capitalized and amortized over the estimated useful lives of the underlying technology, which ranged from two to 10 years. As part of an analysis of the Argus™ Whole Genome Mapping technology in 2013, a change in the estimated lives was made during 2013 such that the amortization period for all of the licensed technology would end by December 31, 2014. In addition, one license agreement was terminated in December 2013 and the related licensed technology costs were amortized in full. As a result, approximately $90,000 of capitalized technology costs and associated accumulated amortization were written off in 2013 upon the termination of the fully amortized license

Total amortization expense was $57,594 and $108,452 for the years ended December 31, 2014 and 2013, respectively. Accumulated amortization was $698,949 and $641,335 at December 31, 2014 and 2013, respectively. All intangible assets were fully amortized at December 31, 2014.

Property and Equipment
Property and equipment are stated at cost and depreciated on a straight-line basis over the estimated useful lives of the related assets. The estimated service lives approximate three to five years. Depreciation expense was $516,324 and $553,355 for the years ended December 31, 2014 and 2013, respectively. Property and equipment consisted of the following at December 31, 2014 and 2013:

	December 31, 2014	December 31, 2013
Laboratory equipment	$ 2,304,615	$ 2,265,717
Office furniture and equipment	691,032	792,129
Computers	1,169,910	1,167,144
Leasehold improvements	245,558	250,442
	4,411,115	4,475,432
Less accumulated depreciation	(3,823,159)	(3,396,009)
Property and equipment, net	$ 587,956	$ 1,079,423

In 2012, the Company began to provide Argus™ Whole Genome Systems under its Argus Reagent Rental Program to customers, in which the Company retains title without requiring customers to purchase the equipment or enter into an equipment lease or rental contract. The costs associated with these instruments are capitalized as fixed assets and charged to sales and marketing on a straight-line basis over the estimated useful life of the instrument, which is approximately four years. During the years ended December 31, 2014 and 2013, these costs were approximately $101,000 and $81,000, respectively. The costs to maintain these systems are charged to operations as incurred. Proceeds from the sale of Reagent Rental Program Systems to customers are reported as Product sales and the remaining net book value of the system is charged to Cost of products sold.

Impairment of Long-Lived Assets
The Company assesses the recoverability of its long-lived assets whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of a long-lived asset is measured by a comparison of the carrying amount of the asset to future undiscounted net cash flows expected to be generated by the asset. An impairment loss would be measured as the amount by which the carrying value of the asset exceeds the estimated fair value of the asset. Assets to be disposed of are reported at the lower of the carrying amount or fair value, less costs to sell. As of December 31, 2014 and 2013, the Company determined that there were no impaired long-lived assets.

Deferred IPO Issuance Costs
Deferred initial public offering (“IPO”) costs, which primarily consist of legal and accounting fees related to the IPO, are capitalized. Deferred and other IPO costs will be offset against IPO proceeds upon the consummation of the IPO. In the event the offering is terminated, deferred IPO costs will be expensed.

Deferred Rent
Deferred rent is recorded and amortized to the extent the total minimum rental payments allocated to the current period on a straight-line basis exceed or are less than the cash payments required. Deferred rent is included in accrued liabilities on the balance sheets.

Revenue Recognition
The Company recognizes revenue primarily from sales of the Argus™ System, sales of extended warranty service contracts for the Argus™ System, and from "funded software development" arrangements with collaborative parties. Revenue is recognized when the following criteria are met: persuasive evidence of an arrangement exists; delivery has occurred; the selling price is fixed or determinable; and collectability is reasonably assured. At times, the Company sells products and services, or performs software development, under multiple-element arrangements with separate units of accounting; in these situations, total consideration is allocated to the identified units of accounting based on their relative selling prices and revenue is then recognized for each unit based on its specific characteristics.

Amounts billed to customers for shipping and handling are included in revenue when the related product or service revenue is recognized. Shipping and handling costs are included in cost of sales; the Company recognized revenue of $22,924 and $35,213 in 2014 and 2013, respectively, for shipping and handling.

Revenue from sales of the Argus™ System
When the Argus™ System is sold without the Genome Builder software, total arrangement consideration is recognized as revenue when the system is delivered to the customer. Ancillary performance obligations, including installation, limited customer training and limited consumables, are considered inconsequential and are combined with the Argus™ System as one unit of accounting.

When the Argus™ System is sold with the Genome Builder software in a multiple-element arrangement, total arrangement consideration is allocated to the Argus™ System and to the Genome Builder software (considered multiple elements) based on their relative selling prices. Selling prices are determined based on sales of similar systems to similar customers and, where no sales have occurred, on management's best estimate of the expected selling price relative to similar products. Revenue related to the Argus™ System is recognized when it is delivered to the customer; revenue for the Genome Builder software is recognized when it is delivered to the customer.

Revenue from sales of Genome Builder Software and consumables (on a stand-alone basis)
Revenue is recognized for Genome Builder Software and for consumables, when sold on a stand-alone basis, upon delivery to the customer.

Revenue from extended warranty service contracts
The Company recognizes revenue associated with extended warranty service contracts over the service period in proportion to the costs expected to be incurred over that same period.

Revenue from funded software development arrangements
The Company's funded software development arrangements generally consist of multiple-elements. Total arrangement consideration is allocated to the identified units of accounting based on their relative selling prices and revenue is then recognized for each unit based on its specific characteristics. When funded software development arrangements include substantive research and development milestones, revenue is recognized for each such milestone when the milestone is achieved and is due and collectible. Milestones are considered substantive if all of the following conditions are met: (1) the milestone is nonrefundable; (2) achievement of the milestone was not reasonably assured at the inception of the arrangement; (3) substantive effort is involved to achieve the milestone; and (4) the amount of the milestone appears reasonable in relation to the effort expended, the other milestones in the arrangement and the related risk associated with achievement of the milestone.

Research and Development Costs
Research and development costs are expensed as incurred. Research and development costs primarily consist of salaries and related expenses for personnel, other resources, fees paid to consultants and outside service partners.

Income Taxes
Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the expected future tax consequences attributable to temporary differences between financial statement carrying amounts of existing assets and liabilities and their respective tax basis. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date. A valuation allowance is established when necessary to reduce deferred income tax assets to the amount expected to be realized.

Tax benefits are initially recognized in the financial statements when it is more likely than not the position will be sustained upon examination by the tax authorities. Such tax positions are initially, and subsequently, measured as the largest amount of tax benefit that is greater than 50% likely of being realized upon ultimate settlement with the tax authority, assuming full knowledge of the position and all relevant facts.

Loss Per Share
Basic loss per share is computed by dividing net loss available to common stockholders by the weighted average number of shares of common stock outstanding during the period.

For periods of net income, and when the effects are not anti-dilutive, diluted earnings per share is computed by dividing net income available to common stockholders by the weighted-average number of shares outstanding plus the impact of all potential dilutive common shares, consisting primarily of common stock options and stock purchase warrants using the treasury stock method, and convertible preferred stock and convertible debt using the if-converted method.

For periods of net loss, diluted loss per share is calculated similarly to basic loss per share because the impact of all dilutive potential common shares is anti-dilutive. The number of anti-dilutive shares, consisting of common stock options, stock purchase warrants, convertible preferred stock and convertible debt exercisable or exchangeable into common stock which have been excluded from the computation of diluted loss per share, were 6.0 million and 2.1 million for the years ended December 31, 2014 and 2013, respectively. The Company’s convertible preferred stock contain non-forfeitable rights to dividends, and therefore are considered to be participating securities; the calculation of basic and diluted income (loss) per share excludes net income (but not net loss) attributable to the convertible preferred stock from the numerator and excludes the impact of those shares from the denominator.

Redeemable Convertible Preferred Stock
The carrying value of the Company's current redeemable convertible preferred stock, which is referred to in these Notes as "Series A Preferred Stock," is increased by the accretion of related discounts, issuance costs and accrued but unpaid dividends so that the carrying amount will equal the redemption amount at the dates the stock becomes redeemable. The Series A Preferred Stock is redeemable at the option of the holders of 70% of the outstanding shares of preferred stock, subject to certain additional requirements (Note 6). Prior to the December 2013 recapitalization (see Note 5), the Company's preferred stock consisted of its Series A Convertible Preferred Stock ("Prior Series A Preferred Stock"), its Series A-1 Redeemable Preferred Stock ("Prior Series A-1 Preferred Stock"), its Series B Convertible Preferred Stock ("Prior Series B Preferred Stock"), and its Series C Convertible Preferred Stock ("Prior Series C Preferred Stock"). In these Notes, the Prior Series A Preferred Stock, the Prior Series B Preferred Stock and the Prior Series C Preferred Stock are collectively referred to as the "Prior Senior Preferred Stock" and the Prior Senior Preferred Stock with the Prior Series A-1 Preferred Stock are collectively referred to as the "Prior Preferred Stock". The Prior Preferred Stock were converted into common stock in the December 2013 recapitalization (Note 5).

Share-Based Compensation
Share-based payments are recognized at fair value. The fair value of share-based payments to employees and directors is estimated, on the date of grant, using the Black-Scholes model. The resulting fair value is recognized ratably over the requisite service period, which is generally the vesting period of the option.

For all time-vesting awards granted, expense is amortized using the straight-line attribution method. For awards that contain a performance condition, expense is amortized using the accelerated attribution method. Share-based compensation expense recognized is based on the value of the portion of stock-based awards that is ultimately expected to vest during the period.

The Company utilizes the Black-Scholes model for estimating fair value of its stock options granted. Option valuation models, including the Black-Scholes model, require the input of highly subjective assumptions, and changes in the assumptions used can materially affect the grant-date fair value of an award. These assumptions include the risk-free rate of interest, expected dividend yield, expected volatility and the expected life of the award.

A discussion of management’s methodology for developing each of the assumptions used in the Black- Scholes model is as follows:

Fair value of common stock
Given the lack of an active public market for the common stock, the Company’s board of directors determined the fair value of the common stock. In the absence of a public market, and as an emerging company with no significant revenues, the Company believes that it is appropriate to consider a range of factors to determine the fair market value of the common stock at each grant date. The factors include: (1) the achievement of clinical and operational milestones by the Company; (2) the status of strategic relationships with collaborators; (3) the significant risks associated with the Company’s stage of development; (4) capital market conditions for life science and medical diagnostic companies, particularly similarly situated, privately held, early-stage companies; (5) the Company’s available cash, financial condition and results of operations; (6) the most recent sales of the Company’s preferred stock; and (7) the preferential rights of the outstanding preferred stock.

Expected volatility
Volatility is a measure of the amount by which a financial variable such as a share price has fluctuated (historical volatility) or is expected to fluctuate (expected volatility) during a period. The Company does not maintain an internal market for its shares and its shares are not traded publicly. The Company has been able to identify several public entities of similar size, complexity and stage of development; accordingly, historical volatility has been calculated using the volatility of this peer group.

Expected dividend yield
The Company has never declared or paid dividends and has no plans to do so in the foreseeable future.

Risk-free interest rate
This is the U.S. Treasury rate for the day of each option grant during the year, having a term that most closely resembles the expected term of the option.

Expected term
This is the period of time that the options granted are expected to remain unexercised. Options granted have a maximum term of 10 years. The Company estimates the expected term of the option to be 6.25 years for options with a standard four-year vesting period, using the simplified method. Over time, management will track actual terms of the options and adjust their estimate accordingly so that estimates will approximate actual behavior for similar options.

Expected forfeiture rate
The forfeiture rate is the estimated percentage of options granted that is expected to be forfeited or canceled on an annual basis before becoming fully vested. The Company estimates the forfeiture rate based on turnover data with further consideration given to the class of the employees to whom the options were granted.

The estimated fair value of equity instruments issued to nonemployees are recorded at fair value on the earlier of the performance commitment date or the date the services required are completed.

Research Collaborations and Development Agreements
In August 2011, the Company entered into a collaboration agreement with a university in the United States to collect, produce, and distribute high-quality, annotated genomic sequence and organism phenotype data from clinically relevant microbes and associated patient demographic data. The primary responsibilities of the university were to create a data storage model including whole genome map data, perform genomic sequencing of relevant microbes, and coordinate publications. The Company's primary responsibilities were to provide funding of up to $250,000 for the hiring of two informatics resources at the university, supply whole genome maps, and supply other clinically relevant data. The collaboration was expected to operate through the end of 2012 and was cancelable by either party on 60 days' notice. In 2014 the agreement was amended to limit the scope of work to the $135,557 already incurred and to adjust payment terms, and as of December 31, 2014, $80,000 was outstanding and is scheduled to be paid in 2015.

In 2007, the Company entered into a development agreement with a governmental entity in which the Company would receive fixed milestone payments for meeting development milestones under the agreement. The first phase of this agreement was completed in 2010. The Company also issued a warrant for Prior Series A Preferred Stock to the governmental entity at the initiation of the agreement. In December 2011, the Company amended the agreement to begin a new phase of development work. Under the contract, the Company was contracted to significantly modify existing software, which changed the functionality of the existing software and other components supplied under the contract. The Company received fixed-fee payments for development work under this amendment and recognized revenue using percentage of completion accounting. The Company recognized revenue of $16,461 in 2013 under this contract. Expenses incurred for development activities under this amendment are reported as research and development expenses as incurred and were $4,514 in 2013. Upon signing the amendment in December 2011, the Company agreed to issue the governmental entity warrants to purchase Prior Series C Preferred Stock upon the successful close of the Prior Series C Preferred Stock financing; on March 5, 2012, the Company issued a warrant to purchase 3,260,870 shares of Prior Series C Preferred Stock. The warrant became vested in proportion to the revenue received by the Company under the development agreement and was fully vested in early 2013. The warrant was exercisable at $0.138 and had a term of seven years. The Company valued the warrant at $133,899, which was recorded as a liability and recognized charges to other expense of $1,639 in 2013. The Prior Series C Preferred Stock warrant was converted into a common stock warrant to purchase 4,125 shares of common stock in the December 2013 recapitalization (see Note 5).

In September 2013, the Company entered into a technology development agreement in which the Company would receive fixed milestone payments for meeting development milestones under the agreement. Since the milestones are substantive, the Company will recognize revenue in the periods in which the substantive milestones are achieved; the Company attained sixteen milestones during 2014 and recognized $2.3 million of revenue related to the milestones. In addition, the Company received an upfront payment of $250,000, which will be recognized on a straight-line basis over the term of the technology development agreement. The Company recognized total revenue of $2,411,120 and $27,778 during 2014 and 2013, respectively, relating to this arrangement.

Reverse Stock Split
In connection with the recapitalization of the Company (see note 5), on December 18, 2013, the Company affected a 1-for-790.5407 reverse split of its common stock. The reverse stock split affected all of the holders of common stock uniformly. Shares of common stock underlying outstanding options and warrants were proportionately reduced and the exercise price of outstanding options and warrants was proportionately increased in accordance with the terms of the agreements governing such securities. All common stock share and per share information in the accompanying financial statements and notes thereto included in this report have been retroactively adjusted to reflect retrospective application of the reverse stock split, except for par value per share and the number of authorized shares, which were not affected by the reverse stock split. In addition, corresponding amounts were reclassified from common stock to additional paid-in capital.

Recent Accounting Pronouncements
In July 2013, the Financial Accounting Standards Board (“FASB”) issued guidance for the presentation of an unrecognized tax benefit when a net operating loss (“NOL”) carryforward, a similar tax loss, or a tax credit carryforward exists. The guidance requires an entity to present in the financial statements an unrecognized tax benefit, or a portion of an unrecognized tax benefit, as a reduction to a deferred tax asset for an NOL carryforward, a similar tax loss, or a tax credit carryforward. If the NOL carryforward, a similar tax loss, or a tax credit carryforward is not available at the reporting date under the tax law of the jurisdiction or the tax law of the jurisdiction does not require the entity to use, and the entity does not intend to use, the deferred tax asset for such purpose, the unrecognized tax benefit will be presented in the financial statements as a liability and will not be combined with deferred tax assets. This guidance does not require any additional recurring disclosures and is effective for fiscal years beginning after December 15, 2013. The adoption of this guidance did not have a material impact on our financial statements.

In May 2014, the FASB issued guidance for revenue recognition for contracts, superseding the previous revenue recognition requirements, along with most existing industry-specific guidance. The guidance requires an entity to review contracts in five steps: 1) identify the contract, 2) identify performance obligations, 3) determine the transaction price, 4) allocate the transaction price, and 5) recognize revenue. The new standard will result in enhanced disclosures regarding the nature, amount, timing and uncertainty of revenue arising from contracts with customers. The standard is effective for our reporting year beginning January 1, 2017 and early adoption is not permitted. We are currently evaluating the impact, if any, that this new accounting pronouncement will have on our financial statements

In August 2014, the FASB issued guidance requiring management to evaluate on a regular basis whether any conditions or events have arisen that could raise substantial doubt about the entity's ability to continue as a going concern. The guidance 1) provides a definition for the term "substantial doubt," 2) requires an evaluation every reporting period, interim periods included, 3) provides principles for considering the mitigating effect of management's plans to alleviate the substantial doubt, 4) requires certain disclosures if the substantial doubt is alleviated as a result of management's plans, 5) requires an express statement, as well as other disclosures, if the substantial doubt is not alleviated, and 6) requires an assessment period of one year from the date the financial statements are issued. The standard is effective for our reporting year beginning January 1, 2017 and early adoption is permitted. We are currently evaluating the impact, if any, that this new accounting pronouncement will have on our financial statements.

We have evaluated all other issued and unadopted Accounting Standards Updates and believe the adoption of these standards will not have a material impact on our results of operations, financial position, or cash flows.

Note 4 - Restructuring Costs

In February and April 2013, the Company restructured its operations to reduce expenditures and conserve cash while accelerating its planned strategic re-positioning into the clinical diagnostics market. In connection with this restructuring, in 2013 the Company reduced its workforce by approximately 36%, or 16 employees, and incurred and paid $329,649 of restructuring costs. There were no restructuring costs in 2014.

Note 5 - Recapitalization

On November 1, 2013, the Company and various investors entered into a financing commitment agreement whereby the Company sold Demand Notes to the investors in the amount of $1,030,000 and the Company commenced a rights offering consisting of $2,000,000 of convertible promissory notes (the "2013 convertible notes"), convertible into the Company's new Series A Redeemable Convertible Preferred Stock (the "Series A Preferred Stock") at $1.00 per share of Series A Preferred Stock. On December 18, 2013, the Company issued $1,999,864 in 2013 convertible notes in exchange for $969,864 in cash and in exchange for bridge funding demand notes that had been issued in the fourth quarter of 2013. On December 30, 2013, the 2013 convertible notes were converted into 1,999,864 shares of Series A Preferred Stock.

In conjunction with, and as a condition of, the financing described above, the following actions were taken as of the date of the issuance of the 2013 convertible notes (these actions are collectively referred to as the "December 2013 recapitalization"):

- A mandatory conversion of all outstanding shares of Prior Senior Preferred Stock into common stock in accordance with the terms of the Certificate of Incorporation,
- A mandatory conversion of all outstanding shares of the Prior Series A-1 Preferred Stock into common stock on a one-to-one basis,
- Elimination of all mandatory, accrued, cumulative and unpaid dividends on the Prior Senior Preferred Stock,
- A 1-for-790.5407 reverse stock split of the Company's common stock as of the financing date, and
- Conversion of all outstanding options and warrants on the reverse stock split terms.

The table below sets forth the various stock issuances of the Company that were outstanding immediately before the December 2013 recapitalization, including the anti-dilution rights available to those shares. The Prior Preferred Stock issuances, excluding anti-dilution rights, were convertible into existing common shares on a one for one basis. The shares listed below, including anti-dilution rights, were converted into 362,537 shares of common stock in the 1 for 790.5407 reverse stock split:

	Shares
Prior Series A Preferred Stock	25,205,800
Prior Series A Preferred Stock Anti-dilution rights	35,915,987
Prior Series B Preferred Stock	64,936,385
Prior Series B Preferred Stock Anti-dilution rights	26,036,056
Prior Series C Preferred Stock	126,802,946
Prior Series A-1 Preferred Stock	4,857,621
Common Stock	2,817,182
Equivalent common shares before recap	286,571,977

The table below sets forth the warrants that were outstanding immediately before the December 2013 recapitalization. These warrants were converted into 37,078 shares of common stock warrants in the 1 for 790.5407 reverse stock split.

	Warrants Outstanding
Prior Series A Preferred Stock Warrants	1,140,000
Prior Series A Preferred Stock Anti-dilution rights	1,624,306
Prior Series C Preferred Stock Warrants	3,260,870
Common Stock Warrants	23,254,778
Equivalent common shares before recap	29,279,954

Immediately prior to the December 2013 recapitalization, there were 16,532,569 common stock options outstanding. These options were converted into options to acquire 20,956 shares of common stock in the 1 for 790.5407 reverse stock split.

Note 6 - Redeemable Convertible Preferred Stock

The Company's current redeemable convertible preferred stock is classified as temporary equity due to redemption provisions outside of the Company's control.

On July 10, 2014, in advance of the issuance of notes convertible into additional shares of the Company's Series A Preferred Stock, the Company filed its Ninth Amended and Restated Certificate of Incorporation to increase the number of authorized shares of preferred stock from 2.5 million to 6.0 million, all designated as Series A Preferred Stock (further convertible into common stock), and to increase the number of authorized shares of common stock from 3.5 million to 7.5 million.

Series A Redeemable Convertible Preferred Stock
The Company issued 1,999,864 shares of Series A Preferred Stock in December 2013 at $1.00 per share in exchange for $1,999,864 in 2013 convertible notes (see Note 5). In February 2014, the Company sold 1,405,096 shares of Series A Preferred Stock for gross proceeds of $1,405,096. In April 2014, the Company sold an additional 594,904 shares of Series A Preferred Stock for gross proceeds of $594,904. The Company incurred issuance costs of $62,098 related to the 2014 Series A Preferred Stock sales. As of December 31, 2014, the Company had a total of 3,999,864 shares of Series A Preferred Stock outstanding, convertible into 3,999,864 shares of common stock.

The following table presents the changes in the Series A Preferred Stock from the December 2013 recapitalization:

	Shares	Amount
December 30, 2013 Issuance	1,999,864	$ 1,999,864
2013 Accretion	-	-
Balance at December 31, 2013	1,999,864	1,999,864
February 2014 Issuance, net of costs	1,405,096	1,361,469
April 2014 Issuance, net of costs	594,904	576,433
2014 Accretion	-	627,133
Balance at December 31, 2014	3,999,864	$ 4,564,899

The Series A Preferred Stock has the right to receive non-cumulative dividends, at a rate of 8% per annum, when and if declared by the board of directors. The Series A Preferred Stock has preference of payment over all other classes and series of capital stock of the Company with respect to dividends, payment on liquidation and payment on redemption. The liquidation and redemption preferences are at two times the Series A Preferred Stock purchase price. The Series A Preferred Stock holders are entitled to vote on all matters that come to stockholders on an as-converted basis with holders of the common stock. In addition, the Series A Preferred Stock has broad based anti-dilution rights. The $627,133 of 2014 accretion in the table above consists of $6,954 of accretion of issuance costs and $620,179 to accrete the Series A Preferred Stock balance on a straight line basis to its redemption price of two times the original issue price on the redemption date.

The holders of Series A Preferred Stock have the right to convert such shares, at their option and at any time, into shares of common stock at the then-applicable conversion rate, as defined. The initial conversion rate is one common share for each preferred share, which may be adjusted for specified dilutive transactions. Beginning in December 2019, the Company may be obligated to redeem shares of Series A Preferred Stock, if requested, by holders of at least 70% of the then-outstanding shares of Series A Preferred Stock. The redemption, if requested, would take place in three equal annual installments. Series A Preferred Stock would be redeemed at two times the original issue price per share plus all accrued and unpaid dividends. The redemptions are subject to certain equity adjustments for specified anti-dilution transactions, as defined.

Prior Senior Preferred Stock
Holders of the Prior Senior Preferred Stock outstanding before the December 2013 recapitalization had a liquidation preference senior to that of the common stock. Upon a liquidation of the Company, the proceeds of the liquidation would have been distributed as follows, unless the Prior Senior Preferred Stock holders would have received a greater amount upon the conversion of their shares to common. First, to the holders of Prior Series C Preferred Stock, an amount per share equal to two times the Prior Series C Preferred Stock original issue price; second, to the holders of Prior Series A Preferred Stock and Prior Series B Preferred Stock, pari passu, an amount per share equal to the Prior Series A Preferred Stock original issue price and the Prior Series B Preferred Stock original issue price (as applicable); third, to the holders of Prior Series C Preferred Stock an amount equal to all unpaid Prior Series C Preferred Stock dividends; fourth, to the holders of Prior Series A Preferred Stock and Prior Series B Preferred Stock, pari passu, an amount equal to all unpaid Prior Series A Preferred Stock and Prior Series B Preferred Stock dividends (as applicable); and the remainder to common stockholders. The Company accrued dividends of $5,058,786 during 2013 (through the December 2013 recapitalization); all such dividends were eliminated in connection with the December 2013 recapitalization (see note 5). All Prior Senior Preferred Stock was converted to common stock in connection with the December 2013 recapitalization.

The holders of the Prior Series A-1 Preferred Stock had no voting rights and were not entitled to receive any dividends. Upon the closing of a qualified initial public offering of at least $30.0 million, all outstanding shares of Prior Series A-1 Preferred Stock would have automatically converted into common stock at $1.02 per share or, at the Company's option, could have been settled in cash for an amount not to exceed $4,857,622. The Prior Series A-1 Preferred Stock was converted to common stock in connection with the December 2013 recapitalization.

The following roll-forward tables provide activity related to the Prior Preferred Stock outstanding prior to the December 2013 recapitalization:

Prior Series A-1 Preferred Stock:	
Ending balance, December 31, 2012	$ 4,924,230
Accretion of issuance costs	6,011
Balance, December 17, 2013	4,930,241
Recapitalization	(4,930,241)
Ending balance, December 31, 2013	$ -
Prior Series A Preferred Stock:	
Ending balance, December 31, 2012	$ 33,987,502
Accrual related to cumulative dividends	1,939,120
Accretion of issuance costs	209,512
Balance, December 17, 2013	36,136,134
Recapitalization	(36,136,134)
Ending balance, December 31, 2013	$ -
Prior Series B Preferred Stock:	
Ending balance, December 31, 2012	$ 27,096,513
Accrual related to cumulative dividends	1,773,457
Accretion of issuance costs	13,121
Balance, December 17, 2013	28,883,091
Recapitalization	(28,883,091)
Ending balance, December 31, 2013	$ -
Prior Series C Preferred Stock:	
Ending balance, December 31, 2012	$ 17,736,824
Accrual related to cumulative dividends	1,346,209
Issuance of Prior Series C - additional costs	(2,670)
Accretion of issuance costs	85,548
Balance, December 17, 2013	19,165,911
Recapitalization	(19,165,911)
Ending balance, December 31, 2013	$ -

Note 7 – Debt

Debt consists of the following:

	December 31,	
	2014	**2013**
Note payable to Montgomery County	$ 5,000	$ 10,000
Convertible notes	1,500,000	-
Secured demand notes	1,500,000	-
	$ 3,005,000	$ 10,000

In July, August and September 2014, the Company raised $1.5 million through the issuance of secured convertible debt (the "2014 convertible notes"). The Company granted a security interest to substantially all of its assets to the 2014 convertible note holders. The debt is convertible, at the option of the holders or in certain cases at the Company's option, into shares of Series A Preferred Stock or other potential equity securities. The debt bears interest at 8% and is due in full on July 11, 2015. The debt is convertible, at the option of at least 67% of the 2014 convertible debt holders, into either (i) one share of Series A Preferred Stock for each $1.00 of convertible debt, or (ii) shares of a new preferred stock issued in the next financing at a price per share of the stock issued in the next financing, less 25%. In the event of a Deemed Liquidation Event, as defined in the Company's Ninth Amended and Restated Certificate of Incorporation, as amended, the sum of two times the outstanding principal amount plus any accrued and unpaid interest would be paid to any holder of these 2014 convertible notes.

In October, November and December 2014, the Company raised an additional $1.5 million through the issuance of 8% secured demand notes, due in February through April 2015 (the "2014 demand notes"). The Company granted a security interest to substantially all of its assets to the 2014 demand note holders, pari passu with the holders of the 2014 convertible notes.

The Company sold $1,030,000 of demand notes as bridge funding in November 2013 (the "2013 demand notes"). The 2013 demand notes were due on December 31, 2013, accrued interest at 8% and could be prepaid at any time before maturity by the Company. The Company granted a security interest to substantially all of its assets to the 2013 demand note holders. On December 18, 2013, the Company sold $1,999,864 of 2013 convertible notes in exchange for the 2013 demand notes and $969,869 in cash (see note 6). The 2013 convertible notes were due on the earlier of December 18, 2014, an event of default, or a change in control as defined in the 2013 convertible notes. Interest accrued at 8% per annum and the 2013 convertible notes were convertible into one share of Series A Preferred Stock for each $1.00 principal remaining on each 2013 convertible note. The 2013 convertible notes were unsecured. The 2013 convertible notes were converted into 1,999,864 shares of Series A Preferred Stock on December 30, 2013.

In 2009, the Company entered into loan agreements with the Department of Business and Economic Development, a principal department of the State of Maryland, and Montgomery County, Maryland. Under the terms of the agreements, the State of Maryland and Montgomery County loaned the Company $100,000 and $10,000, respectively, to assist in the relocation of the Company's operations from Wisconsin to Gaithersburg, Maryland. Interest on the loans accrued at 3%. The interest was deferred and the loans were forgivable under certain conditions, including the Company maintaining operations in Gaithersburg, Maryland, and attaining a specified level of staffing at that site on or before December 31, 2012. The Company did not attain the required level of staffing at December 31, 2012, and, as a result, these notes and accrued interest became due in 2013. The Company negotiated a settlement with the State of Maryland under which it paid $75,000 in June 2013 in full satisfaction of the $100,000 loan principal balance and accrued interest of $11,811. The Company also negotiated a settlement with Montgomery County under which accrued interest due under the loan provisions was forgiven and the loan would be paid in equal quarterly installments over the eight quarters ending December 31, 2015; the Company paid $5,000 of installment payments in 2014. The Company recorded the loan and interest forgiveness of $36,811 as Other Income in 2013 for these two loans.

The weighted average interest rate in 2014 on the Company’s debt instruments was approximately 8%. Total interest expense on all debt instruments was $65,132 and $15,887 in 2014 and 2013, respectively.

Note 8 – Shares and Share-Based Compensation

In December 2013, in conjunction with the December recapitalization (see Note 5), the Company filed its Seventh Amended and Restated Certificate of Incorporation, and increased the number of authorized shares of common stock to 3.5 million and the number of authorized shares of preferred stock to 2.0 million. In February 2014, the Company filed its Eighth Amended and Restated Certificate of incorporation, and increased the number of authorized shares of common stock to 7.0 million and the number of authorized preferred shares to 6.0 million. In July 2014, in advance of the issuance of notes convertible into additional shares of the Company's Series A Preferred Stock (the "2014 convertible notes"), the Company filed its Ninth Amended and Restated Certificate of Incorporation and increased the number of authorized shares of common stock to 7.5 million.

Stock options
In 2002, the Company adopted the 2002 Stock Option and Restricted Stock Plan (the 2002 plan), pursuant to which the Company's Board of Directors could grant either incentive or non-qualified stock options, shares of restricted stock, shares of unrestricted common stock, and other stock-based awards to officers and employees. The 2002 plan authorized a pool of options to purchase a total of 3,036 shares of the Company's common stock. The 2002 plan specified that, in a calendar year, the aggregate fair market value of incentive stock options, determined at the date of the grant, which became exercisable for the first time during any calendar year, could not exceed $100,000 for any participant. Stock options were granted at fair market value or at 110% of fair market value for those participants who were more than 10% stockholders. Generally, stock options have 10-year contractual terms, vest 25% per year and become fully exercisable after four years from the grant date.

In 2008, the Company adopted the 2008 Stock Option and Restricted Stock Plan (the 2008 plan), pursuant to which the Company’s Board of Directors may grant either incentive or non-qualified stock options or shares of restricted stock to directors, key employees, consultants and advisors. Upon adoption, the 2008 plan authorized grants of options to purchase a total of 7,570 shares of the Company’s common stock. Only employees are eligible to have options granted as “incentive stock options.” Generally, stock options have 10-year contractual terms, vest 25% per year and become fully exercisable after four years from the grant date. The Company increased the number of shares of common stock available under the 2008 plan several times; on January 22, 2009, to 8,739 shares; on February 11, 2011, to 20,332 shares; on March 5, 2012, to 28,322 shares; on December 18, 2012, to 36,669 shares; in conjunction with the December 2013 recapitalization and the associated financing, the number of shares reserved for issuance under the 2008 plan was set at 266,609; on April 24, 2014, in conjunction with the 2014 Series A Preferred Stock issuance, the Company further increased the number of shares available under the 2008 plan to 505,282; and on October 23, 2014, the Company increased the number of shares of common stock available under the 2008 plan to 1,447,791 shares. At December 31, 2014, there were 1,043,519 shares available for grant under the 2008 plan.

For the years ended December 31, 2014 and 2013, the Company recorded $64,412 and $152,753, respectively, of stock compensation expense. There were no amounts capitalized for the years ended December 31, 2014 and 2013. The allocation of stock compensation expense by operating expenses category is as follows:

	Year Ended December 31,	
	2014	**2013**
Research and development	$ 5,234	$ 7,876
General and administrative	55,802	142,583
Sales and marketing	3,376	2,294
	$ 64,412	$ 152,753

During 2014, the Company granted stock options to acquire 401,053 shares of common stock at an exercise price of $0.05 per share and with a weighted average grant date fair value of $0.03. At December 31, 2014, the Company had unrecognized expense related to its stock options of $31,718 which will be recognized over a weighted-average period of 2.42 years.

A summary of the status of options granted under the plan is presented below as of and for the years ended December 31, 2014 and 2013:

	Number of Options	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life (in years)	Aggregate Intrinsic Value
Outstanding at January 1, 2013	22,128	$70.97	7.9	$ -
Granted	7,064	$7.91		
Forfeited	(8,190)	$57.86		$ -
Exercised	(46)	$27.17		
Outstanding at December 31, 2013	20,956		8.1	$ -
Granted	401,053	$0.05		
Exercised	(1)	$7.91		$ -
Forfeited	(17,736)	$40.34		
Outstanding at December 31, 2014	404,272	$1.13	9.3	$ -
Exercisable at December 31, 2014	55,670	$1.47	9.0	$ -
Vested and expected to vest	371,349	$1.21	9.3	$ -

The weighted-average grant-date fair value for the option awards granted during the years ended December 31, 2014 and 2013 was $0.03 and $3.56, respectively. The total fair value of options vested in the years ended December 31, 2014 and 2013, was $47,331and $164,248, respectively. The fair value of each option grant was estimated at the date of grant using the Black -Scholes option pricing model based on the assumptions below:

	Year Ended December 31,	
	2014	2013
Annual dividend	-	-
Expected life (in years)	6.25	6.25
Risk free interest rate	1.84-2.02%	.93-1.69%
Expected volatility	60%	60%

On October 23, 2014, the Company's Board of Directors approved grants of stock options to acquire 826,500 shares of common stock under the 2008 Plan, contingent upon obtaining and approving an independent valuation of the fair value of the Company's common stock. These options are not included in the above table and disclosures; stock-based compensation expense related to these stock options will begin to be recognized upon approval by the Board of Directors of the independent valuation which occurred in February 2015.

Restricted stock units
In March 2014 the Company awarded 130,640 restricted stock units to acquire 130,640 shares of common stock to its Chief Executive Officer. The restricted stock units were compensation for his service as Chief Executive Officer from before the grant date through June 2014 and were subject to forfeiture if he did not continue to perform management services through October 24, 2014. The restricted stock units vested on October 24, 2014 and 130,640 shares of common stock were issued to the CEO. The Company reported compensation expense of $6,532 for these restricted stock units in 2014 which was based on the fair market value of the underlying shares at the date of grant.

Stock purchase warrants
At December 31, 2014 and 2013, the following warrants to purchase shares of common stock were outstanding:

Issuance	Number	Exercise Price	Expiration	Outstanding at December 31, 2014	Outstanding at December 31, 2013
August 2007	8,921	$ 7.91	August 2017	8,921	8,921
September 2007	3,451	$ 790.54	September 2014	-	3,451
March 2008	46	$ 790.54	March 2018	46	46
April 2009	33	$ 790.54	April 2014	-	33
November 2009	6,674	$ 7.91	November 2019	6,674	6,674
January 2010	6,674	$ 7.91	January 2020	6,674	6,674
March 2010	1,277	$ 7.91	March 2020	1,277	1,277
November 2011	5,213	$ 7.91	November 2021	5,213	5,213
December 2011	664	$ 7.91	December 2021	664	664
March 2012	4,125	$ 109.90	March 2019	4,125	4,125
				33,594	37,078

The warrants listed above were issued in connection with various debt, preferred stock or development contract agreements. Subsequent to the December 2013 recapitalization, all the above warrants are equity classified.

- The estimated fair value of warrants issued in connection with debt agreements were recorded as deferred financing costs and amortized to interest expense over the term of the related debt agreement. For the years ended December 31, 2014 and 2013, the Company recognized $0 and $5,406, respectively, of amortization expense).
- The estimated fair values of the warrants issued in connection with the preferred stock agreement were recorded as equity issuance costs and reduced the carrying value of the preferred stock at the issuance dates. For the years ended December 31, 2014 and 2013, the Company recognized $0 and $314,192, respectively, of accretion related to the warrants.
- Prior to the December 2013 recapitalization, warrants exercisable into Prior Series A Preferred Stock and Prior Series C Preferred Stock were required to be classified as a liability and marked to their estimated fair value at each reporting date since the preferred stock was redeemable for cash in certain circumstances outside of the Company's control. For the years ended December 31, 2014 and 2013, the Company recorded $0 and $134,560, respectively, as a change in the estimated fair value of the warrant liability
- The estimated fair value of the warrants for Prior Senior Preferred Stock issued in connection with a development contract agreement was recorded as warrant liability and expensed to other expense proportional to the revenue earned under the contract. For the years ended December 31, 2014 and 2013, the Company recorded $0 and $1,639, respectively, as other expense.

Note 9 - Income Taxes

At December 31, 2014 and 2013, the Company has net deferred tax assets of $31,505,287 and $28,704,670, respectively, consisting of net operating loss (NOL) carry forwards, research and experimental (R&E) credits, and differences between depreciation and amortization recorded for financial statement and tax purposes. The Company's net deferred tax assets at December 31, 2014 and 2013 have been offset by a valuation allowance of the same amount. The valuation allowance has been recorded due to the uncertainty of realization of the deferred tax assets. The Company's deferred tax assets and liabilities as of December 31, 2014 and 2013 are as follows:

	2014	2013
Deferred tax assets:		
NOL carryforward	$ 28,704,237	$ 26,137,776
R&E credit carryforward	1,894,478	1,759,478
Share-based compensation	144,742	127,429
Inventory reserve	334,578	377,674
Other	431,935	306,900
Total deferred tax assets	31,509,970	28,709,257
Valuation allowance	(31,505,287)	(28,704,670)
Deferred tax liabilities:		
Fixed assets	(4,683)	(4,587)
Net deferred tax assets	$ -	$ -

The difference between the Company's expected income tax provision (benefit) from applying federal statutory tax rates to the pre-tax loss and actual income tax provision (benefit) relates to the effect of the following:

	2014	2013
Federal income taxes (benefit) at statutory rates	34.0%	34.0%
State income taxes (benefit), net of Federal benefit	3.6%	2.9%
Change in valuation allowance	(51.1%)	(46.7%)
Change in state tax rates and other	13.5%	9.8%
	0.0%	0.0%

Additionally, despite the NOL carryforwards, the Company may have future tax liability due to alternative minimum tax or state tax requirements. The Company had federal NOL carryforwards of $76,267,809 and $70,903,156 at December 31, 2014 and 2013, respectively. The NOL carryforwards begin to expire in 2021. Utilization of the NOL carryforward may be subject to an annual limitation as provided by Section 382 of the Internal Revenue Code. There can be no assurance that the NOL carryforward will ever be utilized.

Note 10 - Lease Commitments

Operating leases
During 2008, the Company relocated its headquarters to Gaithersburg, Maryland. The operating lease for that facility contained stated monthly rates with annual increases effective each anniversary date, and was scheduled to terminate in September 2012. In April 2011, this lease was modified and extended until September 2014; in March 2014, the Company extended the termination date to April 2015. Management is currently negotiating with the landlord to extend the lease further. The new extension contained similar terms and conditions, except that 50% of the monthly rental fee for October and November 2014 were abated. The Company is responsible for all utilities, repairs, insurance, and taxes under this operating lease. Rent expense under the Company's operating leases for the years ended December 31, 2014 and 2013, was $883,155 and $885,310, respectively.

Capital leases
The Company leases computer equipment, office furniture, and equipment under various capital leases. The leases expire at various dates through 2018. The leases require monthly principal and interest payments. Following is a schedule by year of the estimated future minimum payments under all operating and capital leases as of December 31, 2014:

Years ending December 31,	Capital Leases	Operating Leases	Total
2015	$ 117,591	$ 181,062	$ 298,653
2016	89,772	-	89,772
2017	29,622	-	29,622
2018	27,153	-	27,153
2019 and thereafter	-	-	-
Total	$ 264,138	$ 181,062	$ 445,200
Less: amount representing interest	(29,490)		
Net present value of future minimum lease payments	$ 234,648		
Current maturities	(100,499)		
Long-term maturities	$ 134,149		

Amortization expense associated with equipment under capital leases for the years ended December 31, 2014 and 2013 was $122,411 and $52,599, respectively, and is included within depreciation and amortization expense in the statements of operations.

Assets under capital leases were included in the following balance sheet categories as of December 31:

	2014	2013
Laboratory equipment	$ 364,471	$ 364,471
Computers	153,693	153,693
Less accumulated amortization	(245,030)	(122,619)
Capital lease assets, net	$ 273,134	$ 395,545

Note 11 - Employee Benefit Plan

Substantially all full-time employees are eligible to participate in a retirement Savings Plan, the OpGen 401(k) Plan. The Company made discretionary matching contributions until April 2013 when they were suspended. For the years ended December 31, 2014 and 2013, the Company contributed $0 and $27,299, respectively, to the Savings Plan.

Note 12 - License Agreements

The Company was a party to three license agreements to acquire certain patent rights and technologies until December 2013 when one of the agreements was terminated. Royalties are incurred upon the sale of a product or service which utilizes the licensed technology. Certain of the agreements require it to pay minimum royalties or license maintenance fees. The accompanying financial statements reflect $97,134 and $199,449 of total royalty expense for the years ended 2014 and 2013, respectively, which are classified as cost of sales in the accompanying statements of operations. In 2015, future minimum royalty fees are $90,000 under these agreements.

Note 13 – Fair Value Measurements

US GAAP establishes a three-tier fair value hierarchy, which prioritizes the inputs used in measuring fair value. These tiers include:

- Level 1 - defined as observable inputs such as quoted prices in active markets;
- Level 2 - defined as inputs other than quoted prices in active markets that are either directly or indirectly observable; and
- Level 3 - defined as unobservable inputs in which little or no market data exists, therefore requiring an entity to develop its own assumptions such as expected revenue growth and discount factors applied to cash flow projections.

The Company evaluates financial assets and liabilities subject to fair value measurements on a recurring basis to determine the appropriate level at which to classify them each reporting period. This determination requires the Company to make subjective judgments as to the significance of inputs used in determining fair value and where such inputs lie within the hierarchy.

Financial assets and liabilities carried at fair value on a recurring basis
Included in the financial statements are certain financial instruments carried at fair value on a recurring basis, including cash and cash equivalents. The following tables present the fair value hierarchy for the Company's financial assets and liabilities measured at fair value on a recurring basis at December 31, 2014 and 2013:

Description	Fair Value at December 31, 2014	Level 1	Level 2	Level 3
Cash and cash equivalents	$ 749,517	$ 748,048	$ 1,469	$ -

Description	Fair Value at December 31, 2013	Level 1	Level 2	Level 3
Cash and cash equivalents	$ 1,400,345	$ 1,248,885	$ 151,460	$ -

The Company's Level 1 securities primarily consist of cash. The Company determines the estimated fair value for its Level 1 securities using quoted (unadjusted) prices for identical assets or liabilities in active markets. The Company's Level 2 securities primarily consist of money market funds and U.S. Treasury Notes. The Company determines the estimated fair value for its Level 2 securities using the following methods: quoted prices for similar assets/liabilities in active markets, inputs other than quoted prices that are observable for the asset/liability (e.g., interest rates, yield curves volatilities, default rates, etc.) and inputs that are derived principally from or corroborated by other observable market data.

The following table presents information about the Prior Series A Preferred Stock warrant derivative liability, which was measured at fair value on a recurring basis using significant unobservable inputs (Level 3) prior to its conversion into a common stock warrant in connection with the 2013 recapitalization:

	December 31,	
	2014	**2013**
Balance beginning of year	$ -	$ (661)
Transfers to (from) Level 3	-	-
Total gains realized/unrealized included in earnings	-	661
Balance end of year	$ -	$ -

The following table presents information about the Prior Series C Preferred Stock warrant liability when the Company issued a warrant to purchase 3,260,870 shares of Prior Series C Preferred Stock as part of an existing development agreement under which the Company was performing work for the development partner. The warrant was measured at fair value on a recurring basis using significant unobservable inputs (Level 3) prior to its conversion into a common stock warrant in the 2013 recapitalization (see note 5).

	December 31,	
	2014	**2013**
Balance beginning of year	$ -	$ (132,260)
Transfers to (from) Level 3	-	-
Total gains realized/unrealized included in earnings	-	(1,639)
Balance end of year	$ -	133,899

Financial assets and liabilities carried at fair value on a non-recurring basis
The Company does not have any financial assets and liabilities measured at fair value on a non-recurring basis.

Non-financial assets and liabilities carried at fair value on a recurring basis
The Company does not have any non-financial assets and liabilities measured at fair value on a recurring basis.

Non-financial assets and liabilities carried at fair value on a non-recurring basis
The Company measures its long-lived assets, including property and equipment and intangible assets, at fair value on a non-recurring basis when they are deemed to be impaired. No such fair value impairment was recognized in the years ended December 31, 2014 and 2013.

Note 14 – Related Person Transactions

In December 2013, the Company purchased a BioMark HD DNA detection system and related instruments from Fluidigm Corporation ("Fluidigm") for a purchase price of $221,000. In March 2014,the Company entered into a supply agreement with Fluidigm under which Fluidigm supplies the Company with its microfluidic test platform for use in manufacturing the Acuitas MDRO Gene Test. The supply agreement terminates in March 2015. Evan Jones, Chief Executive Officer and Chair of the Board of the Company, is a director of Fluidigm. The approximate dollar value of the amount involved in the transaction with Fluidigm under the supply agreement during 2014 was $121,000, and the Company had an outstanding payable to Fluidigm of $17,000 at December 31, 2014.

Note 15 - Subsequent Events

The Company has performed an evaluation of subsequent events through the date the accompanying financial statements were issued and did not identify any material subsequent transactions that require disclosure, other than those matters discussed below.

In January 2015, the Company engaged an investment bank to pursue a potential public offering of the Company's common stock.

In January 2015, the Company raised $0.3 million of capital through the issuance of a secured demand note, due in February 2015. This demand note was tendered to the Company on February 2015 as partial payment for a 2015 convertible note.

In February 2015, the Company issued to existing investors convertible notes (the "2015 convertible notes"), in an aggregate principal amount of $1.2 million that are convertible into shares of either common stock or Series A Preferred Stock, depending on whether the public offering contemplated by this prospectus is consummated by June 30, 2015. The 2015 convertible notes were issued pursuant to a Notes Purchase Agreement, dated as of February 11, 2015. Following the initial closing, the Company offered an additional $0.3 million of 2015 convertible notes, on the same terms, as a participation offering to existing investors in the Company who are party the Company's Third Amended and Restated Investors' Rights Agreement, as amended. The 2015 convertible note holders were, or will, also be issued warrants, 225,013 in the aggregate, exercisable for shares of common stock at 110% of the initial public offering price and exercisable only if the offering contemplated by this prospectus is consummated. There was no firm commitment on the part of any investor to participate in the 2015 convertible notes offering. In conjunction with the 2015 convertible notes offering, the Company amended its Ninth Amended and Restated Certificate of Incorporation to increase the number of authorized shares of its common stock to 10.0 million and its preferred stock to 7.5 million.

Note 16 - Pro Forma Net Loss Per Share Available to Common Stockholders (Unaudited)

The following table sets forth the computation of the Company's unaudited pro forma basic and diluted net loss per common share after giving effect to the conversion into shares of common stock of (i) convertible notes and (ii) redeemable convertible preferred stock using the as-if converted method as though the conversions had occurred as of the earlier of the specific issuance date or at the beginning of the period:

	Year ended December 31, 2014
Net loss available to common stockholders	$ (6,298,603)
Interest on convertible notes, including deferred financing costs	63,852
Preferred stock dividends	627,113
Pro forma net loss attributable to common stockholders	$ (5,607,618)
Weighted average common shares outstanding - basic and diluted	387,590
Pro forma adjustment to reflect assumed conversion of convertible notes	642,686
Pro forma adjustment to reflect assumed conversion of redeemable convertible preferred stock	3,657,437
Pro forma weighted average common shares outstanding - basic and diluted	4,687,713
Pro forma net loss per common share - basic and diluted	$ (1.20)

Shares

COMMON STOCK

Sole Book-Running Manager

Maxim Group LLC

PART II

Information Not Required in Prospectus

Item 13. Other Expenses of Issuance and Distribution.

The following table sets forth the fees and expenses, other than underwriting discount and commissions, payable in connection with the registration of the common stock hereunder. All amounts are estimates except the SEC registration fee and the FINRA filing fee.

SEC registration fee	$	4,345
Legal fees and expenses	$	400,000
Accounting fees and expenses	$	300,000
FINRA filing fee	$	*
Printer costs and expenses	$	50,000
Total	$	*

***** To be included in an amendment.

Item 14. Indemnification of Directors and Officers.

Section 145 of the Delaware General Corporation Law, or the DGCL, authorizes a corporation to indemnify its directors and officers against liabilities arising out of actions, suits and proceedings to which they are made or threatened to be made a party by reason of the fact that they have served or are currently serving as a director or officer to a corporation. The indemnity may cover expenses (including attorneys' fees) judgments, fines and amounts paid in settlement actually and reasonably incurred by the director or officer in connection with any such action, suit or proceeding. Section 145 permits corporations to pay expenses (including attorneys' fees) incurred by directors and officers in advance of the final disposition of such action, suit or proceeding. In addition, Section 145 provides that a corporation has the power to purchase and maintain insurance on behalf of its directors and officers against any liability asserted against them and incurred by them in their capacity as a director or officer, or arising out of their status as such, whether or not the corporation would have the power to indemnify the director or officer against such liability under Section 145.

We have adopted provisions in our certificate of incorporation and bylaws that limit or eliminate the personal liability of our directors to the fullest extent permitted by the DGCL, as it now exists or may in the future be amended. Consequently, a director will not be personally liable to us or our stockholders for monetary damages or breach of fiduciary duty as a director, except for liability for:

- any breach of the director's duty of loyalty to us or our stockholders;
- any act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- any unlawful payments related to dividends or unlawful stock purchases, redemptions or other distributions; or
- any transaction from which the director derived an improper personal benefit.

These limitations of liability do not alter director liability under the federal securities laws and do not affect the availability of equitable remedies such as an injunction or rescission.

In addition, our bylaws provide that:

- we will indemnify our directors, officers and, in the discretion of our board of directors, certain employees to the fullest extent permitted by the DGCL, as it now exists or may in the future be amended; and

- we will advance reasonable expenses, including attorneys' fees, to our directors and, in the discretion of our board of directors, to our officers and certain employees, in connection with legal proceedings relating to their service for or on behalf of us, subject to limited exceptions.

We have entered into indemnification agreements with each of our directors and executive officers. These agreements provide that we will indemnify each of our directors, such executive officers and, at times, their affiliates to the fullest extent permitted by Delaware law. We will advance expenses, including attorneys' fees (but excluding judgments, fines and settlement amounts), to each indemnified director, executive officer or affiliate in connection with any proceeding in which indemnification is available and we will indemnify our directors and officers for any action or proceeding arising out of that person's services as a director or officer brought on behalf of us and/or in furtherance of our rights. Additionally, each of our directors may have certain rights to indemnification, advancement of expenses and/or insurance provided by their affiliates, which indemnification relates to and might apply to the same proceedings arising out of such director's services as a director referenced herein. Nonetheless, we have agreed in the indemnification agreements that our obligations to those same directors are primary and any obligation of the affiliates of those directors to advance expenses or to provide indemnification for the expenses or liabilities incurred by those directors are secondary.

We also maintain general liability insurance which covers certain liabilities of our directors and officers arising out of claims based on acts or omissions in their capacities as directors or officers, including liabilities under the Securities Act.

The underwriting agreement filed as Exhibit 1.1 to this registration statement provides for indemnification of us and our directors and officers by the underwriters against certain liabilities under the Securities Act and the Exchange Act.

Item 15. Recent Sales of Unregistered Securities.

On December 18, 2013, we effected a 1 for 790.5407 reverse stock split of our common stock. All references to shares, stock options and warrants outstanding, and the exercise price of outstanding derivative securities have been adjusted to reflect such reverse stock split.

The following list sets forth information as to all securities we have sold since January 1, 2011, which were not registered under the Securities Act.

1. On November 8, 2011, the Company issued convertible notes in an aggregate principal amount of $1,893,752.67 and related warrants to purchase common stock to existing institutional and individual accredited investors. In December 2011, a second closing took place to allow other existing institutional and individual accredited investors to participate in the financing opportunity in order to maintain their percentage-ownership position in the Company. The December 2011 closing resulted in the issuance of additional notes in an aggregate principal amount of $405,456.09, plus related warrants. The convertible notes matured on June 30, 2012. Warrant holders paid an aggregate purchase price of $229.93. The warrants expire on November 8, 2021. Upon exercise, warrant holders receive the number of shares purchasable under the warrant multiplied by the difference of the fair market value of one exercise share (to be determined by the Company's Board of Directors, in good faith; or the per share offering price to the public if the warrant is exercised in connection with an initial public offering) minus the exercise price. That product is then divided by the fair market value of one exercise share.

2. From March 5, 2012 through October 26, 2012, the Company sold an aggregate of 126,802,946 shares of its Series C Convertible Preferred Stock ("Series C Preferred Stock") to 28 new and existing institutional and individual accredited investors at a purchase price of $0.138 per share. Each share of the Series C Convertible Preferred Stock was convertible, at the option of the holder, at any time and without payment of additional consideration, into a number of fully paid and non-assessable shares of common stock equal to the number of Series C Preferred Stock being converted multiplied by a fraction, the numerator of which is the Series C Preferred Stock original issue price, and the denominator of which is the Series C Preferred Stock conversion price in effect at the time of the conversion. The purchase price for the shares of Series C Convertible Preferred Stock was paid in cash or by tendering the convertible notes issued in November and December 2011. All outstanding convertible notes were converted in such financing.

3. On March 5, 2012 the Company issued a warrant to purchase 4,125 shares of Series C Preferred Stock to In-Q-Tel, Inc. The warrant expires on March 5, 2019. Upon exercise, In-Q-Tel receives the number of shares purchasable under the warrant multiplied by the difference of the fair market value of one exercise share (to be determined by the Company's Board of Directors, in good faith; or the per share offering price to the public if the warrant is exercised in connection with an initial public offering) minus the exercise price. That product is then divided by the fair market value of one exercised share.

4. On December 18, 2013, the Company effected a recapitalization whereby all of the then existing preferred stock was converted into common stock, all accrued and unpaid cumulative dividends on the preferred stock were cancelled, and a 1 for 790.5407 reverse stock split was effected on all outstanding shares of common stock. In connection with the recapitalization, the Company issued to existing investors convertible notes in an aggregate principal amount of $2,000,000 that were convertible into a new Series A Redeemable Convertible Preferred Stock (the "Series A Preferred Stock"). The notes were convertible at the option of the note holder at any time. Upon conversion, each note holder received one share of Series A Preferred Stock in exchange for each $1.00 principal amount of the notes owned by the converting holder. All of these convertible notes were converted into shares of Series A Preferred Stock by all of the investors in December 2013.

5. From February 19, 2014 through April 2, 2014, the Company sold 2,000,000 shares of its Series A Preferred Stock to existing investors at a purchase price of $1.00 per share. Each share of Series A Preferred Stock is convertible, at the option of the holder, at any time, into a number of fully paid and non-assessable shares of common stock equal to the number of Series A Preferred Stock being converted multiplied by a fraction, the numerator of which is the Series A Preferred Stock original issue price, and the denominator of which is the Series A Preferred Stock conversion price in effect at the time of the conversion.

6. From July 11, 2014 through September 23, 2014, the Company issued convertible notes in an aggregate principal amount of $1,500,000 to existing investors. The notes were convertible, in whole, at any time upon the approval of the requisite note holders, into Series A Preferred Stock. The notes are convertible into either (i) one share of Series A Preferred Stock for each $1.00 of principal of the note or (ii) shares of a new series of preferred stock of the Company with the rights, privileges, preferences and restrictions determined by the Board of Directors, if issued in the next financing conducted by the Company following this financing at a conversion price equal to the price per share of new preferred stock issued in the next financing of the Company, less twenty-five percent.

7. In October 2014, the board of directors authorized the Company to raise bridge funding up to an aggregate of $2,000,000 pursuant to the issuance and sale of secured demand notes to existing investors. The secured demand notes each have a term of up to four months. The Company drew down an aggregate of $1,800,000 of such bridge funding between October 2014 and January 2015.

8. In February 2015, the Company issued to existing investors $1.2 million principal amount of convertible notes, or 2015 convertible notes, that are convertible into shares of either common stock or Series A Preferred Stock, depending on whether the public offering contemplated by this prospectus is consummated by June 30, 2015. The 2015 convertible notes were issued pursuant to a Notes Purchase Agreement, dated as of February 11, 2015. Following the initial closing, the Company offered an additional $0.3 million principal of 2015 convertible notes, on the same terms, as a participation offering to existing investors in the Company who are party the Company's Third Amended and Restated Investors' Rights Agreement, as amended. The 2015 convertible note holders were, or will, also be issued an aggregate of 225,013 warrants, exercisable for shares of common stock at 110% of the initial public offering price and exercisable only if the offering contemplated by this prospectus is consummated. There was no firm commitment on the part of any investor to participate in the 2015 convertible notes offering.

9. In March 2014, the Company issued 130,640 restricted stock units to acquire a like number of shares of common stock to Evan Jones, its Chief Executive Officer, in lieu of cash compensation for serving as Chief Executive Officer. The restricted stock units were subject to forfeiture until October 24, 2014, when the forfeiture restrictions lapsed.

10. Since January 1, 2011, we have issued to employees, consultants, and members of the Board of Directors options to purchase an aggregate of 1,255,230 shares of our common stock at a weighted-average exercise price of $1.58 per share as of January 31, 2015.

11. As of January 31, 2015, 26,673 of the options issued since January 1, 2011 had been exercised or forfeited.

12. As of January 31, 2015, no warrants issued since January 1, 2011 had been exercised or forfeited.

We deemed the offers, sales and issuances of the securities described in paragraphs (1) through (6) above, the issuance of 2015 convertible notes described in paragraph (8) above, and the issuance of the restricted stock units described in paragraph (9), to be exempt from registration under the Securities Act, in reliance on Section 4(2) of the Securities Act, including Regulation D and Rule 506 promulgated thereunder, regarding transactions by an issuer not involving a public offering. We deemed the offer and issuances of the securities described in paragraph (7) above to be exempt from registration under the Securities Act, in reliance on Section 4(2) of the Securities Act regarding transactions by an issuer with a limited number of its existing investors not involving a public offering. All purchasers of securities in transactions exempt from registration pursuant to Regulation D represented to us that they were accredited investors and were acquiring the shares for investment purposes only and not with a view to, or for sale in connection with, any distribution thereof and that they could bear the risks of the investment and could hold the securities for an indefinite period of time. The purchasers received written disclosures that the securities had not been registered under the Securities Act and that any resale must be made pursuant to a registration statement or an available exemption from such registration.

We deemed the grants of stock options described in paragraph (10) and the issuances of shares of common stock upon the exercise of stock options described in paragraph (11) as exempt pursuant to Section 4(2) of the Securities Act or to be exempt from registration under the Securities Act in reliance on Rule 701 of the Securities Act as offers and sales of securities under compensatory benefit plans and contracts relating to compensation in compliance with Rule 701. Each of the recipients of securities in any transaction exempt from registration either received or had adequate access, through employment, business or other relationships, to information about us.

We deemed the shares of common stock issued pursuant to the conversion of our preferred stock described in paragraph (4) as exempt pursuant to Section 3(a)(9) of the Securities Act, which exemption is available for transactions involving securities exchanged by the issuer with its existing security holders exclusively where no commission or other remuneration is paid or given directly or indirectly for soliciting such exchange.

No warrants described in paragraph (12) were exercised during the applicable time period. Thus, no shares of common stock were issued pursuant to the exercise of the warrants.

All certificates representing the securities issued in the transactions described in this Item 15 included appropriate legends setting forth that the securities had not been offered or sold pursuant to a registration statement and describing the applicable restrictions on transfer of the securities. There were no underwriters employed in connection with any of the transactions set forth in this Item 15.

Item 16. Exhibits and Financial Statement Schedules.

(a) Exhibits:

The exhibits to the registration statement are listed in the Exhibit Index to this registration statement and are incorporated herein by reference.

(b) Financial Statements Schedules:

Schedules have been omitted because the information required to be set forth therein is not applicable or is shown in the financial statements or notes thereto included elsewhere in this registration statement .

Item 17. Undertakings.

Insofar as indemnification for liabilities arising under the Securities Act of 1933, as amended, or the Act, may be permitted to directors, officers and controlling persons of the Registrant pursuant to the foregoing provisions, or otherwise, the Registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is therefore unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

The Registrant hereby undertakes that:

(a) The Registrant will provide to the underwriter at the closing as specified in the underwriting agreement, certificates in such denominations and registered in such names as required by the underwriter to permit prompt delivery to each purchaser.

(b) For purposes of determining any liability under the Securities Act of 1933, as amended, the information omitted from a form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in the form of prospectus filed by the Registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act of 1933, as amended, shall be deemed to be part of this registration statement as of the time it was declared effective.

(c) For the purpose of determining any liability under the Securities Act of 1933, as amended, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this Registration Statement on Form S-1 to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Gaithersburg, State of Maryland, on March 3, 2015 .

OPGEN, INC.

By: /s/ Evan Jones
Evan Jones
President and Chief Executive Officer

POWER OF ATTORNEY AND SIGNATURES

KNOW ALL BY THESE PRESENT, that each individual whose signature appears below hereby constitutes and appoints each of Evan Jones, C. Eric Winzer and David Hoekzema as such person's true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for such person in such person's name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this Registration Statement (or any Registration Statement for the same offering that is to be effective upon filing pursuant to Rule 462(b) under the Securities Act of 1933), and to file the same, with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission granting unto each said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as such person might or could do in person, hereby ratifying and confirming all that any said attorney-in-fact and agent, or any substitute or substitutes of any of them, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement and Power of Attorney has been signed by the following person in the capacities and on the date indicated.

Signature	Title	Date
/s/ Evan Jones Evan Jones	President, Chief Executive Officer and Director (principal executive officer)	March 3, 2015
/s/ C. Eric Winzer C. Eric Winzer	Senior Vice President and Chief Financial Officer (principal financial officer and principal accounting officer)	March 3, 2015
/s/ Brian G. Atwood Brian G. Atwood	Director	March 3, 2015
/s/ Timothy Howe Timothy Howe	Director	March 3, 2015
/s/ Laurence R. McCarthy Laurence R. McCarthy	Director	March 3, 2015
/s/ Misti Ushio Misti Ushio	Director	March 3, 2015

EXHIBIT INDEX

Exhibit Number		Description
1.1	*	Form of Underwriting Agreement.
3.1		Ninth Amended and Restated Certificate of Incorporation of the Registrant, currently in effect.
3.1.1		Certificate of Amendment to Certificate of Incorporation, amending the Ninth Amended and Restated Certificate of Incorporation of the Registrant, currently in effect.
3.1.2	*	Form of Tenth Amended and Restated Certificate of Incorporation, to be in effect immediately prior to the consummation of this offering.
3.2		Amended and Restated Bylaws of the Registrant.
4.1	*	Form of Common Stock Certificate of the Registrant.
4.2		Third Amended and Restated Investors' Rights Agreement, dated as of December 18, 2013, among the Registrant and certain investors.
4.3		Stockholders' Agreements Amendment, dated as of July 11, 2014, among the Registrant and certain investors.
4.4		Second Stockholders' Agreements Amendment, dated as of February 7, 2015, among the Registrant and certain investors.
4.5		Form of Warrant to Purchase Common Stock of the Registrant.
5.1		Opinion of Ballard Spahr LLP.
10.1		Lease Agreement, dated as of June 30, 2008, between the Registrant and ARE-708 Quince Orchard, LLC (the "Landlord").
10.1.1		First Amendment to Lease, dated as of April 4, 2011, between the Registrant and the Landlord.
10.1.2		Second Amendment to Lease, dated as of August 15, 2012, between the Registrant and the Landlord.
10.1.3		Third Amendment to Lease, dated as of December 30, 2013, between the Registrant and the Landlord.
10.1.4		Fourth Amendment to Lease, dated as of March 21, 2014, between the Registrant and the Landlord.
10.2		Form of Indemnification Agreement between the Registrant and each of its directors and executive officers.
10.3	#	2008 Stock Option and Restricted Stock Plan of the Registrant, including amendments thereto.
10.4	#	Amended and Restated Chief Executive Officer Letter Agreement, dated March 3, 2014, between the Registrant and Evan Jones.
10.5	#	Executive Change in Control and Severance Benefits Agreement, dated January 19, 2011, between the Registrant and C. Eric Winzer.
10.5.1	#	Amendment to Executive Change in Control and Severance Benefits Agreement, dated as of November 1, 2013, between the Registrant and C. Eric Winzer.
10.6	#	Executive Change in Control and Severance Benefits Agreement, dated January 27, 2012, between the Registrant and Vadim Sapiro.
10.6.1	#	Amendment to Executive Change in Control and Severance Benefits Agreement, dated as of November 1, 2013, between the Registrant and Vadim Sapiro.
10.7	±	Technology Development Agreement, dated September 25, 2013, between the Registrant and Hitachi High-Technologies Corporation.
10.7.1	±	Amendment No. 1 to Technology Development Agreement, dated March 27, 2014, between the Registrant and Hitachi High-Technologies Corporation.
10.8	±	Supply Agreement, dated March 17, 2014, between the Registrant and Fluidigm Corporation.
10.9		Notes Purchase Agreement, dated February 17, 2015, by and among the Registrant and the investors party thereto (including as Exhibit B the form of convertible note).
23.1		Consent of CohnReznick LLP.
23.2		Consent of Ballard Spahr LLP (included in Exhibit 5.1).
24.1		Power of Attorney (see page II-4 of this Registration Statement).

* To be filed with an amendment.

± Confidential treatment has been requested for certain portions of this agreement pursuant to an application for confidential treatment filed with the Securities and Exchange Commission on March 3, 2015. Such provisions have been filed separately with the Commission.

Management contract or compensatory arrangement.

DELAWARE
The First State

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE RESTATED CERTIFICATE OF "OPGEN, INC.", FILED IN THIS OFFICE ON THE TENTH DAY OF JULY, A.D. 2014, AT 3:59 O'CLOCK P.M.

A FILED COPY OF THIS CERTIFICATE HAS BEEN FORWARDED TO THE NEW CASTLE COUNTY RECORDER OF DEEDS.

3338364 8100

[DELAWARE SEAL]

Jeffrey W. Bullock, Secretary of State

AUTHENTICATION: 1528478

140940564

DATE: 07-11-14

You may verify this certificate online
at corp.delaware.gov/authver.shtml

NINTH AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
OPGEN, INC.

(Pursuant to Sections 242 and 245 of the
General Corporation Law of the State of Delaware)

OpGen, Inc., a corporation organized and existing under and by virtue of the provisions of the General Corporation Law of the State of Delaware (the "**General Corporation Law**"),

DOES HEREBY CERTIFY THAT:

1. The name of this corporation is OpGen, Inc., and the Certificate of Incorporation of this corporation was originally filed with the Secretary of State of the State of Delaware on January 22, 2001 under the name eDNA Genomics, Inc. and has been subsequently amended.

2. The Board of Directors duly adopted resolutions proposing to amend and restate the Certificate of Incorporation of this corporation, declaring said amendment and restatement to be advisable and in the best interests of this corporation and its stockholders, and authorizing the appropriate officers of this corporation to solicit the consent of the stockholders therefor, which resolution setting forth the proposed amendment and restatement is as follows:

RESOLVED, that the Certificate of Incorporation, as subsequently amended and restated, of this corporation be amended and restated in its entirety to read as follows:

FIRST: The name of this corporation is OpGen, Inc. (the "**Company**").

SECOND: The address of the registered office of the Company in the State of Delaware is 1209 Orange Street, in the City of Wilmington, County of New Castle 19801. The name of its registered agent at such address is The Corporation Trust Company.

THIRD: The nature of the business or purposes to be conducted or promoted is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law.

FOURTH: The total number of shares of all classes of stock which the Company shall have authority to issue is 13,500,000 shares of capital stock consisting of:

(i) 7,500,000 shares designated as Common Stock, $0.01 par value per share (the "**Common Stock**"); and

(ii) 6,000,000 shares of Preferred Stock, $0.01 par value per share (the "Preferred Stock"), all of which shall be designated as Series A Convertible Preferred Stock (the "**Series A Preferred Stock**").

The following is a statement of the designations and the powers, privileges and rights, and the qualifications, limitations or restrictions thereof in respect of each class of capital stock of the Company.

A. COMMON STOCK

1. General. The voting, dividend and liquidation rights of the holders of the Common Stock are subject to and qualified by the rights, powers and preferences of the holders of the Preferred Stock set forth herein.

2. Voting. The holders of the Common Stock are entitled to one vote for each share of Common Stock held at all meetings of stockholders (and written actions in lieu of meetings). The number of authorized shares of Common Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by (in addition to any vote of the holders of one or more series of Preferred Stock that may be required by the terms of this Certificate of Incorporation) the affirmative vote of the holders of shares of capital stock of the Company representing a majority of the votes represented by all outstanding shares of capital stock of the Company entitled to vote, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law.

B. PREFERRED STOCK

Preferred Stock may be issued from time to time, in one or more series, each of such series to consist of such number of shares and to have such terms, rights, powers and preferences, and the qualifications and limitations with respect thereto, as stated or expressed herein.

C. SERIES A PREFERRED STOCK

The Series A Preferred Stock has the following rights, preferences, powers, privileges and restrictions, qualifications and limitations. Unless otherwise indicated, references to "Sections" or "Subsections" in this Part C of this Article Fourth refer to sections and subsections of Part C of this Article Fourth.

1. Dividends.

1.1 Series A Preferred Stock. From and after the date of the issuance of any shares of Series A Preferred Stock, dividends at the rate per annum of 8% on the Series A Original Issue Price (as defined below) shall accrue on such shares of Series A Preferred Stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series A Preferred Stock) when and if declared by the Board of Directors. Dividends declared on the Series A Preferred shall accrue from day to day, when and if declared, and shall be non-cumulative. The Company shall not declare, pay or set aside any dividends on shares of any other class or series of capital stock of the Company (other than dividends on shares of Common Stock payable in shares of Common Stock) unless (in addition to the obtaining of any consents required elsewhere in this Certificate of Incorporation) first, the holders of shares of Series A Preferred Stock then outstanding shall first receive, or simultaneously receive, an equal dividend on each outstanding share of Series A Preferred Stock and second, in the case of a dividend on Common Stock or any class or series that is convertible into Common Stock, the amount for each such share of Series A Preferred Stock equal to the aggregate amount of such dividends for all shares of Common Stock into which each such share of Series A Preferred Stock could then be converted; provided that, if the Company declares, pays or sets aside, on the same date, a dividend on shares of more than one class or series of capital stock of the Company, the dividend payable to the holders of Series A Preferred Stock pursuant to this Subsection 1.1 shall be calculated based upon the dividend on the class or series of capital stock that would result in the highest Series A Preferred Stock dividend. In no event shall the Company declare, pay or set aside any dividends on shares of any class or series of capital stock of the Company without the prior written consent of holders of 70% of the then outstanding shares of Series A Preferred Stock. The "**Series A Original Issue Price**" shall mean $1.00 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series A Preferred Stock.

2. Liquidation, Dissolution or Winding Up; Certain Mergers, Consolidations and Asset Sales.

2.1 Payments to Holders of Preferred Stock.

(i) Except as provided in Subsection 6.1.2, in the event of any voluntary or involuntary liquidation, dissolution or winding up of the Company, the holders of shares of Series A Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Company available for distribution to its stockholders before any payment shall be made to the holders of Common Stock by reason of their ownership thereof, as follows: first, to the holders of the Series A Preferred Stock, an amount per share equal to two times the Series A Original Issue Price until two times the aggregate Series A Original Issue Price is paid in full; and second, to the holders of Series A Preferred Stock, an amount per share equal to all dividends declared but unpaid thereon, (the amount payable pursuant to this sentence is hereinafter referred to as the "**Preferred Liquidation Amount**"). Notwithstanding the foregoing, in the event of any voluntary or involuntary liquidation, dissolution or winding up of the Company, the holders of Series A Preferred Stock then outstanding shall be entitled to be paid an amount per share equal to the greater of (A) the Preferred Liquidation Amount or (B) such amount per share as would have been payable had all shares of Series A Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution or winding up. If upon any such liquidation, dissolution or winding up of the Company, the assets of the Company available for distribution to its stockholders shall be insufficient to pay the holders of shares of Series A Preferred Stock the full amount to which they shall be entitled under this Subsection 2.1(i), such assets shall be distributed in accordance with the priority set forth in the immediately preceding sentence.

2.2 Payments to Holders of Common Stock. Except as provided in Subsection 6.1.2, in the event of any voluntary or involuntary liquidation, dissolution or winding up of the Company, after the payment of all preferential amounts required to be paid to the holders of shares of Series A Preferred Stock, the remaining assets of the Company available for distribution to its stockholders shall be distributed among the holders of shares of Common Stock, which shall include the Series A Preferred Stock on an as-converted basis, pro rata based on the number of shares held by each such holder.

2.3 Deemed Liquidation Events.

2.3.1 Definition. Each of the following events shall be considered a "**Deemed Liquidation Event**" unless the holders of at least 70% of the outstanding shares of Series A Preferred Stock elect otherwise by written notice sent to the Company at least twenty (20) days prior to the effective date of any such event:

(a) a merger or consolidation in which

(i) the Company is a constituent party, or

(ii) a subsidiary of the Company is a constituent party and the Company issues shares of its capital stock pursuant to such merger or consolidation,

except any such merger or consolidation involving the Company or a subsidiary in which the shares of capital stock of the Company outstanding immediately prior to such merger or consolidation continue to represent, or are converted into or exchanged for shares of capital stock that represent, immediately following such merger or consolidation, at least a majority, by voting power, of the capital stock of (1) the surviving or resulting corporation or (2) if the surviving or resulting corporation is a wholly owned subsidiary of another corporation immediately following such merger or consolidation, the parent corporation of such surviving or resulting corporation (provided that, for the purpose of this Subsection 2.3.1, all shares of Common Stock issuable upon exercise of Options (as defined below) outstanding immediately prior to such merger or consolidation or upon conversion of Convertible Securities (as defined below) outstanding immediately prior to such merger or consolidation shall be deemed to be outstanding immediately prior to such merger or consolidation and, if applicable, converted or exchanged in such merger or consolidation on the same terms as the actual outstanding shares of Common Stock are converted or exchanged); or

(b) the sale, lease, transfer, exclusive license or other disposition, in a single transaction or series of related transactions, by the Company or any subsidiary of the Company of all or substantially all the assets of the Company and its subsidiaries taken as a whole, or the sale or disposition (whether by merger or otherwise) of one or more subsidiaries of the Company if substantially all of the assets of the Company and its subsidiaries taken as a whole are held by such subsidiary or subsidiaries, except where such sale, lease, transfer, exclusive license or other disposition is to a wholly owned subsidiary of the Company.

2.3.2 Effecting a Deemed Liquidation Event.

(a) The Company shall not have the power to effect a Deemed Liquidation Event referred to in Subsection 2.3.1(a)(i) unless the agreement or plan of merger or consolidation for such transaction (the "**Merger Agreement**") provides that the consideration payable to the stockholders of the Company shall be allocated among the holders of capital stock of the Company in accordance with Subsections 2.1, 2.2 and 6.1.2.

(b) In the event of a Deemed Liquidation Event referred to in Subsection 2.3.l(a)(ii) or 2.3.1(b), if the Company does not effect a dissolution of the Company under the General Corporation Law within 90 days after such Deemed Liquidation Event, then (i) the Company shall send a written notice to each holder of Series A Preferred Stock no later than the 90th day after the Deemed Liquidation Event advising such holders of their right (and the requirements to be met to secure such right) pursuant to the terms of the following clause (ii) to require the redemption of such shares of Series A Preferred Stock, and (ii) if the holders of at least 70% of the then outstanding shares of Series A Preferred Stock so request in a written instrument delivered to the Company not later than 120 days after such Deemed Liquidation Event, the Company shall use the consideration received by the Company for such Deemed Liquidation Event (net of any retained liabilities associated with the assets sold or technology licensed, as determined in good faith by the Board of Directors of the Company), together with any other assets of the Company available for distribution to its stockholders (the "**Available Proceeds**"), to the extent legally available therefor, on the l50th day after such Deemed Liquidation Event, to redeem all outstanding shares of Series A Preferred Stock at a price per share equal to the Preferred Liquidation Amount, which amount shall be paid in accordance with the priority set forth in Section 2.1(i). Notwithstanding the foregoing, in the event of a redemption pursuant to the preceding sentence, if the Available Proceeds are not sufficient to redeem all outstanding shares of Series A Preferred Stock, the Company shall redeem a pro rata portion of each holder's shares of the Series A Preferred Stock to the fullest extent of Available Proceeds, and shall redeem the remaining shares to have been redeemed as soon as practicable after the Company has funds legally available therefor. The provisions of Subsections 6.2 through 6.4 shall apply, with such necessary changes in the details thereof as are necessitated by the context, to the redemption of the Series A Preferred Stock pursuant to this Subsection 2.3.2(b). Prior to the distribution or redemption provided for in this Subsection 2.3.2(b), the Company shall not expend or dissipate the consideration received for such Deemed Liquidation Event, except to discharge expenses incurred in connection with such Deemed Liquidation Event or in the ordinary course of business.

2.3.3 Amount Deemed Paid or Distributed. The amount deemed paid or distributed to the holders of capital stock of the Company upon any such merger, consolidation, sale, lease, transfer, exclusive license, other disposition or redemption shall be the cash or the value of the property, rights or securities paid or distributed to such holders by the Company or the acquiring person, firm or other entity. The value of such property, rights or securities shall be determined in good faith by the Board of Directors of the Company, including at least two Preferred Directors (as defined below).

2.3.4 Allocation of Escrow. In the event of a Deemed Liquidation Event pursuant to Subsection 2.3.1(a)(i), if any portion of the consideration payable to the stockholders of the Company is placed into escrow and/or is payable to the stockholders of the Company subject to contingencies, the Merger Agreement shall provide that (a) the portion of such consideration that is not placed in escrow and not subject to any contingencies (the "**Initial Consideration**") shall be allocated among the holders of capital stock of the Company in accordance with Subsections 2.1 and 2.2 as if the Initial Consideration were the only consideration payable in connection with such Deemed Liquidation Event and (b) any additional consideration which becomes payable to the stockholders of the Company upon release from escrow or satisfaction of contingencies shall be allocated among the holders of capital stock of the Company in accordance with Subsections 2.1 and 2.2 after taking into account the previous payment of the Initial Consideration as part of the same transaction.

3. Voting.

3.1 General. Except as set forth in Subsections 3.3 and 8, on any matter presented to the stockholders of the Company for their action or consideration at any meeting of stockholders of the Company (or by written consent of stockholders in lieu of meeting), each holder of outstanding shares of Series A Preferred Stock shall be entitled to cast the number of votes equal to the number of whole shares of Common Stock into which the shares of Series A Preferred Stock held by such holder are convertible as of the record date for determining stockholders entitled to vote on such matter. Except as provided by law or by the other provisions of this Certificate of Incorporation, holders of Series A Preferred Stock shall vote together with the holders of Common Stock as a single class and shall vote as a single class on every matter presented to the stockholders.

3.2 Election of Directors. The holders of record of the Series A Preferred Stock are parties to the Third Amended and Restated Voting Agreement, dated December 18, 2013, by among the Company and the participating investors, as amended by Amendment No. 1 to the Third Amended and Restated Voting Agreement, dated February 19, 2014 (collectively, the "**Voting Agreement**"), under which such investors agree to vote all shares of capital stock, including shares of Series A Preferred Stock, owned by them to elect to the Board of Directors at any annual or special meeting of stockholders or by written consent: (a) persons designated by identified holders of Series A Preferred Stock holding the requisite number of shares (the "**Preferred Directors**"), (b) at least one "Common Stock Director" and (c) the person serving as Chief Executive Officer of the Company (the "**CEO Director**"). If the CEO Director otherwise qualifies as a Preferred Director under the Voting Agreement, he or she shall be a Preferred Director under this Article Fourth.

Subject to compliance with the Voting Agreement, the holders of record of the shares of Common Stock and of Series A Preferred Stock shall be entitled to elect the directors of the Company pursuant to the affirmative vote of at least a majority of the then outstanding Common Stock and Series A Preferred Stock, voting together as a single class on an as-converted to Common Stock basis. If the holders of shares of Series A Preferred Stock or Common Stock (including holders of shares of Series A Preferred Stock voting on as converted to Common Stock basis), as the case may be, fail to elect a sufficient number of directors to fill all directorships for which they are entitled to elect directors, voting exclusively and as a separate class, pursuant to the first sentence of this Subsection 3.2, then any directorship not so filled shall remain vacant until such time as the holders of the Series A Preferred Stock or Common Stock (including holders of shares of Series A Preferred Stock voting on as converted to Common Stock basis), as the case may be, elect a person to fill such directorship by vote or written consent in lieu of a meeting; and no such directorship may be filled by stockholders of the Company other than by the stockholders of the Company that are entitled to elect a person to fill such directorship, voting exclusively and as a separate class pursuant to this Subsection 3.2. At any meeting held for the purpose of electing a director, the presence in person or by proxy of the holders of a majority of the outstanding shares of the class or series entitled to elect such director shall constitute a quorum for the purpose of electing such director. Except as otherwise provided in this Subsection 3.2, a vacancy in any directorship filled by the holders of any class or series shall be filled only by vote or written consent in lieu of a meeting of the holders of such class or series or by any remaining director or directors elected by the holders of such class or series pursuant to this Subsection 3.2.

3.3 Preferred Stock Protective Provisions. At any time when at least 20% of the originally issued shares of Series A Preferred Stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series A Preferred Stock) are outstanding, the Company shall not, either directly or indirectly by amendment, merger, consolidation or otherwise, do any of the following without (in addition to any other vote required by law or the Certificate of Incorporation) the written consent or affirmative vote of the holders of at least 70% of the then outstanding shares of Series A Preferred Stock (voting on a per-preferred share basis), given in writing or by vote at a meeting, consenting or voting (as the case may be) separately as a class:

(a) liquidate, dissolve or wind-up the business and affairs of the Company, effect any Deemed Liquidation Event or any acquisition of another entity, or consent to any of the foregoing;

(b) amend, alter or repeal any provision of the Certificate of Incorporation or Bylaws of the Company;

(c) create, or authorize the creation of, or issue or obligate itself to issue shares of, any additional class or series of capital stock unless the same ranks junior to the Series A Preferred Stock with respect to the distribution of assets on the liquidation, dissolution or winding up of the Company, the payment of dividends and redemption rights, or increase the authorized number of shares of Series A Preferred Stock or increase the authorized number of shares of any additional class or series of capital stock unless the same ranks junior to the Series A Preferred Stock with respect to the distribution of assets on the liquidation, dissolution or winding up of the Company, the payment of dividends and redemption rights;

(d) purchase or redeem (or permit any subsidiary to purchase or redeem) or pay or declare any dividend or make any distribution on, any shares of capital stock of the Company other than as approved by the Board of Directors, including the approval of at least two Preferred Directors;

(e) create, or authorize the creation of, or issue, or authorize the issuance of any debt security, or permit any subsidiary to take any such action with respect to any debt security unless such debt security has received the prior approval of the Board of Directors, including the approval of at least two Preferred Directors;

(f) increase or decrease the authorized number of directors constituting the Board of Directors; or

(g) amend or adopt any equity plan other than as approved by the Board of Directors, including the approval of at least two Preferred Directors.

3.4 Series A Preferred Class Vote. In the event that the holders of the outstanding shares of Series A Preferred Stock shall be entitled, pursuant to the second sentence of Section 242(b)(2) of the General Corporation Law of the State of Delaware, to vote as a separate class on any matter, the approval of such matter shall require the vote of the holders of at least 70% of the then outstanding shares of Series A Preferred Stock (voting on a per-preferred share basis).

4. Optional Conversion.

The holders of the Series A Preferred Stock shall have conversion rights as follows (the "**Conversion Rights**"):

4.1 Right to Convert.

4.1.1 Conversion Ratio. Each share of Series A Preferred Stock shall be convertible, at the option of the holder thereof, at any time and from time to time, and without the payment of additional consideration by the holder thereof, into a number of fully paid and non-assessable shares of Common Stock equal to the number of shares of Series A Preferred Stock being converted multiplied by a fraction, the numerator of which is the Series A Original Issue Price, and the denominator of which is the Series A Conversion Price (as defined below) (the "**Conversion Price**") in effect at the time of conversion. The "**Conversion Price**" shall initially be equal to $1.00 per share of Common Stock. Such initial Series A Conversion Price, and the rate at which shares of Series A Preferred Stock may be converted into shares of Common Stock, shall be subject to adjustment as provided below.

4.1.2 Termination of Conversion Rights. In the event of a notice of redemption of any shares of Series A Preferred Stock pursuant to Section 6, the Conversion Rights of the shares designated for redemption shall terminate at the close of business on the last full day preceding the date fixed for redemption, unless the redemption price is not fully paid on such redemption date, in which case the Conversion Rights for such shares shall continue until such price is paid in full. In the event of a liquidation, dissolution or winding up of the Company or a Deemed Liquidation Event, the Conversion Rights shall terminate at the close of business on the last full day preceding the date fixed for the payment of any such amounts distributable on such event to the holders of Series A Preferred Stock.

4.2 Fractional Shares. No fractional shares of Common Stock shall be issued upon conversion of the Series A Preferred Stock. In lieu of any fractional shares to which the holder would otherwise be entitled, the Company shall pay cash equal to such fraction multiplied by the fair market value of a share of Common Stock as determined in good faith by the Board of Directors of the Company. Whether or not fractional shares would be issuable upon such conversion shall be determined on the basis of the total number of shares of Series A Preferred Stock the holder is at the time converting into Common Stock and the aggregate number of shares of Common Stock issuable upon such conversion.

4.3 Mechanics of Conversion.

4.3.1 Notice of Conversion. In order for a holder of Series A Preferred Stock to voluntarily convert shares of Series A Preferred Stock into shares of Common Stock, such holder shall surrender the certificate or certificates for such shares of Series A Preferred Stock (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Company to indemnify the Company against any claim that may be made against the Company on account of the alleged loss, theft or destruction of such certificate), at the office of the transfer agent for the Series A Preferred Stock (or at the principal office of the Company if the Company serves as its own transfer agent), together with written notice that such holder elects to convert all or any number of the shares of the Series A Preferred Stock represented by such certificate or certificates and, if applicable, any event on which such conversion is contingent. Such notice shall state such holder's name or the names of the nominees in which such holder wishes the certificate or certificates for shares of Common Stock to be issued. If required by the Company, certificates surrendered for conversion shall be endorsed or accompanied by a written instrument or instruments of transfer, in form satisfactory to the Company, duly executed by the registered holder or his, her or its attorney duly authorized in writing. The close of business on the date of receipt by the transfer agent (or by the Company if the Company serves as its own transfer agent) of such certificates (or lost certificate affidavit and agreement) and notice shall be the time of conversion (the "**Conversion Time**"), and the shares of Common Stock issuable upon conversion of the shares represented by such certificate shall be deemed to be outstanding of record as of such date. The Company shall, as soon as practicable after the Conversion Time, issue and deliver to such holder of Series A Preferred Stock, or to his, her or its nominees, a certificate or certificates for the number of full shares of Common Stock issuable upon such conversion in accordance with the provisions hereof, a certificate for the number (if any) of the shares of Series A Preferred Stock represented by the surrendered certificate that were not converted into Common Stock, and cash as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion. Declared but unpaid dividends on Series A Preferred Stock will be waived upon conversion of shares of the Series A Preferred Stock into shares of Common Stock.

4.3.2 Reservation of Shares. The Company shall at all times when the Series A Preferred Stock shall be outstanding, reserve and keep available out of its authorized but unissued capital stock, for the purpose of effecting the conversion of the Series A Preferred Stock, such number of its duly authorized shares of Common Stock as shall from time to time be sufficient to effect the conversion of all outstanding Series A Preferred Stock; and if at any time the number of authorized but unissued shares of Common Stock shall not be sufficient to effect the conversion of all then outstanding shares of the Series A Preferred Stock, the Company shall take such corporate action as may be necessary to increase its authorized but unissued shares of Common Stock to such number of shares as shall be sufficient for such purposes, including, without limitation, engaging in best efforts to obtain the requisite stockholder approval of any necessary amendment to the Certificate of Incorporation. Before taking any action which would cause an adjustment reducing the Conversion Price below the then par value of the shares of Common Stock issuable upon conversion of the Series A Preferred Stock, the Company will take any corporate action which may, in the opinion of its counsel, be necessary in order that the Company may validly and legally issue fully paid and non-assessable shares of Common Stock at such adjusted Conversion Price.

4.3.3 Effect of Conversion. All shares of Series A Preferred Stock which shall have been surrendered for conversion as herein provided shall no longer be deemed to be outstanding and all rights with respect to such shares shall immediately cease and terminate at the Conversion Time, except only the right of the holders thereof to receive shares of Common Stock in exchange therefor. Any shares of Series A Preferred Stock so converted shall be retired and cancelled and may not be reissued as shares of such series, and the Company may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of Series A Preferred Stock accordingly.

4.3.4 No Further Adjustment. Upon any such conversion, no adjustment to the Conversion Price shall be made or on the Common Stock delivered upon conversion.

4.3.5 Taxes. The Company shall pay any and all issue and other similar taxes that may be payable in respect of any issuance or delivery of shares of Common Stock upon conversion of shares of Series A Preferred Stock pursuant to this Section 4. The Company shall not, however, be required to pay any tax which may be payable in respect of any transfer involved in the issuance and delivery of shares of Common Stock in a name other than that in which the shares of Series A Preferred Stock so converted were registered, and no such issuance or delivery shall be made unless and until the person or entity requesting such issuance has paid to the Company the amount of any such tax or has established, to the satisfaction of the Company, that such tax has been paid.

4.4 Adjustments to Conversion Price for Diluting Issues.

4.4.1 Special Definitions. For purposes of this Article Fourth, the following definitions shall apply:

(a) "**Option**" shall mean rights, options or warrants to subscribe for, purchase or otherwise acquire Common Stock or Convertible Securities.

(b) "**Series A Original Issue Date**" shall mean the date on which the first share of Series A Preferred Stock was issued.

(c) "**Convertible Securities**" shall mean any evidences of indebtedness, shares or other securities directly or indirectly convertible into or exchangeable for Common Stock, but excluding Options.

(d) "**Additional Shares of Common Stock**" shall mean all shares of Common Stock issued (or, pursuant to Subsection 4.4.3 below, deemed to be issued) by the Company after the Series A Original Issue Date, other than the following shares of Common Stock, and shares of Common Stock deemed issued pursuant to the following Options and Convertible Securities (collectively "**Exempted Securities**"):

(i) shares of Common Stock, Options or Convertible Securities issued or issuable upon conversion of any Series A Preferred Stock or as a dividend or distribution on Series A Preferred Stock;

(ii) shares of Common Stock, Options or Convertible Securities issued or issuable by reason of a dividend, stock split, split-up or other distribution on shares of Common Stock that is covered by Subsection 4.5, 4.6, 4.7 or 4.8;

(iii) shares of Common Stock or Options issued or issuable to employees or directors of, or consultants or advisors to, the Company or any of its subsidiaries pursuant to a plan, agreement or arrangement approved by the Board of Directors of the Company, including at least two Preferred Directors;

(iv) shares of Common Stock or Preferred Stock issuable upon exercise of Options, Convertible Securities or other rights to purchase any securities of the Company outstanding as of the date of this Amended and Restated Certificate;

(v) shares of Common Stock, Options or Convertible Securities issued or issuable to banks, equipment lessors or other financial institutions, or to real property lessors, pursuant to a debt financing, equipment leasing or real property leasing transaction approved by the Board of Directors of the Company, including at least two Preferred Directors;

(vi) shares of Common Stock or Series A Preferred Stock issued pursuant to the bona fide acquisitions, mergers or similar transactions, as approved by the Board of Directors, including the approval of at least two Preferred Directors;

(vii) shares of Common Stock issued in connection with any future licensing of technology from third parties, as approved by the Board of Directors, including at least two Preferred Directors; or

(viii) shares of Common Stock issued in connection with the Company's initial public offering of its Common Stock.

4.4.2 No Adjustment of Conversion Price. No adjustment in the Series A Conversion Price shall be made as the result of the issuance or deemed issuance of Additional Shares of Common Stock if the Company receives written notice from the holders of at least 70% of the then outstanding shares of Series A Preferred Stock (voting on a per-preferred share basis) agreeing that no such adjustment shall be made as the result of the issuance or deemed issuance of such Additional Shares of Common Stock.

4.4.3 Deemed Issue of Additional Shares of Common Stock.

(a) If the Company at any time or from time to time after the Series A Original Issue Date shall issue any Options or Convertible Securities (excluding Options or Convertible Securities which are themselves Exempted Securities) or shall fix a record date for the determination of holders of any class of securities entitled to receive any such Options or Convertible Securities, then the maximum number of shares of Common Stock (as set forth in the instrument relating thereto, assuming the satisfaction of any conditions to exercisability, convertibility or exchangeability but without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or, in the case of Convertible Securities and Options therefor, the conversion or exchange of such Convertible Securities, shall be deemed to be Additional Shares of Common Stock issued as of the time of such issue or, in case such a record date shall have been fixed, as of the close of business on such record date.

(b) If the terms of any Option or Convertible Security, the issuance of which resulted in an adjustment to the Conversion Price pursuant to the terms of Subsection 4.4.4, are revised as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase or decrease in the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any such Option or Convertible Security or (2) any increase or decrease in the consideration payable to the Company upon such exercise, conversion and/or exchange, then, effective upon such increase or decrease becoming effective, the Conversion Price computed upon the original issue of such Option or Convertible Security (or upon the occurrence of a record date with respect thereto) shall be readjusted to such Conversion Price as would have obtained had such revised terms been in effect upon the original date of issuance of such Option or Convertible Security. Notwithstanding the foregoing, no readjustment pursuant to this clause (b) shall have the effect of increasing the Conversion Price to an amount which exceeds the lower of (i) the Conversion Price in effect immediately prior to the original adjustment made as a result of the issuance of such Option or Convertible Security, or (ii) the Conversion Price that would have resulted from any issuances of Additional Shares of Common Stock (other than deemed issuances of Additional Shares of Common Stock as a result of the issuance of such Option or Convertible Security) between the original adjustment date and such readjustment date.

(c) If the terms of any Option or Convertible Security (excluding Options or Convertible Securities which are themselves Exempted Securities), the issuance of which did not result in an adjustment to the Conversion Price pursuant to the terms of Subsection 4.4.4 (either because the consideration per share (determined pursuant to Subsection 4.4.5) of the Additional Shares of Common Stock subject thereto was equal to or greater than the Conversion Price then in effect, or because such Option or Convertible Security was issued before the Series A Original Issue Date), are revised after the Series A Original Issue Date as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase or decrease in the number of shares of Common Stock issuable upon the exercise, conversion or exchange of any such Option or Convertible Security or (2) any increase or decrease in the consideration payable to the Company upon such exercise, conversion or exchange, then such Option or Convertible Security, as so amended or adjusted, and the Additional Shares of Common Stock subject thereto (determined in the manner provided in Subsection 4.4.3(a)) shall be deemed to have been issued effective upon such increase or decrease becoming effective.

(d) Upon the expiration or termination of any unexercised Option or unconverted or un-exchanged Convertible Security (or portion thereof) which resulted (either upon its original issuance or upon a revision of its terms) in an adjustment to the Conversion Price pursuant to the terms of Subsection 4.4.4, the Conversion Price shall be readjusted to such Conversion Price as would have obtained had such Option or Convertible Security (or portion thereof) never been issued.

(e) If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Company upon such exercise, conversion and/or exchange, is calculable at the time such Option or Convertible Security is issued or amended but is subject to adjustment based upon subsequent events, any adjustment to the Conversion Price provided for in this Subsection 4.4.3 shall be effected at the time of such issuance or amendment based on such number of shares or amount of consideration without regard to any provisions for subsequent adjustments (and any subsequent adjustments shall be treated as provided in clauses (b) and (c) of this Subsection 4.4.3). If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Company upon such exercise, conversion and/or exchange, cannot be calculated at all at the time such Option or Convertible Security is issued or amended, any adjustment to the Conversion Price that would result under the terms of this Subsection 4.4.3 at the time of such issuance or amendment shall instead be effected at the time such number of shares and/or amount of consideration is first calculable (even if subject to subsequent adjustments), assuming for purposes of calculating such adjustment to the Conversion Price that such issuance or amendment took place at the time such calculation can first be made.

4.4.4 Adjustment of Conversion Price Upon Issuance of Additional Shares of Common Stock. In the event the Company shall at any time after the Series A Original Issue Date issue Additional Shares of Common Stock (including Additional Shares of Common Stock deemed to be issued pursuant to Subsection 4.4.3), without consideration or for a consideration per share less than the Conversion Price in effect immediately prior to such issue, then the Conversion Price shall be reduced, concurrently with such issue, to a price (calculated to the nearest one-hundredth of a cent) determined in accordance with the following formula:

$$CP_2 = CP_1 * (A + B) \div (A + C).$$

For purposes of the foregoing formula, the following definitions shall apply:

(a) "CP_2" shall mean the Conversion Price in effect immediately after such issue of Additional Shares of Common Stock

(b) "CP_1" shall mean the Conversion Price in effect immediately prior to such issue of Additional Shares of Common Stock;

(c) "A" shall mean the number of shares of Common Stock outstanding immediately prior to such issue of Additional Shares of Common Stock (treating for this purpose as outstanding all shares of Common Stock issuable upon exercise of Options outstanding immediately prior to such issue or upon conversion or exchange of Convertible Securities (including the Series A Preferred Stock) outstanding (assuming exercise of any outstanding Options therefor) immediately prior to such issue);

(d) "B" shall mean the number of shares of Common Stock that would have been issued if such Additional Shares of Common Stock had been issued at a price per share equal to CP_1 (determined by dividing the aggregate consideration received by the Company in respect of such issue by CP_1); and

(e) "C" shall mean the number of such Additional Shares of Common Stock issued in such transaction.

4.4.5 Determination of Consideration. For purposes of this Subsection 4.4, the consideration received by the Company for the issue of any Additional Shares of Common Stock shall be computed as follows:

(a) Cash and Property: Such consideration shall:

(i) insofar as it consists of cash, be computed at the aggregate amount of cash received by the Company, excluding amounts paid or payable for accrued interest;

(ii) insofar as it consists of property other than cash, be computed at the fair market value thereof at the time of such issue, as determined in good faith by the Board of Directors of the Company; and

(iii) in the event Additional Shares of Common Stock are issued together with other shares or securities or other assets of the Company for consideration which covers both, be the proportion of such consideration so received, computed as provided in clauses (i) and (ii) above, as determined in good faith by the Board of Directors of the Company, including at least two Preferred Directors.

(b) Options and Convertible Securities. The consideration per share received by the Company for Additional Shares of Common Stock deemed to have been issued pursuant to Subsection 4.4.3, relating to Options and Convertible Securities, shall be determined by dividing

(i) the total amount, if any, received or receivable by the Company as consideration for the issue of such Options or Convertible Securities, plus the minimum aggregate amount of additional consideration (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such consideration) payable to the Company upon the exercise of such Options or the conversion or exchange of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise of such Options for Convertible Securities and the conversion or exchange of such Convertible Securities, by

(ii) the maximum number of shares of Common Stock (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or the conversion or exchange of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise of such Options for Convertible Securities and the conversion or exchange of such Convertible Securities.

4.4.6 Multiple Closing Dates. In the event the Company shall issue on more than one date Additional Shares of Common Stock that are a part of one transaction or a series of related transactions and that would result in an adjustment to the Conversion Price pursuant to the terms of Subsection 4.4.4, and such issuance dates occur within a period of no more than 90 days from the first such issuance to the final such issuance, then, upon the final such issuance, the Conversion Price shall be readjusted to give effect to all such issuances as if they occurred on the date of the first such issuance (and without giving effect to any additional adjustments as a result of any such subsequent issuances within such period).

4.5 Adjustment for Stock Splits and Combinations. If the Company shall at any time or from time to time after the Series A Original Issue Date effect a subdivision of the outstanding Common Stock, the Conversion Price in effect immediately before that subdivision shall be proportionately decreased so that the number of shares of Common Stock issuable on conversion of each share of such series shall be increased in proportion to such increase in the aggregate number of shares of Common Stock outstanding. If the Company shall at any time or from time to time after the Series A Original Issue Date combine the outstanding shares of Common Stock, the Conversion Price in effect immediately before the combination shall be proportionately increased so that the number of shares of Common Stock issuable on conversion of each share of such series shall be decreased in proportion to such decrease in the aggregate number of shares of Common Stock outstanding. Any adjustment under this subsection shall become effective at the close of business on the date the subdivision or combination becomes effective.

4.6 Adjustment for Certain Dividends and Distributions. In the event the Company at any time or from time to time after the Series A Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable on the Common Stock in additional shares of Common Stock, then and in each such event the Conversion Price in effect immediately before such event shall be decreased as of the time of such issuance or, in the event such a record date shall have been fixed, as of the close of business on such record date, by multiplying the Conversion Price then in effect by a fraction:

(1) the numerator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date, and

(2) the denominator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date plus the number of shares of Common Stock issuable in payment of such dividend or distribution.

Notwithstanding the foregoing, (a) if such record date shall have been fixed and such dividend is not fully paid or if such distribution is not fully made on the date fixed therefor, the Conversion Price shall be recomputed accordingly as of the close of business on such record date and thereafter the Conversion Price shall be adjusted pursuant to this subsection as of the time of actual payment of such dividends or distributions; and (b) that no such adjustment shall be made if the holders of Series A Preferred Stock simultaneously receive a dividend or other distribution of shares of Common Stock in a number equal to the number of shares of Common Stock as they would have received if all outstanding shares of Series A Preferred Stock had been converted into Common Stock on the date of such event.

4.7 Adjustments for Other Dividends and Distributions. In the event the Company at any time or from time to time after the Series A Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable in securities of the Company (other than a distribution of shares of Common Stock in respect of outstanding shares of Common Stock) or in other property and the provisions of Section 1 do not apply to such dividend or distribution, then and in each such event the holders of Series A Preferred Stock shall receive, simultaneously with the distribution to the holders of Common Stock, a dividend or other distribution of such securities or other property in an amount equal to the amount of such securities or other property as they would have received if all outstanding shares of Series A Preferred Stock had been converted into Common Stock on the date of such event.

4.8 Adjustment for Merger or Reorganization, etc. Subject to the provisions of Subsection 2.3, if there shall occur any reorganization, recapitalization, reclassification, consolidation or merger involving the Company in which the Common Stock (but not the Series A Preferred Stock) is converted into or exchanged for securities, cash or other property (other than a transaction covered by Subsections 4.4, 4.6 or 4.7), then, following any such reorganization, recapitalization, reclassification, consolidation or merger, each share of Series A Preferred Stock shall thereafter be convertible in lieu of the Common Stock into which it was convertible prior to such event into the kind and amount of securities, cash or other property which a holder of the number of shares of Common Stock of the Company issuable upon conversion of one share of Series A Preferred Stock immediately prior to such reorganization, recapitalization, reclassification, consolidation or merger would have been entitled to receive pursuant to such transaction; and, in such case, appropriate adjustment (as determined in good faith by the Board of Directors of the Company) shall be made in the application of the provisions in this Section 4 with respect to the rights and interests thereafter of the holders of the Series A Preferred Stock, to the end that the provisions set forth in this Section 4 (including provisions with respect to changes in and other adjustments of the Conversion Price) shall thereafter be applicable, as nearly as reasonably may be, in relation to any securities or other property thereafter deliverable upon the conversion of the Series A Preferred Stock.

4.9 Certificate as to Adjustments. Upon the occurrence of each adjustment or readjustment of the Conversion Price pursuant to this Section 4, the Company at its expense shall, as promptly as reasonably practicable but in any event not later than 10 days thereafter, compute such adjustment or readjustment in accordance with the terms hereof and furnish to each holder of Series A Preferred Stock a certificate setting forth such adjustment or readjustment (including the kind and amount of securities, cash or other property into which the Series A Preferred Stock is convertible) and showing in detail the facts upon which such adjustment or readjustment is based. The Company shall, as promptly as reasonably practicable after the written request at any time of any holder of Series A Preferred Stock (but in any event not later than 10 days thereafter), furnish or cause to be furnished to such holder a certificate setting forth (i) the Conversion Price then in effect, and (ii) the number of shares of Common Stock and the amount, if any, of other securities, cash or property which then would be received upon the conversion of such Series A Preferred Stock.

4.10 Notice of Record Date. In the event:

(a) the Company shall take a record of the holders of its Common Stock (or other capital stock or securities at the time issuable upon conversion of the Series A Preferred Stock) for the purpose of entitling or enabling them to receive any dividend or other distribution, or to receive any right to subscribe for or purchase any shares of capital stock of any class or any other securities, or to receive any other security; or

(b) of any capital reorganization of the Company, any reclassification of the Common Stock of the Company, or any Deemed Liquidation Event; or

(c) of the voluntary or involuntary dissolution, liquidation or winding-up of the Company,

then, and in each such case, the Company will send or cause to be sent to the holders of the Series A Preferred Stock a notice specifying, as the case may be, (i) the record date for such dividend, distribution or right, and the amount and character of such dividend, distribution or right, or (ii) the effective date on which such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up is proposed to take place, and the time, if any is to be fixed, as of which the holders of record of Common Stock (or such other capital stock or securities at the time issuable upon the conversion of the Series A Preferred Stock) shall be entitled to exchange their shares of Common Stock (or such other capital stock or securities) for securities or other property deliverable upon such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up, and the amount per share and character of such exchange applicable to the Series A Preferred Stock and the Common Stock. Such notice shall be sent at least 10 days prior to the record date or effective date for the event specified in such notice.

5. Mandatory Conversion.

5.1 Trigger Events. Upon (a) the closing of the sale of shares of Common Stock to the public at a price per share of at least four times the Series A Original Purchase Price (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock), in a firm-commitment underwritten public offering pursuant to an effective registration statement under the Securities Act of 1933, as amended, resulting in at least $30,000,000 of proceeds, net of the underwriting discount and commissions, to the Company ("**QPO**") or (b) the date and time, or the occurrence of an event, specified by vote or written consent of the holders of at least 70% of the then outstanding shares of Series A Preferred Stock (voting on a per-preferred share basis) (with respect to such vote, excluding any vote for mandatory conversion in connection with a public offering of the Company's securities that is not a QPO) (the time of such closing or the date and time specified or the time of the event specified in such vote or written consent is referred to herein as the "**Mandatory Conversion Time**"), then (i) upon the occurrence of the events described in clauses (a) or (b) above, all outstanding shares of Series A Preferred Stock shall automatically be converted into shares of Common Stock, at the then effective conversion rate and (ii) such shares may not be reissued by the Company.

5.2 Procedural Requirements. All holders of record of shares of Series A Preferred Stock shall be sent written notice of the Mandatory Conversion Time and the place designated for mandatory conversion of all such shares of Series A Preferred Stock pursuant to this Section 5. Such notice need not be sent in advance of the occurrence of the Mandatory Conversion Time. Upon receipt of such notice, each holder of shares of Series A Preferred Stock shall surrender his, her or its certificate or certificates for all such shares (or, if such holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Company to indemnify the Company against any claim that may be made against the Company on account of the alleged loss, theft or destruction of such certificate) to the Company at the place designated in such notice. If so required by the Company, certificates surrendered for conversion shall be endorsed or accompanied by written instrument or instruments of transfer, in form satisfactory to the Company, duly executed by the registered holder or by his, her or its attorney duly authorized in writing. All rights with respect to the Series A Preferred Stock converted pursuant to Section 5.1, including the rights, if any, to receive notices and vote (other than as a holder of Common Stock), will terminate at the Mandatory Conversion Time (notwithstanding the failure of the holder or holders thereof to surrender the certificates at or prior to such time), except only the rights of the holders thereof, upon surrender of their certificate or certificates (or lost certificate affidavit and agreement) therefor, to receive the items provided for in the next sentence of this Subsection 5.2. As soon as practicable after the Mandatory Conversion Time and the surrender of the certificate or certificates (or lost certificate affidavit and agreement) for Series A Preferred Stock, the Company shall issue and deliver to such holder, or to his, her or its nominees, a certificate or certificates for the number of full shares of Common Stock issuable on such conversion in accordance with the provisions hereof, together with cash as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion and the payment of any declared but unpaid dividends on the shares of Series A Preferred Stock converted. Such converted Series A Preferred Stock shall be retired and cancelled and may not be reissued as shares of such series, and the Company may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of Series A Preferred Stock accordingly.

6. Redemption.

6.1 Mandatory and Optional Redemption.

6.1.1 Redemption. Except as prohibited by law or by an agreement approved by the Board of Directors, including the approval of at least two Preferred Directors, shares of Series A Preferred Stock shall be redeemed by the Company out of funds lawfully available therefor at a price equal to two times the Series A Original Issue Price per share, plus any dividends declared but unpaid thereon (the "**Redemption Price**"), in three annual installments commencing 60 days after receipt by the Company at any time on or after the sixth anniversary of the Series A Original Issue Date, upon receipt by the Company from the holders of at least 70% of the then outstanding shares of Series A Preferred Stock, of written notice requesting redemption of all shares of Series A Preferred Stock (the date of each such installment being referred to as a "**Redemption Date**"). On each Redemption Date, the Company shall redeem any and all outstanding shares of Series A Preferred Stock. If the Company does not have sufficient funds legally available to redeem on any Redemption Date all shares of Series A Preferred Stock to be redeemed on such Redemption Date, the Company shall redeem a pro rata portion of each holder's redeemable shares of Series A Preferred Stock out of funds legally available therefor, based upon the amounts that such holder would have received in the event that such redemption was a Deemed Liquidation Event, and shall redeem the remaining shares to have been redeemed as soon as practicable after the Company has funds legally available therefor.

6.1.2 Mandatory Redemption. Upon the occurrence of any Deemed Liquidation Event in which the holders of Series A Preferred Stock receive a distribution per share in an amount of at least two times the Series A Original Purchase Price, the assets of the Company shall be distributed as follows:

(a) first, to the holders of the Series A Preferred Stock and Common Stock (including shares of Common Stock issued upon conversion of the Series A Preferred Stock) until the holders of Common Stock issued upon conversion of the Series A Preferred Stock receive a distribution per share in an amount that is at least two times the Series A Original Purchase Price Original Purchase Price; and

(b) thereafter, ratably, to the holders of the Common Stock (including shares of Common Stock issued upon conversion of the Series A Preferred Stock).

All amounts payable to the holders of the Series A Preferred Stock pursuant to this Subsection 6.1.2, may be made either in cash or, in the event of a merger in which the Company's shares are exchanged for stock of another company, stock of such other Company at the Company's option (the "**Mandatory Redemption Consideration**") as soon as reasonably practicable after the occurrence of the events contemplated in this Subsection 6.1.2 (the "**Mandatory Redemption Date**").

6.2 Redemption Notice. Written notice of the mandatory redemptions pursuant to Subsections 6.1.1 or 6.1.2 (the "**Redemption Notice**") shall be sent to each holder of record of Series A Preferred Stock not less than 40 days prior to each Redemption Date. Each Redemption Notice shall state, as applicable:

(a) the number of shares of Series A Preferred Stock held by the holder that the Company shall redeem on the Redemption Date specified in the Redemption Notice;

(b) the Redemption Date and the Redemption Price, or the Mandatory Redemption Date and the Mandatory Redemption Consideration;

(c) the date upon which the holder's right to convert such shares terminates (as determined in accordance with Subsection 4.1); and

(d) that the holder is to surrender to the Company, in the manner and at the place designated, his, her or its certificate or certificates representing the shares of Series A Preferred Stock to be redeemed.

6.3 Surrender of Certificates; Payment. On or before the applicable Redemption Date or applicable Mandatory Redemption Date, each holder of shares of Series A Preferred Stock to be redeemed on such Redemption Date or such Mandatory Redemption Date, unless such holder has exercised his, her or its right to convert such shares as provided in Section 4, shall surrender the certificate or certificates representing such shares (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Company to indemnify the Company against any claim that may be made against the Company on account of the alleged loss, theft or destruction of such certificate) to the Company, in the manner and at the place designated in the Redemption Notice, and thereupon the Redemption Price or Mandatory Redemption Consideration for such shares shall be payable to the order of the person whose name appears on such certificate or certificates as the owner thereof. In the event less than all of the shares of Series A Preferred Stock represented by a certificate are redeemed, a new certificate representing the unredeemed shares of Series A Preferred Stock shall promptly be issued to such holder.

6.4 Rights Subsequent to Redemption. If the Redemption Notice shall have been duly given, and if on the applicable Redemption Date or applicable Mandatory Redemption Date, the Redemption Price or Mandatory Redemption Consideration payable upon redemption of the shares of Series A Preferred Stock to be redeemed on such Redemption Date or such Mandatory Redemption Date is paid or tendered for payment or deposited with an independent payment agent so as to be available therefor, then notwithstanding that the certificates evidencing any of the shares of Series A Preferred Stock so called for redemption shall not have been surrendered, dividends with respect to such shares of Series A Preferred Stock shall cease to accrue after such Redemption Date or such Mandatory Redemption Date and all rights with respect to such shares shall forthwith after the Redemption Date or applicable Mandatory Redemption Date terminate, except only the right of the holders to receive the Redemption Price or Mandatory Redemption Consideration without interest upon surrender of their certificate or certificates therefor.

7. Redeemed or Otherwise Acquired Shares. Any shares of Series A Preferred Stock that are redeemed or otherwise acquired by the Company or any of its subsidiaries shall be automatically and immediately cancelled and retired and shall not be reissued, sold or transferred. Neither the Company nor any of its subsidiaries may exercise any voting or other rights granted to the holders of Series A Preferred Stock following redemption.

8. Waiver. Subject to the following sentence, any of the rights, powers, preferences and other terms of the Series A Preferred Stock set forth herein may be waived on behalf of all holders of Series A Preferred Stock by the affirmative written consent or vote of the holders of at least 70% of the shares of Series A Preferred Stock then outstanding (on a per-preferred share basis).

9. Notices. Any notice required or permitted by the provisions of this Article Fourth to be given to a holder of shares of Series A Preferred Stock shall be mailed, postage prepaid, to the post office address last shown on the records of the Company, or given by electronic communication in compliance with the provisions of the General Corporation Law, and shall be deemed sent upon such mailing or electronic transmission.

FIFTH: Subject to any additional vote required by the Certificate of Incorporation, in furtherance and not in limitation of the powers conferred by statute, the Board of Directors is expressly authorized to make, repeal, alter, amend and rescind any or all of the Bylaws of the Company.

SIXTH: Subject to any additional vote required by the Certificate of Incorporation, the number of directors of the Company shall be determined in the manner set forth in the Bylaws of the Company.

SEVENTH: Elections of directors need not be by written ballot unless the Bylaws of the Company shall so provide.

EIGHTH: Meetings of stockholders may be held within or without the State of Delaware, as the Bylaws of the Company may provide. The books of the Company may be kept outside the State of Delaware at such place or places as may be designated from time to time by the Board of Directors or in the Bylaws of the Company.

NINTH: To the fullest extent permitted by law, a director of the Company shall not be personally liable to the Company or its stockholders for monetary damages for breach of fiduciary duty as a director. If the General Corporation Law or any other law of the State of Delaware is amended after approval by the stockholders of this Article Ninth to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Company shall be eliminated or limited to the fullest extent permitted by the General Corporation Law as so amended.

Any repeal or modification of the foregoing provisions of this Article Ninth by the stockholders of the Company shall not adversely affect any right or protection of a director of the Company existing at the time of, or increase the liability of any director of the Company with respect to any acts or omissions of such director occurring prior to, such repeal or modification.

TENTH: To the fullest extent permitted by applicable law, the Company is authorized to provide indemnification of (and advancement of expenses to) directors, officers and agents of the Company (and any other persons to which General Corporation Law permits the Company to provide indemnification) through Bylaw provisions, agreements with such agents or other persons, vote of stockholders or disinterested directors or otherwise, in excess of the indemnification and advancement otherwise permitted by Section 145 of the General Corporation Law.

Any amendment, repeal or modification of the foregoing provisions of this Article Tenth shall not adversely affect any right or protection of any director, officer or other agent of the Company existing at the time of such amendment, repeal or modification.

ELEVENTH: The Company renounces any interest or expectancy of the Company in, or in being offered an opportunity to participate in, any Excluded Opportunity. An "**Excluded Opportunity**" is any matter, transaction or interest that is presented to, or acquired, created or developed by, or which otherwise comes into the possession of, (i) any director of the Company who is not an employee of the Company or any of its subsidiaries, or (ii) any holder of Preferred Stock or any partner, member, director, stockholder, employee or agent of any such holder, other than someone who is an employee of the Company or any of its subsidiaries (collectively, "**Covered Persons**"), unless such matter, transaction or interest is presented to, or acquired, created or developed by, or otherwise comes into the possession of, a Covered Person expressly and solely in such Covered Person's capacity as a director of the Company.

IN WITNESS WHEREOF, this Ninth Amended and Restated Certificate of Incorporation has been executed by a duly authorized officer of this corporation on this 10th day of July, 2014.

OPGEN, INC.

By: /s/ C. Eric Winzer
Name: C. Eric Winzer
Title: Chief Financial Officer

[Signature Page to Ninth Amended and Restated Certificate of Incorporation]

DELAWARE
The First State

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF AMENDMENT OF "OPGEN, INC.", FILED IN THIS OFFICE ON THE THIRTEENTH DAY OF FEBRUARY, A.D. 2015, AT 12:40 O'CLOCK P.M.

A FILED COPY OF THIS CERTIFICATE HAS BEEN FORWARDED TO THE NEW CASTLE COUNTY RECORDER OF DEEDS.

/s/Jeffrey W. Bullock
Jeffrey W. Bullock, Secretary of State

3338364 8100 AUTHENTICATION: 1528478

150195808 [DELAWARE SEAL] DATE: 02-13-15

You may verify this certificate online
at corp.delaware.gov/authver.shtml

CERTIFICATE OF AMENDMENT OF CERTIFICATE OF INCORPORATION OF OPGEN, INC.

OpGen, Inc. (the "**Corporation**"), a corporation organized and existing under the General Corporation Law of the State of Delaware, hereby certifies as follows:

1. This Certificate of Amendment (the "**Certificate of Amendment**") amends the provisions of the Corporation's Ninth Amended and Restated Certificate of Incorporation that was filed with the Secretary of State on July 10, 2014 (the "**Certificate of Incorporation**").

2. The first sentence of the FOURTH Article of the Certificate of Incorporation is hereby deleted in its entirety and replaced with the following:

"**FOURTH:** The total number of shares of all classes of stock which the Company shall have authority to issue is 17,500,000 shares of capital stock consisting of:

(i) 10,000,000 shares designated as Common Stock, $0.01 par value per share (the "**Common Stock**"); and

(ii) 7,500,000 shares of Preferred Stock, $0.01 par value per share (the "**Preferred Stock**"), all of which shall be designated as Series A Convertible Preferred Stock (the "**Series A Preferred Stock**")."

3. This Certificate of Amendment was duly adopted in accordance with the provisions of Sections 228 and 242 of the General Corporation Law of the State of Delaware.

4. All other provisions of the Certificate of Incorporation shall remain in full force and effect.

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by C. Eric Winzer, its Chief Financial Officer, this 13th day of February, 2015.

OPGEN, INC.

By: /s/ C. Eric Winzer
Name: C. Eric Winzer
Title: Chief Financial Officer

AMENDED AND RESTATED

BYLAWS

OF

OPGEN, INC.
(a Delaware corporation)

The following are the Bylaws ("Bylaws") of **OPGEN, INC.**, a Delaware corporation (the "Corporation"), effective as of February 5, 2015.

ARTICLE I
OFFICES

Section 1.01 **PRINCIPAL EXECUTIVE OFFICE**. The principal executive office of the Corporation shall be located at 708 Quince Orchard Road, Gaithersburg, Maryland 20878. The Board of Directors of the Corporation (the "Board of Directors") may change the location of said principal executive office.

Section 1.02 **OTHER OFFICES**. The Corporation may also have an office or offices at such other place or places, either within or without the State of Delaware, as the Board of Directors may from time to time determine or as the business of the Corporation may require.

ARTICLE II
MEETINGS OF STOCKHOLDERS

Section 2.01 **ANNUAL MEETINGS**. The annual meeting of stockholders of the Corporation shall be held at a date and at such time as the Board of Directors shall determine. At each annual meeting of stockholders, directors shall be elected in accordance with the provisions of Section 3.03 hereof and any other proper business may be transacted.

Section 2.02 **SPECIAL MEETINGS**. Special meetings of stockholders for any purpose or purposes may be called at any time by a majority of the Board of Directors, by the Chairman of the Board or by the President. Special meetings may not be called by any other person or persons. Each special meeting shall be held at such date and time as is requested by the person or persons calling the meeting, subject to limits fixed by applicable law.

Section 2.03 **PLACE OF MEETINGS**. Each annual or special meeting of stockholders shall be held at such location as may be determined by the Board of Directors or, if no such determination is made, at such place as may be determined by the Chairman of the Board. If no location is so determined, any annual or special meeting shall be held at the principal executive office of the Corporation.

Section 2.04 **NOTICE OF STOCKHOLDER MEETINGS**. Written notice of each annual or special meeting of stockholders (the "Meeting Notice") shall be delivered either personally or by mail to stockholders entitled to vote at such meeting no fewer than ten (10) nor more than sixty (60) days before the date of the meeting. The Meeting Notice shall include the time, date and location of the meeting to which such Meeting Notice relates. The purpose or purposes for which the meeting is called may, in the case of an annual meeting, and shall, in the case of a special meeting, be set forth in the Meeting Notice. If mailed, notice is given when deposited in the United States mail, postage prepaid, directed to the stockholder at his address as it shall appear on the stock books of the Corporation, unless he shall have filed with the Secretary of the Corporation a written request that notices intended for him be mailed to some other address, in which case such notice shall be mailed to the address designated in such request.

Section 2.05 **NOTICE REQUIREMENTS FOR DIRECTOR NOMINATIONS AND STOCKHOLDER PROPOSALS**.

(a) Only persons who are nominated in accordance with the procedures set forth in these Bylaws shall be eligible to serve as directors. Nominations of persons for election to the Board of Directors of the Corporation may be made at a meeting of stockholders (i) by or at the direction of the Board of Directors or (ii) by any stockholder of the Corporation who is a stockholder of record at the time of giving of notice provided for in this Section 2.05, who is entitled to vote for the election of directors at the meeting and who complies with the notice procedures set forth in this Section 2.05.

(b) Nominations by stockholders shall be made pursuant to timely notice in writing to the Secretary of the Corporation. To be timely, a stockholder's notice shall be delivered to or mailed and received at the Corporation's principal executive office: (i) in the case of an annual meeting, no fewer than 90 days nor more than 120 days prior to the first anniversary of the date of the Meeting Notice for the preceding year's annual meeting; provided, however, that in the event that the date of the annual meeting is changed by more than 30 days from such anniversary date, notice by the stockholder to be timely must be so received not later than the close of business on the tenth day following the earlier of the day on which notice of the date of the meeting was mailed or public disclosure was made; and (ii) in the case of a special meeting at which directors are to be elected, not later than the close of business on the tenth day following the earlier of the day on which notice of the date of the meeting was mailed or public disclosure was made.

(c) Such stockholder's notice shall set forth: (i) as to each person whom the stockholder proposes to nominate for election or reelection as a director, all information relating to such person that is required to be disclosed in solicitations of proxies for elections of directors, or is otherwise required, in each case pursuant to Regulation 14A under the Securities Exchange Act of 1934, as amended (including such person's written consent to being named in the proxy statement as a nominee and to serving as a director if elected); (ii) as to the stockholder giving the notice, (A) the name and address, as they appear on the Corporation's books, of such stockholder and (B) the class and number of shares of the Corporation which are owned beneficially and of record by such stockholder of record and by the beneficial owner, if any, on whose behalf the nomination is made; and (iii) as to the beneficial owner, if any, on whose behalf the nomination is made, (A) the name and address of such person and (B) the class and number of shares of the Corporation which are beneficially owned by such person. At the request of the Board of Directors, any person nominated by the Board of Directors for election as a director shall furnish to the Secretary of the Corporation that information required to be set forth in a stockholder's notice of nomination which pertains to the nominee.

(d) At an annual meeting of the stockholders, only such business shall be conducted as shall have been brought before the meeting (i) pursuant to the Corporation's Meeting Notice, (ii) by or at the direction of the Board of Directors or (iii) by any stockholder of the Corporation who is a stockholder of record at the time of giving of the notice provided for in this Section 2.05, who is entitled to vote at such meeting and who complies with the notice procedures set forth in Section 2.05(e).

(e) For business to be properly brought before an annual meeting by a stockholder pursuant to clause (iii) of paragraph (d) of this Section 2.05, the stockholder must have given timely notice thereof in writing to the Secretary of the Corporation. To be timely, a stockholder's notice must be delivered to or mailed and received at the principal executive office of the Corporation no fewer than 90 days nor more than 120 days prior to the first anniversary of the date of the Meeting Notice for the preceding year's annual meeting; provided, however, that in the event that the date of the meeting is changed by more than 30 days from such anniversary date, to be timely, notice by the stockholder must be received no later than the close of business on the tenth day following the earlier of the day on which notice of the date of the meeting was mailed or public disclosure was made. A stockholder's notice to the Secretary shall set forth as to each matter the stockholder proposes to bring before the meeting: (i) a brief description of the business desired to be brought before the meeting and the reasons for conducting such business at the meeting; (ii) the name and address, as they appear on the Corporation's books, of the stockholder proposing such business, and the name and address of the beneficial owner, if any, on whose behalf the proposal is made; (iii) the class and number of shares of the Corporation which are owned beneficially and of record by such stockholder of record and by the beneficial owner, if any, on whose behalf the proposal is made; and (iv) any material interest of such stockholder of record and the beneficial owner, if any, on whose behalf the proposal is made in such business.

(f) Notwithstanding anything in these Bylaws to the contrary, no business shall be conducted at an annual meeting except in accordance with the procedures set forth in this Section 2.05. Additionally, no person shall be eligible to serve as a director of the Corporation unless nominated in accordance with the procedures set forth in this Section 2.05. The chairman of the meeting shall, if the facts warrant, determine and declare to the meeting that (i) the business was not properly brought before the meeting and in accordance with the procedures prescribed by this Section 2.05 or (ii) a nomination was not made in accordance with the procedures prescribed by these Bylaws. If the chairman of the meeting should so determine, he or she shall so declare to the meeting, and any such business not properly brought before the meeting shall not be transacted or the defective nomination shall be disregarded. Notwithstanding the foregoing provisions of this Section 2.05, a stockholder shall also comply with all applicable requirements of the Securities Exchange Act of 1934, as amended, and the rules and regulations thereunder with respect to the matters set forth in this Section 2.05.

Section 2.06 **CONDUCT OF MEETINGS**. All actual and special meetings of stockholders shall be conducted in accordance with such rules and procedures as the Board of Directors may determine subject to the requirements of applicable law and, as to matters not governed by such rules and procedures, as the chairman of such meeting shall determine. The Chairman of the Board shall be the chairman of any annual or special meeting of stockholders. The Secretary, or in the absence of the Secretary, a person designated by the Chairman of the Board, shall act as secretary of the meeting.

Section 2.07 **QUORUM**. At any meeting of stockholders of the Corporation, the presence, in person or by proxy, of the holders of record of a majority of the shares then issued and outstanding and entitled to vote at the meeting shall constitute a quorum for the transaction of business; provided, however, that this Section 2.07 shall not affect any different requirement which may exist under statute, pursuant to the rights of any authorized class or series of stock, or under the Certificate of Incorporation of the Corporation, as amended or restated from time to time (the "Certificate of Incorporation"), for the vote necessary for the adoption of any measure governed thereby. The stockholders present at a duly called and held meeting at which a quorum is present may continue to do business until adjournment, notwithstanding the withdrawal of enough stockholders to leave less than a quorum, if any action taken (other than adjournment) is approved by at least a majority of the shares required to constitute a quorum.

In the absence of a quorum, the stockholders present in person or by proxy, by majority vote and without further notice, may adjourn the meeting from time to time until a quorum is attained, but in the absence of a quorum, no other business may be transacted at that meeting, except as provided in this section. At any reconvened meeting following such adjournment at which a quorum is present, any business may be transacted which might have been transacted at the meeting as originally noticed.

Section 2.08 **VOTES REQUIRED**. The affirmative vote of a majority of the shares present in person or represented by proxy at a duly called meeting of stockholders of the Corporation, at which a quorum is present and entitled to vote on the subject matter, shall be sufficient to take or authorize action upon any matter which may properly come before the meeting, except that the election of directors shall be by plurality vote, unless the vote of a greater or different number thereof is required by statute, by the rights of any authorized class of stock or by the Certificate of Incorporation.

Unless the Certificate of Incorporation or a resolution of the Board of Directors adopted in connection with the issuance of shares of any class or series of stock provides for a greater or lesser number of votes per share, or limits or denies voting rights, each outstanding share of stock, regardless of class or series, shall be entitled to one (1) vote on each matter submitted to a vote at a meeting of stockholders.

Section 2.09 **PROXIES**. Every person entitled to vote for directors or on any other matter shall have the right to do so either in person or by one or more agents authorized by a written proxy signed by the person and filed with the Secretary of the Corporation. A proxy shall be deemed signed if the stockholder's name is placed on the proxy (whether by manual signature, typewriting, telegraphic transmission, or otherwise) by the stockholder or the stockholder's attorney in fact. A validly executed proxy which does not state that it is irrevocable shall continue in full force and effect unless: (i) revoked by the person executing it, before the vote pursuant to that proxy, by a writing delivered to the Corporation stating that the proxy is revoked, or by a subsequent proxy executed by, or as to any meeting by attendance at such meeting and voting in person by, the person executing the proxy; or (ii) written notice of the death or incapacity of the maker of that proxy is received by the Corporation before the vote pursuant to that proxy is counted; provided, however, that no proxy shall be valid after the expiration of three (3) years from the date of the proxy, unless otherwise provided in the proxy.

A duly executed proxy shall be irrevocable if it states that it is irrevocable and if, and only as long as, it is coupled with an interest sufficient under applicable law to support an irrevocable power. A proxy may be made irrevocable regardless of whether the interest with which it is coupled is an interest in the stock itself or an interest in the Corporation generally.

Section 2.10 **STOCKHOLDER ACTION BY WRITTEN CONSENT**. To the fullest extent permitted by law, whenever any action is required or permitted to be taken at a meeting of stockholders, by law, by the Certificate of Incorporation or by these Bylaws, such action may be taken without a meeting, without prior notice and without a vote of stockholders, if a consent in writing, setting forth the action so taken, shall be signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote thereon were present and voted.

Section 2.11 **RECORD DATE FOR STOCKHOLDER NOTICE AND VOTING**. For purposes of determining the stockholders entitled to notice of any meeting or to vote or entitled to receive payment of any dividend or other distribution or allotment of any rights, or entitled to exercise any rights in respect of any change, conversion or exchange of stock or for the purpose of any other lawful action, the Board of Directors may fix, in advance, a record date, which shall not be more than sixty (60) days nor fewer than ten (10) days before the date of any such meeting nor more than sixty (60) days before any such other action, and in this event only stockholders at the close of business on the record date are entitled to notice or to vote, as the case may be, notwithstanding any transfer of any shares on the books of the Corporation after the record date, except as otherwise provided in the Delaware General Corporation Law.

If the Board of Directors does not so fix a record date:

(a) The record date for determining the stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the business day immediately preceding the day on which notice is given, or, if notice is waived, at the close of business on the business day immediately preceding the day on which the meeting is held.

(b) The record date for determining stockholders for any other purpose shall be at the close of business on the day on which the Board of Directors adopts the resolution relating thereto.

(c) A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting; provided, however, that the Board of Directors may fix a new record date for the adjourned meeting.

Section 2.12 LIST OF STOCKHOLDERS. The Secretary of the Corporation shall prepare and make (or cause to be prepared and made), at least ten (10) days before every meeting of stockholders, a complete list of the stockholders entitled to vote at the meeting, arranged in alphabetical order and showing the address of, and the number of shares registered in the name of, each stockholder. Such list shall be open to the examination of any stockholder, for any purpose germane to the meeting, during ordinary business hours, for a period of at least ten (10) days prior to the meeting, either at a place within the city where the meeting is to be held, which place shall be specified in the notice of the meeting, or, if not so specified, at the place where the meeting is to be held. The list shall also be produced and kept at the time and place of the meeting during the duration thereof, and may be inspected by any stockholder present at such meeting.

Section 2.13 VOTING. The stockholders entitled to vote at any meeting of stockholders shall be determined in accordance with the provisions of Section 2.12. The stockholders' vote may be by voice vote or by ballot. Any stockholder may vote any number of his or her shares entitled to vote in favor of the proposal and refrain from voting the remaining shares or vote them against the proposal, but, if the stockholder fails to specify the number of shares which the stockholder is voting affirmatively, it will be conclusively presumed that the stockholder's approving vote is with respect to all shares that the stockholder is entitled to vote.

Section 2.14 WAIVER OF NOTICE OR CONSENT BY ABSENT STOCKHOLDERS. The transactions of any meeting of stockholders, either annual or special, however called and noticed, and wherever held, shall be as valid as though effected at a meeting duly held after regular call and notice, if a quorum be present either in person or by proxy, and if, either before or after the meeting, each person entitled to vote, who was not present in person or by proxy, signs a written waiver of notice or a consent to a holding of the meeting, or an approval of the minutes. The waiver of notice, consent or approval need not specify either the business to be transacted or the purpose of any annual or special meeting of stockholders. All such waivers, consents or approvals shall be filed with the corporate records or made a part of the minutes of the meeting. Attendance by a person at a meeting shall also constitute a waiver of notice of that meeting, except when the person attends the meeting for the express purpose of objecting and objects, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened, and except that attendance at a meeting is not a waiver of any right to object to the consideration of matters required by law to be included in the notice of the meeting but not so included if that objection is expressly made at the meeting.

Section 2.15 INSPECTORS OF ELECTION. In advance of any meeting of stockholders, the Board of Directors shall appoint Inspectors of Election to act at such meeting or at any adjournment or adjournments thereof. If such Inspectors are not so appointed or fail or refuse to act, the chairman of any such meeting may (and, upon the demand of any stockholder or stockholder's proxy, shall) make such an appointment.

The number of Inspectors of Election shall be one (1) or three (3). If there are three (3) Inspectors of Election, the decision, act or certificate of a majority shall be effective and shall represent the decision, act or certificate of all. No such Inspector need be a stockholder of the Corporation.

Subject to any provisions of the Certificate of Incorporation, the Inspectors of Election shall determine the number of shares outstanding, the voting power of each, the shares represented at the meeting, the existence of a quorum and the authenticity, validity and effect of proxies; they shall receive votes, ballots or consents, hear and determine all challenges and questions in any way arising in connection with the right to vote, count and tabulate all votes or consents, determine when the polls shall close and determine the result; and finally, they shall do such acts as may be proper to conduct the election or vote with fairness to all stockholders. On request, the Inspectors of Election shall make a report in writing to the secretary of the meeting concerning any challenge, question or other matter as may have been determined by them and shall execute and deliver to such secretary a certificate of any fact found by them.

ARTICLE III
DIRECTORS

Section 3.01 **POWERS**. The business and affairs of the Corporation shall be managed by and be under the direction of the Board of Directors. The Board of Directors shall exercise all the powers of the Corporation, except those that are conferred upon or reserved to the stockholders by statute, the Certificate of Incorporation or these Bylaws.

Section 3.02 **NUMBER**. The number of directors shall be fixed from time to time by resolution of the Board of Directors but shall not be less than three (3) nor more than fifteen (15).

Section 3.03 **ELECTION AND TERM OF OFFICE**. The directors shall be elected at the annual meeting of the stockholders, except as provided in Section 3.06 of this Article III, and each director shall hold office for the term for which he is elected and until his successor is elected and qualified. Directors need not be residents of the State of Delaware, stockholders of the Corporation or citizens of the United States. Unless provided otherwise by applicable law, any director may be removed at any time, with or without cause, at a special meeting of the stockholders called for that purpose.

Section 3.04 **ELECTION OF CHAIRMAN OF THE BOARD**. At the organizational meeting immediately following the annual meeting of stockholders, the directors shall elect a Chairman of the Board from among the directors who shall hold office until the corresponding meeting of the Board of Directors in the next year and until his successor shall have been elected or until his earlier resignation, removal or death. Any vacancy in such office may be filled for the unexpired portion of the term in the same manner by the Board of Directors at any regular or special meeting.

Section 3.05 **REMOVAL**. Any director may be removed from office only as provided in the Certificate of Incorporation.

Section 3.06 **VACANCIES AND ADDITIONAL DIRECTORSHIPS**. Except as the Delaware General Corporation Law may otherwise require, and subject to the rights of the holders of any series of Preferred Stock with respect to the filling of vacancies or new directorships in the Board of Directors, newly created directorships resulting from death, resignation, disqualification, removal or other cause shall be filled solely by the affirmative vote of a majority of the remaining directors then in office, even though less than a quorum of the Board of Directors. Any director elected in accordance with the preceding sentence shall hold office for the remainder of the full term of the class of directors in which the new directorship was created or the vacancy occurred and until such director's successor shall have been elected and qualified. No decrease in the number of directors constituting the Board of Directors shall shorten the term of any incumbent director.

Section 3.07 **REGULAR AND SPECIAL MEETINGS**. Regular meetings of the Board of Directors shall be held: (i) immediately following the annual meeting of the stockholders; (ii) without call at such time as shall from time to time be fixed by the Board of Directors; and (iii) as called by the Chairman of the Board in accordance with applicable law.

Special meetings of the Board of Directors shall be held upon call by or at the direction of the Chairman of the Board, the President or any two (2) directors, except that when the Board of Directors consists of one (1) director, then the one director may call a special meeting. Except as otherwise required by law, notice of each special meeting shall be mailed to each director, addressed to him at his residence or usual place of business at least three (3) days before the day on which the meeting is to be held, or shall be sent to him at such place by telex, telegram, cable, facsimile transmission or telephoned or delivered to him personally, not later than the day before the day on which the meeting is to be held. Such notice shall state the time and place of such meeting, but need not state the purpose or purposes thereof, unless otherwise required by law, the Certificate of Incorporation or these Bylaws.

Notice of any meeting need not be given to any director who attends such meeting in person (except when the person attends a meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened) or who waives notice thereof in a signed writing before or after such meeting.

Section 3.08 **QUORUM**. At all meetings of the Board of Directors, a majority of the fixed number of directors shall constitute a quorum for the transaction of business, except that when the Board of Directors consists of one (1) director, then the one director shall constitute a quorum. In the absence of a quorum, the directors present, by majority vote and without notice other than by announcement, may adjourn the meeting from time to time until a quorum shall be present. At any reconvened meeting following such an adjournment at which a quorum shall be present, any business may be transacted which might have been transacted at the meeting as originally noticed.

Section 3.09 **VOTES REQUIRED**. Except as otherwise provided by applicable law or by the Certificate of Incorporation, the vote of a majority of the directors present at a meeting duly held at which a quorum is present shall be sufficient to pass any measure.

Section 3.10 **PLACE AND CONDUCT OF MEETINGS**. Each regular meeting and special meeting of the Board of Directors shall be held at a location determined as follows: the Board of Directors may designate any place, within or without the State of Delaware, for the holding of any meeting. If no such designation is made: (a) any meeting called by a majority of the directors shall be held at such location, within the county of the Corporation's principal executive office, as the directors calling the meeting shall designate; and (b) any other meeting shall be held at such location, within the county of the Corporation's principal executive office, as the Chairman of the Board may designate or, in the absence of such designation, at the Corporation's principal executive office. Subject to the requirements of applicable law, all regular and special meetings of the Board of Directors shall be conducted in accordance with such rules and procedures as the Board of Directors may approve and, as to matters not governed by such rules and procedures, as the chairman of such meeting shall determine. The chairman of any regular or special meeting shall be the Chairman of the Board, or, in his absence, a person designated by the Board of Directors. The Secretary, or, in the absence of the Secretary, a person designated by the chairman of the meeting shall act as secretary of the meeting. Any meeting, regular or special, may be held by conference telephone or similar communication equipment, so long as all directors participating in the meeting can hear one another, and all such directors shall be deemed to be present in person at the meeting.

Section 3.11 **FEES AND COMPENSATION**. Directors shall be paid such compensation as may be fixed from time to time by resolution of the Board of Directors: (a) for their usual and contemplated services as directors; (b) for their services as members of committees appointed by the Board of Directors, including attendance at committee meetings as well as services which may be required when committee members must consult with management staff; and (c) for extraordinary services as directors or as members of committees appointed by the Board of Directors, over and above those services for which compensation is fixed pursuant to items (a) and (b) in this Section 3.11. Compensation may be in the form of an annual retainer fee or a fee for attendance at meetings, or both, or in such other form or on such basis as the resolutions of the Board of Directors shall fix. Directors shall be reimbursed for all reasonable expenses incurred by them in attending meetings of the Board of Directors and committees appointed by the Board of Directors and in performing compensable extraordinary services. Nothing contained herein shall be construed to preclude any director from serving the Corporation in any other capacity, such as an officer, agent, employee, consultant or otherwise, and receiving compensation therefor.

Section 3.12 **COMMITTEES OF THE BOARD OF DIRECTORS**. To the full extent permitted by applicable law, the Board of Directors may from time to time establish committees, including, but not limited to, standing or special committees and an executive committee with authority and responsibility for bookkeeping, with authority to act as signatories on Corporation bank or similar accounts and with authority to choose attorneys for the Corporation and direct litigation strategy, which shall have such duties and powers as are authorized by these Bylaws or by the Board of Directors. Committee members, and the chairman of each committee, shall be appointed by the Board of Directors. The Chairman of the Board, in conjunction with the several committee chairmen, shall make recommendations to the Board of Directors for its final action concerning members to be appointed to the several committees of the Board of Directors. Any member of any committee may be removed at any time with or without cause by the Board of Directors. Vacancies which occur on any committee shall be filled by a resolution of the Board of the Directors. If any vacancy shall occur in any committee by reason of death, resignation, disqualification, removal or otherwise, the remaining members of such committee, so long as a quorum is present, may continue to act until such vacancy is filled by the Board of Directors. The Board of Directors may, by resolution, at any time deemed desirable, discontinue any standing or special committee. Members of standing committees, and their chairmen, shall be elected yearly at the regular meeting of the Board of Directors which is held immediately following the annual meeting of stockholders. The provisions of Sections 3.07, 3.08, 3.09 and 3.10 of these Bylaws shall apply, *MUTATIS MUTANDIS*, to any such Committee of the Board of Directors.

Section 3.13 **WAIVER OF NOTICE**. The transactions of any meeting of the Board of Directors, however called and noticed or wherever held, shall be as valid as though had at a meeting duly held after regular call and notice if a quorum is present and if, either before or after the meeting, each of the directors not present signs a written waiver of notice, a consent to holding the meeting or an approval of the minutes. The waiver of notice or consent need not specify the purpose of the meeting. All such waivers, consents, and approvals shall be filed with the corporate records or made a part of the minutes of the meeting. Notice of a meeting shall also be deemed given to any director who attends the meeting without protesting, before or at its commencement, the lack of notice to that director.

Section 3.14 **ADJOURNMENT**. A majority of the directors present, whether or not constituting a quorum, may adjourn any meeting to another time and place.

Section 3.15 **NOTICE OF ADJOURNMENT**. Notice of the time and place of holding an adjourned meeting need not be given to absent directors if the time and place are fixed at the meeting adjourned.

Section 3.16 **ACTION WITHOUT MEETING**. Any action required or permitted to be taken by the Board of Directors or any committee thereof may be taken without a meeting, if all members of the Board of Directors shall individually or collectively consent in writing to that action. Such action by written consent shall have the same force and effect as a unanimous vote of the Board of Directors. Such written consent or consents shall be filed with the minutes of the proceedings of the Board of Directors.

ARTICLE IV
OFFICERS

Section 4.01 **DESIGNATION, ELECTION AND TERM OF OFFICE**. The Corporation shall have a Chairman of the Board, a President, a Treasurer or Chief Financial Officer, such senior vice presidents and vice presidents as the Board of Directors deems appropriate, a Secretary and such other officers as the Board of Directors may deem appropriate. These officers shall be elected annually by the Board of Directors at the organizational meeting immediately following the annual meeting of stockholders, and each such officer shall hold office until the corresponding meeting of the Board of Directors in the next year and until his successor shall have been elected and qualified or until his earlier resignation, death or removal. Any vacancy in any of the above offices may be filled for the unexpired portion of the term by the Board of Directors at any regular or special meeting. Any number of offices may be held by the same person in accordance with Section 4.08 herein.

Section 4.02 **CHAIRMAN OF THE BOARD**. The Chairman of the Board of Directors shall preside at all meetings of the directors and shall have such other powers and duties as may from time to time be assigned to him by the Board of Directors.

Section 4.03 **PRESIDENT**. The President shall be the chief executive officer of the Corporation and shall, subject to the power of the Board of Directors, have general supervision, direction and control of the business and affairs of the Corporation. He shall preside at all meetings of the stockholders and, in the absence of the Chairman of the Board, at all meetings of the directors. He shall have the general powers and duties of management usually vested in the office of president of a corporation, and shall have such other duties as may be assigned to him from time to time by the Board of Directors.

Section 4.04 **TREASURER OR CHIEF FINANCIAL OFFICER**. The Treasurer or Chief Financial Officer shall keep and maintain, or cause to be kept and maintained, adequate and correct books and records of account of the properties and business transactions of the Corporation, including accounts of its assets, liabilities, receipts, disbursements, gains, losses, capital, retained earnings and shares. The books of account shall at all reasonable times be open to inspection by the directors. The Treasurer or Chief Financial Officer shall deposit all moneys and other valuables in the name and to the credit of the Corporation with such depositories as may be designated by the Board of Directors. He shall disburse the funds of the Corporation as may be ordered by the Board of Directors, shall render to the President and directors, whenever they request it, an account of all of his transactions as the Treasurer or Chief Financial Officer and of the financial condition of the Corporation, and shall have such other powers and perform such other duties as may be prescribed by the Board of Directors or the Bylaws.

Section 4.05 **SECRETARY**. The Secretary shall keep the minutes of the meetings of the stockholders, the Board of Directors and all committees. He shall be the custodian of the corporate seal and shall affix it to all documents which he is authorized by law or the Board of Directors to sign and seal. He also shall perform such other duties as may be assigned to him from time to time by the Board of Directors or the Chairman of the Board or President.

Section 4.06 **ASSISTANT OFFICERS**. The President may appoint one or more assistant secretaries and such other assistant officers as the business of the Corporation may require, each of whom shall hold office for such period, have such authority and perform such duties as may be specified from time to time by the President.

Section 4.07 **WHEN DUTIES OF AN OFFICER MAY BE DELEGATED**. In the case of absence or disability of an officer of the Corporation or for any other reason that may seem sufficient to the Board of Directors, the Board of Directors or any officer designated by it, or the President, may, for the time of the absence or disability, delegate such officer's duties and powers to any other officer of the Corporation.

Section 4.08 **OFFICERS HOLDING TWO OR MORE OFFICES**. The same person may hold any two (2) or more of the above-mentioned offices.

Section 4.09 **COMPENSATION**. The Board of Directors shall have the power to fix the compensation of all officers and employees of the Corporation.

Section 4.10 **RESIGNATIONS**. Any officer may resign at any time by giving written notice to the Board of Directors, to the President or to the Secretary of the Corporation. Any such resignation shall take effect at the time specified therein unless otherwise determined by the Board of Directors. The acceptance of a resignation by the Corporation shall not be necessary to make it effective.

Section 4.11 **REMOVAL**. Any officer of the Corporation may be removed, with or without cause, by the affirmative vote of a majority of the entire Board of Directors. Any assistant officer of the Corporation may be removed, with or without cause, by the President or by the Board of Directors.

ARTICLE V
INDEMNIFICATION OF DIRECTORS, OFFICERS, EMPLOYEES AND OTHER CORPORATE AGENTS

Section 5.01 **ACTION, ETC., OTHER THAN BY OR IN THE RIGHT OF THE CORPORATION**. The Corporation shall indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the Corporation) by reason of the fact that he is or was a director, officer, employee or agent of the Corporation, or is or was serving at the request of the Corporation as a director, officer, employee, trustee or agent of a subsidiary of the Corporation or another corporation, partnership, joint venture, trust or other enterprise (all such persons being referred to hereinafter as an "Agent"), against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by him in connection with such action, suit or proceeding if he acted in good faith and in a manner he reasonably believed to be in or not opposed to the best interests of the Corporation, and with respect to any criminal action or proceeding, had no reasonable cause to believe his conduct was unlawful. The termination of any action, suit or proceeding by judgment, order, settlement, conviction, or upon a plea of *nolo contendere* or its equivalent, shall not, of itself, create a presumption that the person did not act in good faith and in a manner which he reasonably believed to be in or not opposed to the best interests of the Corporation, and, with respect to any criminal action or proceeding, that he had reasonable cause to believe that his conduct was unlawful.

Section 5.02 **ACTION, ETC., BY OR IN THE RIGHT OF THE CORPORATION**. The Corporation shall indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the Corporation to procure a judgment in its favor by reason of the fact that he is or was an Agent against expenses (including attorneys' fees) actually and reasonably incurred by him in connection with the defense or settlement of such action or suit if he acted in good faith and in a manner he reasonably believed to be in or not opposed to the best interests of the Corporation, except that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the Corporation by a court of competent jurisdiction, after exhaustion of all appeals therefrom, unless and only to the extent that the court in which such action or suit was brought shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which such court shall deem proper.

Section 5.03 **DETERMINATION OF RIGHT OF INDEMNIFICATION**. Any indemnification under Sections 5.01 or 5.02 (unless ordered by a court) shall be made by the Corporation only as authorized in the specific case upon a determination that indemnification of the Agent is proper in the circumstances because the Agent has met the applicable standard of conduct set forth in Sections 5.01 and 5.02 hereof, which determination is made (a) by the Board of Directors, by a majority vote of a quorum consisting of directors who were not parties to such action, suit or proceeding, or (b) if such a quorum is not obtainable, or, even if obtainable, if a quorum of disinterested directors so directs, by independent legal counsel in a written opinion, or (c) by the stockholders.

Section 5.04 **INDEMNIFICATION AGAINST EXPENSES OF SUCCESSFUL PARTY**. Notwithstanding the other provisions of this Article V, to the extent that an Agent has been successful on the merits or otherwise, including the dismissal of an action without prejudice or the settlement of an action without admission of liability, in defense of any action, suit or proceeding referred to in Sections 5.01 or 5.02 hereof, or in defense of any claim, issue or matter therein, such Agent shall be indemnified against expenses, including attorneys' fees actually and reasonably incurred by such Agent in connection therewith.

Section 5.05 **ADVANCES OF EXPENSES**. Except as limited by Section 5.06 of this Article V, expenses incurred by an Agent in defending any civil or criminal action, suit, or proceeding may be paid by the Corporation in advance of the final disposition of such action, suit or proceeding at the discretion of the Board of Directors. If the Board of Directors authorizes advancement of expenses, then the Agent shall be entitled to receive such amount as the Board of Directors has authorized only upon the Agent entering into and delivering to the Board of Directors a written undertaking to repay such amount if it shall ultimately be determined that such Agent is not entitled to indemnification as authorized in this Article V. Notwithstanding the foregoing, no advance shall be made by the Corporation if a determination is reasonably and promptly made by the Board of Directors by a majority vote of a quorum of disinterested directors, or (if such a quorum is not obtainable or, even if obtainable, a quorum of disinterested directors so directs) by independent legal counsel in a written opinion, that, based upon the facts known to the Board of Directors or counsel at the time such determination is made, such person acted in bad faith and in a manner that such person did not believe to be in or not opposed to the best interest of the Corporation, or, with respect to any criminal proceeding, that such person believed or had reasonable cause to believe his conduct was unlawful.

Section 5.06 **RIGHT OF AGENT TO INDEMNIFICATION UPON APPLICATION; PROCEDURE UPON APPLICATION**. Any indemnification or advance under this Article V shall be made promptly, and in any event within ninety (90) days, upon the written request of the Agent, unless, in the case of advancement, the Board of Directors has in its discretion determined not to advance expenses as provided in Section 5.05. The right to indemnification or advances as granted by this Article V shall be enforceable by the Agent in any court of competent jurisdiction, if the Board of Directors or independent legal counsel denies the claim, in whole or in part, or if no disposition of such claim is made within ninety (90) days. The Agent's expenses incurred in connection with successfully establishing his right to indemnification, in whole or in part, in any such proceeding shall also be indemnified by the Corporation.

Section 5.07 **OTHER RIGHTS AND REMEDIES**. The indemnification and advancement of expenses provided by, or granted pursuant to, this Article V shall not be deemed exclusive of any other rights to which an Agent seeking indemnification or advancement of expenses may be entitled under any Bylaw, agreement, vote of stockholders or disinterested directors or otherwise, both as to action in his official capacity and as to action in another capacity while holding such office, and shall, unless otherwise provided when authorized or ratified, continue as to a person who has ceased to be an Agent and shall inure to the benefit of the heirs, executors and administrators of such a person. All rights to indemnification under this Article V shall be deemed to be provided by a contract between the Corporation and the Agent who serves in such capacity at any time while these Bylaws and other relevant provisions of the Delaware General Corporation Law and other applicable law, if any, are in effect. Any repeal or modification thereof shall not affect any rights or obligations then existing.

Section 5.08 **INSURANCE**. Upon resolution passed by the Board of Directors, the Corporation may purchase and maintain insurance on behalf of any person who is or was an Agent against any liability asserted against him and incurred by him in any such capacity, or arising out of his status as such, whether or not the Corporation would have the power to indemnify him against such liability under the provisions of this Article V.

Section 5.09 **CONSTITUENT CORPORATIONS**. For the purposes of this Article V, references to "the Corporation" shall include, in addition to the Corporation, all constituent corporations (including all constituents of constituents) absorbed in a consolidation or merger as well as the resulting or surviving corporation, which, if the separate existence of such constituent corporation had continued, would have had power and authority to indemnify its Agents, so that any Agent of such constituent corporation shall stand in the same position under the provisions of the Article V with respect to the resulting or surviving corporation as that Agent would have with respect to such constituent corporation if its separate existence had continued.

Section 5.10 **OTHER ENTERPRISES, FINES, AND SERVING AT CORPORATION'S REQUEST**. For purposes of this Article V: references to "other enterprises" shall include employee benefit plans; references to "fines" shall include any excise taxes assessed on a person with respect to any employee benefit plan; and references to "serving at the request of the Corporation" shall include any service as a director, officer, employee or agent of the Corporation which imposes duties on, or involves services by, such director, officer, employee or agent with respect to any employee benefit plan, its participants or beneficiaries; and a person who acted in good faith and in a manner he reasonably believed to be in the interest of the participants and beneficiaries of an employee benefit plan shall be deemed to have acted in a manner "not opposed to the best interests of the Corporation" as referred to in this Article V.

Section 5.11 **SAVINGS CLAUSE**. If this Article V or any portion thereof shall be invalidated on any ground by any court of competent jurisdiction, then the Corporation shall nevertheless indemnify each Agent as to expenses (including attorneys' fees), judgments, fines and amounts paid in settlement with respect to any action, suit or proceeding, whether civil, criminal, administrative or investigative, and whether internal or external, including a grand jury proceeding and an action or suit brought by or in the right of the Corporation, to the full extent permitted by any applicable portion of this Article V that shall not have been invalidated, or by any other applicable law.

ARTICLE VI
STOCK

Section 6.01 **SHARES OF STOCK**. The shares of the Corporation shall be represented by certificates, each of which shall represent and certify the number and class (and series, if appropriate) of shares of stock represented by such certificate in the Corporation; provided, that the Board of Directors may adopt a resolution permitting shares to be uncertificated. Any such resolution shall not apply to shares represented by a certificate until such certificate is surrendered to the Corporation. Except as otherwise expressly provided by law, the rights and obligations of the holders of uncertificated stock and the rights and obligations of the holders of certificates representing stock of the same class and series shall be identical. Every holder of stock represented by certificates shall be entitled to have a certificate signed in the name of the Corporation by the Chairman of the Board or a Vice-Chairman of the Board or the President or a Vice President, together with the Treasurer or an Assistant Treasurer or the Chief Financial Officer, or the Secretary or an Assistant Secretary. Any or all of the signatures on any certificate may be a facsimile. In case any officer, transfer agent or registrar who has signed or whose facsimile signature has been placed upon a certificate shall have ceased to be such officer, transfer agent or registrar before such certificate is issued, it may be issued by the Corporation with the same effect as if such person were such officer, transfer agent or registrar at the date of issue.

Section 6.02 **TRANSFER OF SHARES**. Shares of stock shall be transferable on the books of the Corporation (i) in the case of certificated shares, only by the registered holder thereof, in person or by such person's duly authorized attorney lawfully constituted in writing, upon the surrender of the certificate representing the shares to be transferred, properly endorsed, to the Corporation's transfer agent, if the Corporation has a transfer agent, or to the Corporation's registrar, if the Corporation has a registrar, or to the Secretary, if the Corporation has neither a transfer agent nor a registrar or (ii) in the case of uncertificated shares, upon receipt of proper transfer instructions from the registered holder thereof or by such person's duly authorized attorney lawfully constituted in writing, and upon payment of all necessary taxes and compliance with appropriate procedures for transferring shares of stock in uncertificated form; provided, however, that such surrender and endorsement, compliance or payment of taxes shall not be required in any case in which the Corporation shall determine to waive such requirement. The Board of Directors shall have power and authority to make such other rules and regulations concerning the issue, transfer and registration of certificates of the Corporation's stock as it may deem expedient. With respect to certificated shares of stock, every certificate exchanged, returned or surrendered to the Corporation shall be marked "Cancelled," with the date of cancellation, by the Secretary or Assistant Secretary of the Corporation or the transfer agent thereof. No transfer of stock shall be valid as against the Corporation for any purpose until it shall have been entered in the stock records of the Corporation by an entry showing from and to whom transferred.

Section 6.03 **TRANSFER AGENTS AND REGISTRARS**. The Corporation may have one or more transfer agents and one or more registrars of its stock whose respective duties the Board of Directors or the Secretary may, from time to time, define. No certificate of stock shall be valid until countersigned by a transfer agent, if the Corporation has a transfer agent, or until registered by a registrar, if the Corporation has a registrar. The duties of transfer agent and registrar may be combined.

Section 6.04 **STOCK LEDGERS**. Original or duplicate stock ledgers, containing the names and addresses of the stockholders of the Corporation and the number of shares of each class of stock held by them, shall be kept at the principal executive office of the Corporation or at the office of its transfer agent or registrar.

Section 6.05 **LOST, STOLEN OR DESTROYED CERTIFICATES**. In respect of any previously issued stock certificate that is alleged to have been lost, destroyed or wrongfully taken, the Corporation shall issue either a new stock certificate or uncertificated shares in place of such lost, destroyed or wrongfully taken certificate; provided, that the holder of record of the certificate (a) makes proof in affidavit form that it has been lost, destroyed or wrongfully taken; (b) requests the issuance of a new certificate or uncertificated shares before the Corporation has notice that the certificate has been acquired by a purchaser for value in good faith and without notice of any adverse claims; (c) gives bond in such form as the Corporation may direct, to indemnify the Corporation, the transfer agent and registrar against any claim that may be made on account of the alleged loss, destruction or theft of a certificate; and (d) satisfies any other reasonable requirements imposed by the Board of Directors. When any certificate has been lost, apparently destroyed or wrongfully taken, if the owner of record of the certificate fails to notify this Corporation within a reasonable time after notice that the certificate has been lost, destroyed or stolen, and if the proper officers or transfer agent of the Corporation register a transfer of the certificate before receiving such notification, such prior owner of record shall be precluded from asserting against the Corporation, any officer of the Corporation and the transfer agent of the Corporation, any claim for wrongful transfer of the certificate, any claim to a new certificate or any claim for rights normally accorded to stockholders of the Corporation.

ARTICLE VII
MISCELLANEOUS

Section 7.01 RELATIONSHIP BETWEEN BYLAWS, CERTIFICATE OF INCORPORATION, AND DELAWARE GENERAL CORPORATION LAW. To the extent that the Certificate of Incorporation or the Delaware General Corporation Law grant to any person any rights which are restricted under these Bylaws, and the Certificate of Incorporation or the Delaware General Corporation Law preclude the Bylaws from imposing such restriction, then the extent of such rights shall be as provided in the Certificate of Incorporation or the Delaware General Corporation Law, as the case may be, and these Bylaws shall be so interpreted.

Section 7.02 AMENDMENT. These Bylaws may be amended, altered or repealed by resolution adopted by the Board of Directors.

THIRD AMENDED AND RESTATED
INVESTORS' RIGHTS AGREEMENT

THIS THIRD AMENDED AND RESTATED INVESTORS' RIGHTS AGREEMENT (the "**Agreement**") is made as of December 18, 2013, by and among OpGen, Inc., a Delaware corporation (the "**Company**"), and each of the investors listed on Schedule A hereto, each of which is referred to in this Agreement as an "**Investor**."

RECITALS

WHEREAS, prior to the date hereof, (i) the Company's capital stock consisted of Series A Convertible Preferred Stock, Series A-1 Redeemable Preferred Stock, Series B Convertible Preferred Stock, Series C Convertible Preferred Stock (collectively, the "**Old Preferred Stock**") and Common Stock, each as described in the Sixth Amended and Restated Certificate of Incorporation of the Company, (ii) all issued and outstanding shares of the Old Preferred Stock were converted into shares of Common Stock, (iii) the Company adopted a Seventh Amended and Restated Certificate of Incorporation (the "**Restated Certificate**"), which replaced the Old Preferred Stock with new Series A Convertible Preferred Stock as described in the Restated Certificate, and (iv) the Company effected a one (1) for 790.5407 reverse stock split of the shares of the Common Stock.

WHEREAS, the Company and certain investors (the "**Existing Investors**") previously entered into a Second Amended and Restated Investors' Rights Agreement, dated as of March 5, 2012 (the "**Prior Agreement**"), wherein the Company agreed to certain matters relating to rights and privileges of the Company and the Existing Investors;

WHEREAS, certain of the Existing Investors and the Company have entered into a Notes Purchase Agreement, dated as of the date hereof (the "**Purchase Agreement**") pursuant to which such Investors purchased Convertible Notes of the Company (the "**Notes**") which are convertible into Series A Convertible Preferred Stock of the Company, par value $0.01 per share (the "**Series A Preferred Stock**").

WHEREAS, the parties to the Prior Agreement desire to amend the Prior Agreement to terminate all rights and obligations thereunder and to set forth any new rights and obligations of the parties under this Agreement.

WHEREAS, in accordance with Section 6.6 of the Prior Agreement, the required parties have agreed to amend and restate the Prior Agreement in the form of this Agreement and, therefore, all Existing Investors (whether or not signing this Agreement) shall become bound by this Agreement.

NOW, THEREFORE, the parties to this Agreement further agree as follows:

1. Definitions. For purposes of this Agreement:

1.1 "**Affiliate**" means, with respect to any specified Person, any other Person who, directly or indirectly, controls, is controlled by, or is under common control with such Person, including without limitation any general partner, managing member, officer or director of such Person or any venture capital fund now or hereafter existing that is controlled by one or more general partners or managing members of, or shares the same management company with, such Person.

1.2 "**Common Stock**" means shares of the Company's common stock, par value $0.01 per share.

1.3 "**Damages**" means any loss, damage, or liability (joint or several) to which a party hereto may become subject under the Securities Act, the Exchange Act, or other federal or state law, insofar as such loss, damage, or liability (or any action in respect thereof) arises out of or is based upon (i) any untrue statement or alleged untrue statement of a material fact contained in any registration statement of the Company, including any preliminary prospectus or final prospectus contained therein or any amendments or supplements thereto; (ii) an omission or alleged omission to state therein a material fact required to be stated therein, or necessary to make the statements therein not misleading; or (iii) any violation or alleged violation by the indemnifying party (or any of its agents or Affiliates) of the Securities Act, the Exchange Act, any state securities law, or any rule or regulation promulgated under the Securities Act, the Exchange Act, or any state securities law.

1.4 "**Derivative Securities**" means any securities or rights convertible into, or exercisable or exchangeable for (in each case, directly or indirectly), Common Stock, including options and warrants.

1.5 "**Exchange Act**" means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

1.6 "**Excluded Registration**" means (i) a registration relating to the sale of securities to employees of the Company or a subsidiary pursuant to a stock option, stock purchase, or similar plan; (ii) a registration relating to an SEC Rule 145 transaction; (iii) a registration on any form that does not include substantially the same information as would be required to be included in a registration statement covering the sale of the Registrable Securities; or (iv) a registration in which the only Common Stock being registered is Common Stock issuable upon conversion of debt securities that are also being registered.

1.7 "**Form S-1**" means such form under the Securities Act as in effect on the date hereof or any successor registration form under the Securities Act subsequently adopted by the SEC.

1.8 "**Form S-3**" means such form under the Securities Act as in effect on the date hereof or any registration form under the Securities Act subsequently adopted by the SEC that permits incorporation of substantial information by reference to other documents filed by the Company with the SEC.

1.9 "**GAAP**" means generally accepted accounting principles in the United States.

1.10 "**Holder**" means any holder of Registrable Securities who is a party to this Agreement.

1.11 "**Immediate Family Member**" means a child, stepchild, grandchild, parent, stepparent, grandparent, spouse, sibling, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, including adoptive relationships, of a natural person referred to herein.

1.12 "**Initiating Holders**" means, collectively, Holders who properly initiate a registration request under this Agreement.

1.13 "**IPO**" means the Company's first underwritten public offering of its Common Stock under the Securities Act.

1.14 "**Key Employee**" means any executive-level employee (including division director and vice president-level positions) as well as any employee who, either alone or in concert with others, develops, invents, programs, or designs any Company Intellectual Property (as defined in the Purchase Agreement).

1.15 "**New Securities**" means, collectively, equity securities of the Company, whether or not currently authorized, as well as rights, options, or warrants to purchase such equity securities, or securities of any type whatsoever that are, or may become, convertible or exchangeable into or exercisable for such equity securities.

1.16 "**Notes**" means any evidence of indebtedness of the Company convertible into Common Stock.

1.17 "**Person**" means any individual, corporation, partnership, trust, limited liability company, association or other entity.

1.18 "**Preferred Director**" means any director of the Company that the holders of record, or deemed holders of record by holding the Notes, of the Series A Preferred Stock are entitled to elect pursuant to the Company's Certificate of Incorporation, as amended from time to time.

1.19 "**Preferred Stock**" means, collectively, the Series A Preferred Stock and any other series of preferred stock that the Company may issue after the date of this Agreement.

1.20 "**Registrable Securities**" means (i) the Common Stock held by an Investor or issuable or issued upon conversion of the Preferred Stock (including the Series A Preferred Stock issued or issuable upon conversion of Notes; and (ii) any Common Stock issued as (or issuable upon the conversion or exercise of any warrant, right, or other security that is issued as) a dividend or other distribution with respect to, or in exchange for or in replacement of, the shares referenced in clause (i) above; excluding in all cases, however, any Registrable Securities sold by a Person in a transaction in which the applicable rights under this Agreement are not assigned pursuant to Section 6.1, and excluding for purposes of Section 2 any shares for which registration rights have terminated pursuant to Section 2.13 of this Agreement.

1.21 "**Registrable Securities then outstanding**" means the number of shares determined by adding the number of shares of outstanding Common Stock that are Registrable Securities and the number of shares of Common Stock issuable (directly or indirectly) pursuant to then exercisable and/or convertible securities that are Registrable Securities.

1.22 "**Restricted Securities**" means the securities of the Company required to bear the legend set forth in Section 2.12(b) hereof.

1.23 "**SEC**" means the Securities and Exchange Commission.

1.24 "**SEC Rule 144**" means Rule 144 promulgated by the SEC under the Securities Act.

1.25 "**SEC Rule 145**" means Rule 145 promulgated by the SEC under the Securities Act.

1.26 "**Securities Act**" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

1.27 "**Selling Expenses**" means all underwriting discounts, selling commissions, and stock transfer taxes applicable to the sale of Registrable Securities, and fees and disbursements of counsel for any Holder, except for the fees and disbursements of the Selling Holder Counsel borne and paid by the Company as provided in Section 2.6.

2. Registration Rights. The Company covenants and agrees as follows:

2.1 Demand Registration.

(a) Form S-1 Demand. If at any time after the earlier of (i) five (5) years after the date of this Agreement or (ii) one hundred eighty (180) days after the effective date of the registration statement for the IPO, the Company receives a request from Holders of twenty percent (20%) of the Registrable Securities then outstanding that the Company file a Form S-1 registration statement with respect to all or part of the Registrable Securities having an anticipated aggregate offering price, net of Selling Expenses, of at least $5 million, then the Company shall (i) within ten (10) days after the date such request is given, give notice thereof (the "**Demand Notice**") to all Holders other than the Initiating Holders; and (ii) as soon as practicable, and in any event within sixty (60) days after the date such request is given by the Initiating Holders, file a Form S-1 registration statement under the Securities Act covering all Registrable Securities that the Initiating Holders requested to be registered and any additional Registrable Securities requested to be included in such registration by any other Holders, as specified by notice given by each such Holder to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Section 2.1(c) and Section 2.3.

(b) Form S-3 Demand. If at any time when it is eligible to use a Form S-3 registration statement, the Company receives a request from Holders of at least twenty percent (20%) of the Registrable Securities then outstanding that the Company file a Form S-3 registration statement with respect to outstanding Registrable Securities of such Holders having an anticipated aggregate offering price, net of Selling Expenses, of at least $2 million, then the Company shall (i) within ten (10) days after the date such request is given, give a Demand Notice to all Holders other than the Initiating Holders; and (ii) as soon as practicable, and in any event within forty-five (45) days after the date such request is given by the Initiating Holders, file a Form S-3 registration statement under the Securities Act covering all Registrable Securities requested to be included in such registration by any other Holders, as specified by notice given by each such Holder to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Section 2.1(c) and Section 2.3.

(c) Notwithstanding the foregoing obligations, if the Company furnishes to Holders requesting a registration pursuant to this Section 2.1 a certificate signed by the Company's chief executive officer stating that in the good faith judgment of the Company's Board of Directors it would be materially detrimental to the Company and its stockholders for such registration statement to either become effective or remain effective for as long as such registration statement otherwise would be required to remain effective, because such action would (i) materially interfere with a significant acquisition, corporate reorganization, or other similar transaction involving the Company; (ii) require premature disclosure of material information that the Company has a bona fide business purpose for preserving as confidential; or (iii) render the Company unable to comply with requirements under the Securities Act or Exchange Act, then the Company shall have the right to defer taking action with respect to such filing, for a period of not more than ninety (90) days after the request of the Initiating Holders is given; provided, however, that the Company may not invoke this right more than twice in any twelve (12) month period; and provided further that the Company shall not register any securities for its own account or that of any other stockholder during such ninety (90) day period other than an Excluded Registration.

(d) The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Section 2.1(a) (i) during the period that is one hundred eighty (180) days after the effective date of a Company-initiated registration, provided, that the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; (ii) after the Company has effected two registrations pursuant to Section 2.1(a); or (iii) if the Initiating Holders propose to dispose of shares of Registrable Securities that may be immediately registered on Form S-3 pursuant to a request made pursuant to Section 2.1(b). The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Section 2.1(b) (i) during the period that is one hundred eighty (180) days after the effective date of, a Company-initiated registration, provided, that the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; or (ii) if the Company has effected two registrations pursuant to Section 2.1(b) within the twelve (12) month period immediately preceding the date of such request. A registration shall not be counted as "effected" for purposes of this Section 2.1(d) until such time as (i) all Registrable Securities requested to be registered are so registered and (ii) the applicable registration statement has been declared effective by the SEC, unless the Initiating Holders withdraw their request for such registration (for any reason other than as a result of a material adverse change to the Company) and forfeit their right to one demand registration statement pursuant to Section 2.6, in which case such withdrawn registration statement shall be counted as "effected" for purposes of this Section 2.1(d).

2.2 Company Registration. If the Company proposes to register (including, for this purpose, a registration effected by the Company for stockholders other than the Holders) any of its securities under the Securities Act in connection with the public offering of such securities solely for cash (other than in an Excluded Registration), the Company shall, at such time, promptly give each Holder notice of such registration. Upon the request of each Holder given within twenty (20) days after such notice is given by the Company, the Company shall, subject to the provisions of Section 2.3, cause to be registered all of the Registrable Securities that each such Holder has requested to be included in such registration. The Company shall have the right to terminate or withdraw any registration initiated by it under this Section 2.2 before the effective date of such registration, whether or not any Holder has elected to include Registrable Securities in such registration. The expenses (other than Selling Expenses) of such withdrawn registration shall be borne by the Company in accordance with Section 2.6.

2.3 Underwriting Requirements.

(a) If, pursuant to Section 2.1, the Initiating Holders intend to distribute the Registrable Securities covered by their request by means of an underwriting, they shall so advise the Company as a part of their request made pursuant to Section 2.1, and the Company shall include such information in the Demand Notice. The underwriter(s) will be selected by the Company, subject only to the approval of a majority in interest of the Initiating Holders, which approval shall not be unreasonably withheld or delayed. In such event, the right of any Holder to include such Holder's Registrable Securities in such registration shall be conditioned upon such Holder's participation in such underwriting and the inclusion of such Holder's Registrable Securities in the underwriting to the extent provided herein. All Holders proposing to distribute their securities through such underwriting shall (together with the Company as provided in Section 2.4(e)) enter into an underwriting agreement in customary form with the underwriters selected for such underwriting. Notwithstanding any other provision of this Section 2.3, if the Company and underwriters together advise the Initiating Holders in writing that marketing factors require a limitation on the number of shares to be underwritten, then the Initiating Holders shall so advise all Holders of Registrable Securities that otherwise would be underwritten pursuant hereto, and the number of Registrable Securities that may be included in the underwriting shall be allocated among such Holders of Registrable Securities, including the Initiating Holders, in proportion (as nearly as practicable) to the number of Registrable Securities owned by each Holder, or in such other proportion as shall mutually be agreed to by all such selling Holders; provided, however, that the number of Registrable Securities held by the Holders to be included in such underwriting shall not be reduced unless all other securities are first entirely excluded from the underwriting.

(b) In connection with any offering involving an underwriting of shares of the Company's capital stock pursuant to Section 2.2, the Company shall not be required to include any of the Holders' Registrable Securities in such underwriting unless the Holders accept the terms of the underwriting as agreed upon between the Company and its underwriters, and then only in such quantity as the underwriters in their sole discretion determine will not jeopardize the success of the offering by the Company. If the total number of securities, including Registrable Securities, requested by stockholders to be included in such offering exceeds the number of securities to be sold (other than by the Company) that the underwriters in their reasonable discretion determine is compatible with the success of the offering, then the Company shall be required to include in the offering only that number of such securities, including Registrable Securities, which the underwriters and the Company in their sole discretion determine will not jeopardize the success of the offering. If the underwriters determine that less than all of the Registrable Securities requested to be registered can be included in such offering, then the Registrable Securities that are included in such offering shall be allocated among the selling Holders in proportion (as nearly as practicable to) the number of Registrable Securities owned by each selling Holder or in such other proportions as shall mutually be agreed to by all such selling Holders. Notwithstanding the foregoing, in no event shall (i) the number of Registrable Securities included in the offering be reduced unless all other securities (other than securities to be sold by the Company) are first entirely excluded from the offering, or (ii) the number of Registrable Securities included in the offering be reduced below thirty percent (30%) of the total number of securities included in such offering, unless such offering is the IPO, in which case the selling Holders may be excluded further if the underwriters make the determination described above and no other stockholder's securities are included in such offering. For purposes of the provision in this Section 2.3(b) concerning apportionment, for any selling Holder that is a partnership, limited liability company, or corporation, the partners, members, retired partners, retired members, stockholders, and Affiliates of such Holder, or the estates and Immediate Family Members of any such partners, retired partners, members, and retired members and any trusts for the benefit of any of the foregoing Persons, shall be deemed to be a single "selling Holder," and any pro rata reduction with respect to such "selling Holder" shall be based upon the aggregate number of Registrable Securities owned by all Persons included in such "selling Holder," as defined in this sentence.

(c) For purposes of Section 2.1, a registration shall not be counted as "effected" if, as a result of an exercise of the underwriter's cutback provisions in Section 2.3(a), fewer than fifty percent (50%) of the total number of Registrable Securities that Holders have requested to be included in such registration statement are actually included.

2.4 Obligations of the Company. Whenever required under this Section 2 to effect the registration of any Registrable Securities, the Company shall, as expeditiously as reasonably possible:

(a) prepare and file with the SEC a registration statement with respect to such Registrable Securities and use its commercially reasonable efforts to cause such registration statement to become effective and, upon the request of the Holders of a majority of the Registrable Securities registered thereunder, keep such registration statement effective for a period of up to one hundred twenty (120) days or, if earlier, until the distribution contemplated in the registration statement has been completed; provided, however, that such one hundred twenty (120) day period shall be extended for a period of time equal to the period the Holder refrains, at the request of an underwriter of Common Stock (or other securities) of the Company, from selling any securities included in such registration;

(b) prepare and file with the SEC such amendments and supplements to such registration statement, and the prospectus used in connection with such registration statement, as may be necessary to comply with the Securities Act in order to enable the disposition of all securities covered by such registration statement;

(c) furnish to the selling Holders such numbers of copies of a prospectus, including a preliminary prospectus, as required by the Securities Act, and such other documents as the Holders may reasonably request in order to facilitate their disposition of their Registrable Securities;

(d) use its commercially reasonable efforts to register and qualify the securities covered by such registration statement under such other securities or blue-sky laws of such jurisdictions as shall be reasonably requested by the selling Holders; provided that the Company shall not be required to qualify to do business or to file a general consent to service of process in any such states or jurisdictions, unless the Company is already subject to service in such jurisdiction and except as may be required by the Securities Act;

(e) in the event of any underwritten public offering, enter into and perform its obligations under an underwriting agreement, in usual and customary form, with the underwriter(s) of such offering;

(f) use its commercially reasonable efforts to cause all such Registrable Securities covered by such registration statement to be listed on a national securities exchange or trading system and each securities exchange and trading system (if any) on which similar securities issued by the Company are then listed;

(g) provide a transfer agent and registrar for all Registrable Securities registered pursuant to this Agreement and provide a CUSIP number for all such Registrable Securities, in each case not later than the effective date of such registration;

(h) promptly make available for inspection by the selling Holders, any underwriters participating in any disposition pursuant to such registration statement, and any attorney or accountant or other agent retained by any such underwriter or selected by the selling Holders, all financial and other records, pertinent corporate documents, and properties of the Company, and cause the Company's officers, directors, employees, and independent accountants to supply all information reasonably requested by any such seller, underwriter, attorney, accountant, or agent, in each case, as necessary or advisable to verify the accuracy of the information in such registration statement and to conduct appropriate due diligence in connection therewith;

(i) notify each selling Holder, promptly after the Company receives notice thereof, of the time when such registration statement has been declared effective or a supplement to any prospectus forming a part of such registration statement has been filed; and

(j) after such registration statement becomes effective, notify each selling Holder of any request by the SEC that the Company amend or supplement such registration statement or prospectus.

2.5 Furnish Information. It shall be a condition precedent to the obligations of the Company to take any action pursuant to this Section 2 with respect to the Registrable Securities of any selling Holder that such Holder shall furnish to the Company such information regarding itself, the Registrable Securities held by it, and the intended method of disposition of such securities as is reasonably required to effect the registration of such Holder's Registrable Securities.

2.6 Expenses of Registration. All expenses (other than Selling Expenses) incurred in connection with registrations, filings, or qualifications pursuant to Section 2, including all registration, filing, and qualification fees; printers' and accounting fees; fees and disbursements of counsel for the Company; and the reasonable fees and disbursements, not to exceed $35,000, of one counsel for the selling Holders ("Selling Holder Counsel"), shall be borne and paid by the Company; provided, however, that the Company shall not be required to pay for any expenses of any registration proceeding begun pursuant to Section 2.1 if the registration request is subsequently withdrawn at the request of the Holders of a majority of the Registrable Securities to be registered (in which case all selling Holders shall bear such expenses pro rata based upon the number of Registrable Securities that were to be included in the withdrawn registration), unless the Holders of a majority of the Registrable Securities agree to forfeit their right to one registration pursuant to Section 2.1(a) or Section 2.1(b), as the case may be; provided further that if, at the time of such withdrawal, the Holders shall have learned of a material adverse change in the condition, business, or prospects of the Company from that known to the Holders at the time of their request and have withdrawn the request with reasonable promptness after learning of such information then the Holders shall not be required to pay any of such expenses and shall not forfeit their right to one registration pursuant to Section 2.1(a) or Section 2.1(b). All Selling Expenses relating to Registrable Securities registered pursuant to this Section 2 shall be borne and paid by the Holders pro rata on the basis of the number of Registrable Securities registered on their behalf.

2.7 Delay of Registration. No Holder shall have any right to obtain or seek an injunction restraining or otherwise delaying any registration pursuant to this Agreement as the result of any controversy that might arise with respect to the interpretation or implementation of this Section 2.

2.8 Indemnification. If any Registrable Securities are included in a registration statement under this Section 2:

(a) To the extent permitted by law, the Company will indemnify and hold harmless each selling Holder, and the partners, members, officers, directors, and stockholders of each such Holder; legal counsel and accountants for each such Holder; any underwriter (as defined in the Securities Act) for each such Holder; and each Person, if any, who controls such Holder or underwriter within the meaning of the Securities Act or the Exchange Act, against any Damages, and the Company will pay to each such Holder, underwriter, controlling Person, or other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; provided, however, that the indemnity agreement contained in this Section 2.8(a) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Company, which consent shall not be unreasonably withheld, nor shall the Company be liable for any Damages to the extent that they arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of any such Holder, underwriter, controlling Person, or other aforementioned Person expressly for use in connection with such registration.

(b) To the extent permitted by law, each selling Holder, severally and not jointly, will indemnify and hold harmless the Company, and each of its directors, each of its officers who has signed the registration statement, each Person (if any), who controls the Company within the meaning of the Securities Act, legal counsel and accountants for the Company, any underwriter (as defined in the Securities Act), any other Holder selling securities in such registration statement, and any controlling Person of any such underwriter or other Holder, against any Damages, in each case only to the extent that such Damages arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of such selling Holder expressly for use in connection with such registration; and each such selling Holder will pay to the Company and each other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; provided, however, that the indemnity agreement contained in this Section 2.8(b) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Holder, which consent shall not be unreasonably withheld; and provided further that in no event shall the aggregate amounts payable by any Holder by way of indemnity or contribution under Sections 2.8(b) and 2.8(d) exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of fraud or willful misconduct by such Holder.

(c) Promptly after receipt by an indemnified party under this Section 2.8 of notice of the commencement of any action (including any governmental action) for which a party may be entitled to indemnification hereunder, such indemnified party will, if a claim in respect thereof is to be made against any indemnifying party under this Section 2.8, give the indemnifying party notice of the commencement thereof. The indemnifying party shall have the right to participate in such action and, to the extent the indemnifying party so desires, participate jointly with any other indemnifying party to which notice has been given, and to assume the defense thereof with counsel mutually satisfactory to the parties; provided, however, that an indemnified party (together with all other indemnified parties that may be represented without conflict by one counsel) shall have the right to retain one separate counsel, with the fees and expenses to be paid by the indemnifying party, if representation of such indemnified party by the counsel retained by the indemnifying party would be inappropriate due to actual or potential differing interests between such indemnified party and any other party represented by such counsel in such action. The failure to give notice to the indemnifying party within a reasonable time of the commencement of any such action shall relieve such indemnifying party of any liability to the indemnified party under this Section 2.8, to the extent that such failure materially prejudices the indemnifying party's ability to defend such action. The failure to give notice to the indemnifying party will not relieve it of any liability that it may have to any indemnified party otherwise than under this Section 2.8.

(d) To provide for just and equitable contribution to joint liability under the Securities Act in any case in which either (i) any party otherwise entitled to indemnification hereunder makes a claim for indemnification pursuant to this Section 2.8 but it is judicially determined (by the entry of a final judgment or decree by a court of competent jurisdiction and the expiration of time to appeal or the denial of the last right of appeal) that such indemnification may not be enforced in such case, notwithstanding the fact that this Section 2.8 provides for indemnification in such case, or (ii) contribution under the Securities Act may be required on the part of any party hereto for which indemnification is provided under this Section 2.8, then, and in each such case, such parties will contribute to the aggregate losses, claims, damages, liabilities, or expenses to which they may be subject (after contribution from others) in such proportion as is appropriate to reflect the relative fault of each of the indemnifying party and the indemnified party in connection with the statements, omissions, or other actions that resulted in such loss, claim, damage, liability, or expense, as well as to reflect any other relevant equitable considerations. The relative fault of the indemnifying party and of the indemnified party shall be determined by reference to, among other things, whether the untrue or allegedly untrue statement of a material fact, or the omission or alleged omission of a material fact, relates to information supplied by the indemnifying party or by the indemnified party and the parties' relative intent, knowledge, access to information, and opportunity to correct or prevent such statement or omission; provided, however, that, in any such case, (x) no Holder will be required to contribute any amount in excess of the public offering price of all such Registrable Securities offered and sold by such Holder pursuant to such registration statement, and (y) no Person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) will be entitled to contribution from any Person who was not guilty of such fraudulent misrepresentation; and provided further that in no event shall a Holder's liability pursuant to this Section 2.8(d), when combined with the amounts paid or payable by such Holder pursuant to Section 2.8(b), exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of willful misconduct or fraud by such Holder.

(e) Notwithstanding the foregoing, to the extent that the provisions on indemnification and contribution contained in the underwriting agreement entered into in connection with the underwritten public offering are in conflict with the foregoing provisions, the provisions in the underwriting agreement shall control.

(f) Unless otherwise superseded by an underwriting agreement entered into in connection with the underwritten public offering, the obligations of the Company and Holders under this Section 2.8 shall survive the completion of any offering of Registrable Securities in a registration under this Section 2, and otherwise shall survive the termination of this Agreement.

2.9 Reports Under Exchange Act. With a view to making available to the Holders the benefits of SEC Rule 144 and any other rule or regulation of the SEC that may at any time permit a Holder to sell securities of the Company to the public without registration or pursuant to a registration on Form S-3, the Company shall:

(a) make and keep available adequate current public information, as those terms are understood and defined in SEC Rule 144, at all times after the effective date of the registration statement filed by the Company for the IPO;

(b) use commercially reasonable efforts to file with the SEC in a timely manner all reports and other documents required of the Company under the Securities Act and the Exchange Act (at any time after the Company has become subject to such reporting requirements); and

(c) furnish to any Holder, so long as the Holder owns any Registrable Securities, forthwith upon request (i) to the extent accurate, a written statement by the Company that it has complied with the reporting requirements of SEC Rule 144 (at any time after ninety (90) days after the effective date of the registration statement filed by the Company for the IPO), the Securities Act, and the Exchange Act (at any time after the Company has become subject to such reporting requirements), or that it qualifies as a registrant whose securities may be resold pursuant to Form S-3 (at any time after the Company so qualifies); (ii) a copy of the most recent annual or quarterly report of the Company and such other reports and documents so filed by the Company; and (iii) such other information as may be reasonably requested in availing any Holder of any rule or regulation of the SEC that permits the selling of any such securities without registration (at any time after the Company has become subject to the reporting requirements under the Exchange Act) or pursuant to Form S-3 (at any time after the Company so qualifies to use such form).

2.10 Limitations on Subsequent Registration Rights. From and after the date of this Agreement, the Company shall not, without the prior written consent of the Holders of a majority of the Registrable Securities then outstanding, enter into any agreement with any holder or prospective holder of any securities of the Company that (i) would provide to such holder the right to include securities in any registration on other than either a pro rata basis with respect to the Registrable Securities or on a subordinate basis after all Holders have had the opportunity to include in the registration and offering all shares of Registrable Securities that they wish to so include or (ii) allow such holder or prospective holder to initiate a demand for registration of any securities held by such holder or prospective holder; provided that this limitation shall not apply to any additional Investor who becomes a party to this Agreement in accordance with Section 6.9.

2.11 "Market Stand-off" Agreement. Each Holder hereby agrees that it will not, without the prior written consent of the managing underwriter(s), during the period commencing on the date of the final prospectus relating to the registration by the Company of shares of its Common Stock and ending on the date specified by the Company and the managing underwriter(s) (such period not to exceed one hundred eighty (180) days in the case of the IPO) (i) lend; offer; pledge; sell; contract to sell; sell any option or contract to purchase; purchase any option or contract to sell; grant any option, right, or warrant to purchase; or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any securities convertible into or exercisable or exchangeable (directly or indirectly) for Common Stock held immediately before the effective date of the registration statement for such offering or (ii) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of such securities, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Common Stock or other securities, in cash, or otherwise. The foregoing provisions of this Section 2.11 shall apply only to the IPO, shall not apply to the sale of any shares to an underwriter pursuant to an underwriting agreement, and shall be applicable to the Holders only if all officers and directors and all stockholders individually owning more than one percent (1%) of the Company's outstanding Common Stock (after giving effect to conversion into Common Stock of all outstanding Preferred Stock) are subject to the same restrictions. The underwriters in connection with such registration are intended third-party beneficiaries of this Section 2.11 and shall have the right, power, and authority to enforce the provisions hereof as though they were a party hereto. Each Holder further agrees to execute such agreements as may be reasonably requested by the underwriters in connection with such registration that are consistent with this Section 2.11 or that are necessary to give further effect thereto. Any discretionary waiver or termination of the restrictions of any or all of such agreements by the Company or the underwriters shall apply pro rata to all Holders subject to such agreements, based on the number of shares subject to such agreements.

2.12 Restrictions on Transfer.

(a) The Preferred Stock and the Registrable Securities shall not be sold, pledged, or otherwise transferred, and the Company shall not recognize and shall issue stop-transfer instructions to its transfer agent with respect to any such sale, pledge, or transfer, except upon the conditions specified in this Agreement, which conditions are intended to ensure compliance with the provisions of the Securities Act. A transferring Holder will cause any proposed purchaser, pledgee, or transferee of the Preferred Stock and the Registrable Securities held by such Holder to agree to take and hold such securities subject to the provisions and upon the conditions specified in this Agreement.

(b) Each certificate or instrument representing (i) the Preferred Stock, (ii) the Registrable Securities, and (iii) any other securities issued in respect of the securities referenced in clauses (i) and (ii), upon any stock split, stock dividend, recapitalization, merger, consolidation, or similar event, shall (unless otherwise permitted by the provisions of Section 2.12(c)) be stamped or otherwise imprinted with a legend substantially in the following form:

THE SECURITIES REPRESENTED HEREBY HAVE BEEN ACQUIRED FOR INVESTMENT AND HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933. SUCH SHARES MAY NOT BE SOLD, PLEDGED, OR TRANSFERRED IN THE ABSENCE OF SUCH REGISTRATION OR A VALID EXEMPTION FROM THE REGISTRATION AND PROSPECTUS DELIVERY REQUIREMENTS OF SAID ACT.

THE SECURITIES REPRESENTED HEREBY MAY BE TRANSFERRED ONLY IN ACCORDANCE WITH THE TERMS OF AN AGREEMENT BETWEEN THE COMPANY AND THE STOCKHOLDER, A COPY OF WHICH IS ON FILE WITH THE SECRETARY OF THE COMPANY.

The Holders consent to the Company making a notation in its records and giving instructions to any transfer agent of the Restricted Securities in order to implement the restrictions on transfer set forth in this Section 2.12.

(c) The holder of each certificate representing Restricted Securities, by acceptance thereof, agrees to comply in all respects with the provisions of this Section 2. Before any proposed sale, pledge, or transfer of any Restricted Securities, unless there is in effect a registration statement under the Securities Act covering the proposed transaction, the Holder thereof shall give notice to the Company of such Holder's intention to effect such sale, pledge, or transfer. Each such notice shall describe the manner and circumstances of the proposed sale, pledge, or transfer in sufficient detail and, if reasonably requested by the Company, shall be accompanied at such Holder's expense by either (i) a written opinion of legal counsel who shall, and whose legal opinion shall, be reasonably satisfactory to the Company, addressed to the Company, to the effect that the proposed transaction may be effected without registration under the Securities Act; (ii) a "no action" letter from the SEC to the effect that the proposed sale, pledge, or transfer of such Restricted Securities without registration will not result in a recommendation by the staff of the SEC that action be taken with respect thereto; or (iii) any other evidence reasonably satisfactory to counsel to the Company to the effect that the proposed sale, pledge, or transfer of the Restricted Securities may be effected without registration under the Securities Act, whereupon the Holder of such Restricted Securities shall be entitled to sell, pledge, or transfer such Restricted Securities in accordance with the terms of the notice given by the Holder to the Company. The Company will not require such a legal opinion or "no action" letter (x) in any transaction in compliance with SEC Rule 144 or (y) in any transaction in which such Holder distributes Restricted Securities to an Affiliate of such Holder for no consideration; provided that each transferee agrees in writing to be subject to the terms of this Section 2.12. Each certificate or instrument evidencing the Restricted Securities transferred as above provided shall bear, except if such transfer is made pursuant to SEC Rule 144, the appropriate restrictive legend set forth in Section 2.12(b), except that such certificate shall not bear such restrictive legend if, in the opinion of counsel for such Holder and the Company, such legend is not required in order to establish compliance with any provisions of the Securities Act.

2.13 Termination of Registration Rights. The right of any Holder to request registration or inclusion of Registrable Securities in any registration pursuant to Section 2.1 or Section 2.2 shall terminate upon the earlier to occur of:

(a) the closing of a Deemed Liquidation Event, as such term is defined in the Company's Certificate of Incorporation, as amended from time to time; and

(b) when all of such Holder's Registrable Securities are eligible to be sold without restriction under SEC Rule 144 within any 90-day period.

3. Information and Observer Rights.

3.1 Delivery of Financial Statements. The Company shall deliver to each Investor, provided that the Board of Directors, by a vote that includes at least two of the Preferred Directors, has not reasonably determined that such Investor is a competitor of the Company:

(a) as soon as practicable, but in any event within ninety (90) days after the end of each fiscal year of the Company, (i) a balance sheet as of the end of such year, (ii) statements of income and of cash flows for such year, and a comparison between (x) the actual amounts as of and for such fiscal year and (y) the comparable amounts for the prior year and as included in the Budget (as defined in Section 3.1(e)) for such year, with an explanation of any material differences between such amounts and a schedule as to the sources and applications of funds for such year, and (iii) a statement of stockholders' equity as of the end of such year, all such financial statements audited and certified by independent public accountants of nationally recognized standing selected by the Company;

(b) as soon as practicable, but in any event within forty-five (45) days after the end of each of the first three (3) quarters of each fiscal year of the Company, unaudited statements of income and of cash flows for such fiscal quarter, and an unaudited balance sheet and a statement of stockholders' equity as of the end of such fiscal quarter, all prepared in accordance with GAAP (except that such financial statements may (i) be subject to normal year-end audit adjustments and (ii) not contain all notes thereto that may be required in accordance with GAAP);

(c) as soon as practicable, but in any event within forty-five (45) days after the end of each of the first three (3) quarters of each fiscal year of the Company, a statement showing the number of shares of each class and series of capital stock and securities convertible into or exercisable for shares of capital stock outstanding at the end of the period, the Common Stock issuable upon conversion or exercise of any outstanding securities convertible or exercisable for Common Stock and the exchange ratio or exercise price applicable thereto, and the number of shares of issued stock options and stock options not yet issued but reserved for issuance, if any, all in sufficient detail as to permit the Investors to calculate their respective percentage equity ownership in the Company, and certified by the chief financial officer or chief executive officer of the Company as being true, complete, and correct;

(d) as soon as practicable, but in any event within thirty (30) days of the end of each month, an unaudited income statement and statement of cash flows for such month, and an unaudited balance sheet and statement of stockholders' equity as of the end of such month, all prepared in accordance with GAAP (except that such financial statements may (i) be subject to normal year-end audit adjustments and (ii) not contain all notes thereto that may be required in accordance with GAAP);

(e) as soon as practicable, but in any event thirty (30) days before the end of each fiscal year, a budget and business plan for the next fiscal year (collectively, the "**Budget**"), approved by the Board of Directors and prepared on a monthly basis, including balance sheets, income statements, and statements of cash flow for such months and, promptly after prepared, any other budgets or revised budgets prepared by the Company;

(f) with respect to the financial statements called for in Section 3.1(a), Section 3.1(b) and Section 3.1(d), an instrument executed by the chief financial officer and chief executive officer of the Company certifying that such financial statements were prepared in accordance with GAAP consistently applied with prior practice for earlier periods (except as otherwise set forth in Section 3.1(b) and Section 3.1(d)) and fairly present in all material respects the financial condition of the Company and its results of operation for the periods specified therein; and

(g) such other information relating to the financial condition, business, prospects, or corporate affairs of the Company as any Investor may from time to time reasonably request; provided, however, that the Company shall not be obligated under this Section 3.1 to provide information (i) that the Company reasonably determines in good faith to be a trade secret or confidential information (unless covered by an enforceable confidentiality agreement, in form acceptable to the Company) or (ii) the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel.

If, for any period, the Company has any subsidiary whose accounts are consolidated with those of the Company, then in respect of such period the financial statements delivered pursuant to the foregoing sections shall be the consolidated and consolidating financial statements of the Company and all such consolidated subsidiaries.

Notwithstanding anything else in this Section 3.1 to the contrary, the Company may cease providing the information set forth in this Section 3.1 during the period starting with the date thirty (30) days before the Company's good-faith estimate of the date of filing of a registration statement if it reasonably concludes it must do so to comply with the SEC rules applicable to such registration statement and related offering; provided that the Company's covenants under this Section 3.1 shall be reinstated at such time as the Company is no longer actively employing its commercially reasonable efforts to cause such registration statement to become effective.

3.2 Inspection. The Company shall permit each Investor (provided that the Board of Directors has not reasonably determined that such Investor is a competitor of the Company), at such Investor's expense, and upon reasonable advance notification, to visit and inspect the Company's properties; examine its books of account and records; and discuss the Company's affairs, finances, and accounts with its officers, during normal business hours of the Company as may be reasonably requested by the Investor; provided, however, that the Company shall not be obligated pursuant to this Section 3.2 to provide access to any information that it reasonably and in good faith considers to be a trade secret or confidential information (unless covered by an enforceable confidentiality agreement, in form acceptable to the Company) or the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel.

3.3 Termination of Information. The covenants set forth in Section 3.1 and Section 3.2 shall terminate and be of no further force or effect (i) immediately before the consummation of a QPO (as such term is defined in the Company's Certificate of Incorporation, as amended from time to time), or (ii) upon a Deemed Liquidation Event, as such term is defined in the Company's Certificate of Incorporation, as amended from time to time, whichever event occurs first.

4. Rights to Future Stock Issuances.

4.1 Right of First Offer. Subject to the terms and conditions of this Section 4.1 and applicable securities laws, if the Company proposes to offer or sell any New Securities, the Company shall first offer such New Securities to each Investor. An Investor shall be entitled to apportion the right of first offer hereby granted to it among itself and its Affiliates in such proportions as it deems appropriate.

(a) The Company shall give notice (the "**Offer Notice**") to each Investor, stating (i) its bona fide intention to offer such New Securities, (ii) the number of such New Securities to be offered, and (iii) the price and terms, if any, upon which it proposes to offer such New Securities.

(b) By notification to the Company within twenty (20) days after the Offer Notice is given, each Investor may elect to purchase or otherwise acquire, at the price and on the terms specified in the Offer Notice, up to that portion of such New Securities which equals the proportion that the Common Stock issued and held, or issuable (directly or indirectly) upon conversion and/or exercise, as applicable, of the Notes, the Preferred Stock and any other Derivative Securities then held, by such Investor bears to the total Common Stock of the Company then outstanding (assuming full conversion and/or exercise, as applicable, of all Notes, Preferred Stock and other Derivative Securities). At the expiration of such twenty (20) day period, the Company shall promptly notify each Investor that elects to purchase or acquire all the shares available to it (each, a "**Fully Exercising Investor**") of any other Investor's failure to do likewise. During the ten (10) day period commencing after the Company has given such notice, each Fully Exercising Investor may, by giving notice to the Company, elect to purchase or acquire, in addition to the number of shares specified above, up to that portion of the New Securities for which Investors were entitled to subscribe but that were not subscribed for by the Investors which is equal to the proportion that the Common Stock issued and held, or issuable (directly or indirectly) upon conversion and/or exercise, as applicable, of the Notes, Preferred Stock and any other Derivative Securities then held, by such Fully Exercising Investor bears to the Common Stock issued and held, or issuable (directly or indirectly) upon conversion and/or exercise, as applicable, of the Notes, Preferred Stock and any other Derivative Securities then held, by all Fully Exercising Investors who wish to purchase such unsubscribed shares. The closing of any sale pursuant to this Section 4.1(b) shall occur within the later of ninety (90) days of the date that the Offer Notice is given and the date of initial sale of New Securities pursuant to Section 4.1(c).

(c) If all New Securities referred to in the Offer Notice are not elected to be purchased or acquired as provided in Section 4.1(b), the Company may, during the ninety (90) day period following the expiration of the periods provided in Section 4.1(b), offer and sell the remaining unsubscribed portion of such New Securities to any Person or Persons at a price not less than, and upon terms no more favorable to the offeree than, those specified in the Offer Notice. If the Company does not enter into an agreement for the sale of the New Securities within such period, or if such agreement is not consummated within thirty (30) days of the execution thereof, the right provided hereunder shall be deemed to be revived and such New Securities shall not be offered unless first reoffered to the Investors in accordance with this Section 4.1.

(d) The right of first offer in this Section 4.1 shall not be applicable to (i) Exempted Securities (as defined in the Company's Certificate of Incorporation, as amended from time to time); (ii) shares of Common Stock issued in the IPO; and (iii) shares of securities issued in connection with acquisitions by the Company.

(e) In lieu of complying with the provisions of Subsections 4.1(a) through (d), unless such non-compliance with Subsections 4.1(a) through (d) adversely affects the Investors in any way in which case the Company will be required to comply with the provisions of Subsections 4.1(a) through (d), the Company may elect to give notice to the Investors within thirty (30) days after the issuance of New Securities. Such notice shall describe the type, price, and terms of the New Securities. Each Investor shall have twenty (20) days from the date notice is given to elect to purchase up to the number of New Securities that would, if purchased by such Investor, maintain such Investor's percentage-ownership position, calculated as set forth in Section 4.1(b) before giving effect to the issuance of such New Securities. The closing of such sale shall occur within sixty (60) days of the date notice is given to the Investors.

4.2 Termination. The covenants set forth in Section 4.1 shall terminate and be of no further force or effect (i) immediately before the consummation of a QPO, as such term is defined in the Company's Certificate of Incorporation, as amended from time to time, or (ii) upon a Deemed Liquidation Event, as such term is defined in the Company's Certificate of Incorporation, as amended from time to time, whichever event occurs first.

5. Additional Covenants.

5.1 Insurance. The Company shall use its commercially reasonable efforts to obtain, within ninety (90) days of the date hereof, from financially sound and reputable insurers Directors and Officers liability insurance and term "key-person" insurance on its Chief Executive Officer, in an amount and on terms and conditions satisfactory to the Board of Directors, and will use commercially reasonable efforts to cause such insurance policies to be maintained until such time as the Board of Directors determines that such insurance should be discontinued. The key-person policy shall name the Company as loss payee, and neither policy shall be cancelable by the Company without prior approval by the Board of Directors, including at least two of the Preferred Directors.

5.2 Employee Agreements. To the extent the Company has not already done so, the Company will cause (i) each person now or hereafter employed by it or by any subsidiary (or engaged by the Company or any subsidiary as a consultant/independent contractor) with access to confidential information and/or trade secrets to enter into a nondisclosure and proprietary rights assignment agreement and (ii) each Key Employee to enter into a one year noncompetition and nonsolicitation agreement, each agreement substantially in the form approved by the Board of Directors. In addition, the Company shall not amend, modify, terminate, waive, or otherwise alter, in whole or in part, any of the above-referenced agreements or any restricted stock agreement between the Company and any employee, without the consent of at least two of the Preferred Directors.

5.3 Employee Stock. Unless otherwise approved by the Board of Directors, including at least two Preferred Directors, all future employees and consultants of the Company who purchase, receive options to purchase, or receive awards of shares of the Company's capital stock after the date hereof shall be required to execute restricted stock or option agreements, as applicable, providing for (i) vesting of shares over a four (4) year period, with the first twenty-five percent (25%) of such shares vesting following twelve (12) months of continued employment or service, and the remaining shares vesting ratably in quarterly installments over the following twelve (12) quarters, and (ii) a market stand-off provision substantially similar to that in Section 2.11. In addition, unless otherwise approved by the Board of Directors, including at least two of the Preferred Directors, the Company shall retain a "right of first refusal" on employee transfers until the Company's IPO and shall have the right to repurchase unvested shares at cost upon termination of employment of a holder of restricted stock.

5.4 Matters Requiring Investor Director Approval. So long as at least twenty percent (20%) of the principal amount of the Notes on the date of this Agreement, or, if converted, at least twenty percent (20%) of the shares of Series A Preferred Stock so converted (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series A Preferred Stock), remain outstanding, the Company hereby covenants and agrees with each of the Investors that it shall not, without approval of the Board of Directors, which approval must include the affirmative vote of two of the Preferred Directors:

(a) make, or permit any subsidiary to make, any loan or advance to, or own any stock or other securities of, any subsidiary or other corporation, partnership, or other entity unless it is wholly owned by the Company;

(b) make, or permit any subsidiary to make, any loan or advance to any Person, including, without limitation, any employee or director of the Company or any subsidiary, except advances and similar expenditures in the ordinary course of business or under the terms of an employee stock or option plan approved by the Board of Directors;

(c) guarantee, directly or indirectly, or permit any subsidiary to guarantee, directly or indirectly, any indebtedness except for trade accounts of the Company or any subsidiary arising in the ordinary course of business;

(d) make any investment other than investments in prime commercial paper, money market funds, certificates of deposit in any United States bank having a net worth in excess of $100,000,000 or obligations issued or guaranteed by the United States of America, in each case having a maturity not in excess of two years;

(e) incur any aggregate indebtedness in excess of $50,000 that is not already included in a budget approved by the Board of Directors, other than trade credit incurred in the ordinary course of business;

(f) otherwise enter into or be a party to any transaction with any director, officer, or employee of the Company or any "associate" (as defined in Rule 12b-2 promulgated under the Exchange Act) of any such Person, except for transactions contemplated by this Agreement and the Purchase Agreement;

(g) hire, terminate, or change the compensation of the executive officers, including approving any option grants or stock awards to executive officers;

(h) change the principal business of the Company, enter new lines of business, or exit the current line of business; or

(i) sell, assign, license, pledge, or encumber material technology or intellectual property, other than licenses granted in the ordinary course of business.

5.5 Board Matters. Unless otherwise determined by the vote of a majority of the directors then in office, the Board of Directors shall meet at least six times per year in accordance with an agreed-upon schedule. The Company shall reimburse the nonemployee directors for all reasonable out-of-pocket travel expenses incurred (consistent with the Company's travel policy) in connection with attending meetings of the Board of Directors. The Company shall cause to be established, as soon as practicable after such request, and will maintain, an audit and compensation committee, each of which shall consist solely of non-management directors, and each of which shall include at least two Preferred Directors.

5.6 Successor Indemnification. If the Company or any of its successors or assignees consolidates with or merges into any other Person and is not the continuing or surviving corporation or entity of such consolidation or merger, then to the extent necessary, proper provision shall be made so that the successors and assignees of the Company assume the obligations of the Company with respect to indemnification of members of the Board of Directors as in effect immediately before such transaction, whether such obligations are contained in the Company's Bylaws, its Certificate of Incorporation, as amended from time to time, or elsewhere, as the case may be.

5.7 Termination of Covenants. The covenants set forth in this Section 5, except for Section 5.6, shall terminate and be of no further force or effect (i) immediately before the consummation of a QPO, as such term is defined in the Company's Certificate of Incorporation, as amended from time to time, or (ii) upon a Deemed Liquidation Event, as such term is defined in the Company's Certificate of Incorporation, as amended from time to time, whichever event occurs first.

6. Miscellaneous.

6.1 Successors and Assigns. The rights under this Agreement may be assigned (but only with all related obligations) by a Holder to a transferee of Registrable Securities that (i) is an Affiliate of a Holder; (ii) is a Holder's Immediate Family Member or trust for the benefit of an individual Holder or one or more of such Holder's Immediate Family Members; or (iii) after such transfer, holds at least 100,000 shares of Registrable Securities (subject to appropriate adjustment for stock splits, stock dividends, combinations, and other recapitalizations); provided, however, that (x) the Company is, within a reasonable time after such transfer, furnished with written notice of the name and address of such transferee and the Registrable Securities with respect to which such rights are being transferred; and (y) such transferee agrees in a written instrument delivered to the Company to be bound by and subject to the terms and conditions of this Agreement, including the provisions of Section 2.11. For the purposes of determining the number of shares of Registrable Securities held by a transferee, the holdings of a transferee (1) that is an Affiliate or stockholder of a Holder; (2) who is a Holder's Immediate Family Member; or (3) that is a trust for the benefit of an individual Holder or such Holder's Immediate Family Member shall be aggregated together and with those of the transferring Holder; provided further that all transferees who would not qualify individually for assignment of rights shall have a single attorney-in-fact for the purpose of exercising any rights, receiving notices, or taking any action under this Agreement. The terms and conditions of this Agreement inure to the benefit of and are binding upon the respective successors and permitted assignees of the parties. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and permitted assignees any rights, remedies, obligations or liabilities under or by reason of this Agreement, except as expressly provided herein.

6.2 Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of Delaware excluding that body of law pertaining to conflict of law.

6.3 Counterparts; Facsimile. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. This Agreement may also be executed and delivered by facsimile signature and in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

6.4 Titles and Subtitles. The titles and subtitles used in this Agreement are for convenience only and are not to be considered in construing or interpreting this Agreement.

6.5 Notices. All notices and other communications given or made pursuant to this Agreement shall be in writing and shall be deemed effectively given upon the earlier of actual receipt or: (i) personal delivery to the party to be notified; (ii) when sent, if sent by electronic mail or facsimile during the recipient's normal business hours, and if not sent during normal business hours, then on the recipient's next business day; (iii) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid; or (iv) one (1) business day after the business day of deposit with a nationally recognized overnight courier, freight prepaid, specifying next-day delivery, with written verification of receipt. All communications shall be sent to the respective parties at their addresses as set forth on Schedule A hereto, or to the principal office of the Company and to the attention of the Chief Executive Officer, in the case of the Company, or to such email address, facsimile number, or address as subsequently modified by written notice given in accordance with this Section 6.5.

If notice is given to the Company, a copy shall also be sent to:

Ballard Spahr LLP
1735 Market Street, 51st Floor
Philadelphia, PA 19103-7599
Attn: Mary J. Mullany

If notice is given to the Company's stockholders, a copy shall also be sent to:

Goodwin Procter LLP
Exchange Place
53 State Street
Boston, MA 02109
Attn: Joseph C. Theis, Jr.

6.6 Amendments and Waivers. Any term of this Agreement may be amended and the observance of any term of this Agreement may be waived (either generally or in a particular instance, and either retroactively or prospectively) only with the written consent of the Company and the holders of a majority of the Registrable Securities then outstanding; provided that the Company may in its sole discretion waive compliance with Section 2.12(c) (and the Company's failure to object promptly in writing after notification of a proposed assignment allegedly in violation of Section 2.12(c) shall be deemed to be a waiver); and provided further that any provision hereof may be waived by any waiving party on such party's own behalf, without the consent of any other party. Notwithstanding the foregoing, this Agreement may not be amended or terminated and the observance of any term hereof may not be waived with respect to any Investor without the written consent of such Investor, unless such amendment, termination, or waiver applies to all Investors in the same fashion (it being agreed that a waiver of the provisions of Section 4 with respect to a particular transaction shall be deemed to apply to all Investors in the same fashion if such waiver does so by its terms, notwithstanding the fact that certain Investors may nonetheless, by agreement with the Company, purchase securities in such transaction). The Company shall give prompt notice of any amendment or termination hereof or waiver hereunder to any party hereto that did not consent in writing to such amendment, termination, or waiver. Any amendment, termination, or waiver effected in accordance with this Section 6.6 shall be binding on all parties hereto, regardless of whether any such party has consented thereto. No waivers of or exceptions to any term, condition, or provision of this Agreement, in any one or more instances, shall be deemed to be or construed as a further or continuing waiver of any such term, condition, or provision.

6.7 Severability. In case any one or more of the provisions contained in this Agreement is for any reason held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision of this Agreement, and such invalid, illegal, or unenforceable provision shall be reformed and construed so that it will be valid, legal, and enforceable to the maximum extent permitted by law.

6.8 Aggregation of Stock. All shares of Registrable Securities held or acquired by Affiliates shall be aggregated together for the purpose of determining the availability of any rights under this Agreement and such Affiliated persons may apportion such rights as among themselves in any manner they deem appropriate.

6.9 Additional Investors. Notwithstanding anything to the contrary contained herein, if the Company issues additional shares of the Company's Preferred Stock after the date hereof, any purchaser of such shares of Preferred Stock may become a party to this Agreement by executing and delivering an additional counterpart signature page to this Agreement, and thereafter shall be deemed an "Investor" for all purposes hereunder. No action or consent by the Investors shall be required for such joinder to this Agreement by such additional Investor, so long as such additional Investor has agreed in writing to be bound by all of the obligations as an "Investor" hereunder.

6.10 Entire Agreement. This Agreement (including any Schedules and Exhibits hereto) constitutes the full and entire understanding and agreement among the parties with respect to the subject matter hereof, and any other written or oral agreement relating to the subject matter hereof existing between the parties is expressly canceled. Upon the effectiveness of this Agreement, the Prior Agreement shall terminate and be of no further force and effect and shall be superseded and replaced in its entirety by this Agreement.

6.11 Delays or Omissions. No delay or omission to exercise any right, power, or remedy accruing to any party under this Agreement, upon any breach or default of any other party under this Agreement, shall impair any such right, power, or remedy of such nonbreaching or nondefaulting party, nor shall it be construed to be a waiver of or acquiescence to any such breach or default, or to any similar breach or default thereafter occurring, nor shall any waiver of any single breach or default be deemed a waiver of any other breach or default theretofore or thereafter occurring. All remedies, whether under this Agreement or by law or otherwise afforded to any party, shall be cumulative and not alternative.

6.12 Acknowledgment. The Company acknowledges that the Investors are in the business of venture capital investing and therefore review the business plans and related proprietary information of many enterprises, including enterprises which may have products or services which compete directly or indirectly with those of the Company. Nothing in this Agreement shall preclude or in any way restrict the Investors from investing or participating in any particular enterprise whether or not such enterprise has products or services which compete with those of the Company.

[Remainder of Page Intentionally Left Blank]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors' Rights Agreement as of the date first written above.

COMPANY:

OPGEN, INC.

By: /s/ C. E. Winzer
Name: C. Eric Winzer
Its: Chief Financial Officer

[Signature Page to Third Amended and Restated Investors' Rights Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTORS:

CHL MEDICAL PARTNERS III, L.P.

By: CHL Medical Partners III, LLC
its General Partner

By: /s/ Timothy Howe
Name: Timothy Howe
Title: Executive Vice President

CHL MEDICAL PARTNERS III SIDE FUND, L.P.

By: CHL Medical Partners III, LLC
its General Partner

By: /s/ Timothy Howe
Name: Timothy Howe
Title: Executive Vice President

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTORS:

jVEN CAPITAL, LLC

By: /s/ Evan Jones
Name: Evan Jones
Title: Authorized Signatory

/s/ Evan Jones
Evan Jones

/s/ Cynthia Jones
Cynthia Jones

[Signature Page to Third Amended and Restated Investors' Rights Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTORS:

VERSANT VENTURE CAPITAL III, L.P.

By: Versant Ventures III, LLC,
its General Partner

By: /s/ Brian Atwood
Name: Brian Atwood
Title: Managing Director

VERSANT SIDE FUND III, L.P.

By: Versant Ventures III, LLC,
its General Partner

By: /s/ Brian Atwood
Name: Brian Atwood
Title: Managing Director

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors' Rights Agreement as of the date first written above.

INVESTOR:

HARRIS & HARRIS GROUP, INC.

By: /s/ Sandra M. Forman
Name: Sandra M. Forman
Title: General Counsel

[Signature Page to Third Amended and Restated Investors' Rights Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors Rights Agreement as of the date first written above.

INVESTORS:

MASON WELLS OPGEN HOLDINGS, INC.

By: /s/ John J. Byrnes
Name: John J. Byrnes
Title:

[Signature Page to Third Amended and Restated Investors' Rights Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors Rights Agreement as of the date first written above.

INVESTORS:

MASON WELLS BIOMEDICAL FUND I LIMITED PARTNERSHIP

By: Mason Wells Biomedical Partners I, LLC,
General Partner

By: /s/ John J. Byrnes
Name: John J. Byrnes
Title:

[Signature Page to Third Amended and Restated Investors' Rights Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors Rights Agreement as of the date first written above.

INVESTORS:

CROSS CREEK CAPITAL, L.P.

By: Cross Creek Capital GP, L.P.
its Sole General Partner

By: Cross Creek Capital, LLC
its Sole General Partner

By: Wasatch Advisors, Inc.
its Sole Member

By: _[signature illegible]
Name:
Title:

CROSS CREEK CAPITAL EMPLOYEES' FUND, L.P.

By: Cross Creek Capital GP, L.P.
its Sole General Partner

By: Cross Creek Capital, LLC
its Sole General Partner

By: Wasatch Advisors, Inc.
its Sole Member

By: _[signature illegible]
Name:
Title:

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors Rights Agreement as of the date first written above.

INVESTORS:

OPGEN INVESTORS, LLC

By: /s/ Timothy Keane
Name: Timothy Keane
Title: Manager

VB PARTNERS

By: /s/ Gregory J. Lynch
Name: Gregory J. Lynch
Title: Partner

CAPITAL EXPRESS GROUP, LLC

By: /s/ Jean A. Sargent
Name: Jean A. Sargent
Title: Sole Principal

JOHN WHITEHEAD INDIVIDUAL RETIREMENT ACCOUNT

By: /s/ John Whitehead
Name: John Whitehead
Title:

/s/ W. Kent Velde
W. KENT VELDE

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors Rights Agreement as of the date first written above.

INVESTORS:

PAUL A. AND GLORIA M. FREDERICK REVOCABLE TRUST DATED THE 7TH OF FEBRUARY, 2011

By: /s/ Paul A. Frederick
Name: Paul A. Frederick

By: /s/ Gloria M. Frederick
Name: Gloria M. Frederick
Title: Trustees

/s/ Lon P. Frederick
LON P. FREDERICK

THUNDER RIVER LLC

By: /s/ Charles M. Fleischman
Name: Charles M. Fleischman
Title: Partner

/s/ Tyler Carruthers Covington
TYLER CARRUTHERS COVINGTON

/s/ Ryland A. Winston, JR.
RYLAND A. WINSTON, JR.

/s/ Virginia Collett
VIRGINIA COLLETT

/s/ John C. Lee IV
JOHN C. LEE IV

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors Rights Agreement as of the date first written above.

INVESTORS:

_____
NEIL D. COHEN

/s/ Michael D. Smith
MICHAEL DIEHL SMITH

/s/ Lynn Hoffman Henderson
LYNN HOFFMAN HENDERSON

/s/ J. Anthony Curcio
J. ANTHONY CURCIO

/s/ Suzanne M. Bond
SUZANNE M. BOND

/s/ Janice King Ivey
JANICE KING IVEY

/s/ William Martin Ivey
WILLIAM MARTIN IVEY

[Signature Page to Third Amended and Restated Investors' Rights Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Investors Rights Agreement as of the date first written above.

INVESTORS:

IN-Q-TEL, INC.

By: /s/ Matthew Strottman
Name: Matthew Strottman
Title: CFO

ALEXANDRIA EQUITIES, LLC

By: Alexandria Real Estate Equities, Inc.,
its managing member

By: /s/ Dean A. Shigenaga
Name: Dean A. Shigenaga
Title: Executive Vice President
Chief Financial Officer

SCHEDULE A

Investors

CHL Medical Partners III, L.P.
CHL Medical Partners III Side Fund, L.P.
1055 Washington Boulevard, 6th Floor
Stamford, CT 06901
Phone: (203) 324-7700
Fax: (203) 324-3636
Email: THowe@chlmedical.com

Versant Venture Capital III, L.P.
Versant Side Fund III, L.P.
3000 Sand Hill Road, Bldg 4, Suite 210
Menlo Park, CA 94025
Phone: (650) 233-7877
Fax : (650) 854-9513
Email: batwood@versantventures.com

jVen Capital, LLC
Evan Jones
Cynthia Jones
11009 Cripplegate Road
Potomac, MD 20854
Phone: (301) 299-2088
Fax: (240) 632-7401
Email: ej@jvencapital.com

Harris & Harris Group, Inc.
1450 Broadway, 24th Floor
New York, NY 10018
Phone: (212) 852-0900
Fax: (212) 852-9563
Email: closings@hhvc.com

Mason Wells Biomedical Fund I Limited Partnership
Mason Wells OpGen Holdings, Inc.
411 East Wisconsin Avenue, Suite 1280
Milwaukee, WI 53202
Phone: (414) 727-6400Fax: (414) 727-6410
Email: Trevor.D'Souza@masonwells.com

Cross Creek Capital, L.P.
Cross Creek Capital Employees' Fund, L.P.
150 Social Hall Avenue, 4th Floor
Salt Lake City, Utah 84111
Phone:
Fax:
Email: Ventureops@wasatchadvisors.com

OpGen Investors, LLC
2701 Zastrow Rd
Hartland, WI 53029
Phone:
Fax:
Email: tim@goldenangelsinvestors.com

VB Partners
c/o Michael Best & Friedrich LLP
1 South Pinckney Street, Suite 700
P.O. Box 1806
Madison, WI 53701
Phone:
Fax:
Email: gjlynch@michaelbest.com

Capital Express Group, LLC
888 17th Street, NW, #205
Washington, DC 20006
Phone:
Fax:
Email: jsargent@888realtyinvestors.com

John Whitehead Individual Retirement Account
c/o Tom Victory, Paragon Financial Management
721 US Highway One, #117
North Palm Beach, FL 33408
Phone:
Fax:
Email: whitehead@msn.com and tvictory@ix.netcom.com

W. Kent Velde
c/o Lakeview Equity Partners, LLC
700 N. Water Street, Suite 360
Milwaukee, WI 53202
Phone:
Fax:
Email: kvelde@lakeviewequity.com

Paul A. and Gloria M. Frederick Revocable Trust dated the 7th of February, 2011
Lon P. Frederick
1234 East Juneau Avenue
Milwaukee, WI 53202
Phone:
Fax:
Email: lf@investfrederick.com

Thunder River LLC
4319 Leland Street
Chevy Chase, MD 20815
Phone:
Fax:
Email: chuck@fleischman.org

Tyler Carruthers Covington
3018 Sunset Drive
Charlotte, NC 28209
Phone:
Fax:
Email: tcovington@collett.biz

Ryland A. Winston, Jr.
1111 Metropolitan Avenue
Ste. 700
Charlotte, NC 28204
Phone:
Fax:
Email: rwinston@collett.biz

Virginia Collett
2635 Sherwood Avenue
Charlotte, NC 28207
Phone:
Fax:
Email: jcollett@collett.biz

J. Anthony Curcio & Suzanne M. Bond JTWROS
4321 Castlewood Road
Charlotte, NC 28209-3042
Phone:
Fax:
Email: jcconsult@bellsouth.net

Janice King Ivey & William Martin Ivey JTWROS
5009 Sharon View Road
Charlotte, NC 28226
Phone:
Fax:
Email: jan@wellsfargochampionship.com

John C. Lee IV
12150 Monument Drive, Ste. 150
Fairfax, VA 22033
Phone:
Fax:
Email: jlee@leetechnologies.com

Neil D. Cohen
9001 Durham Drive
Potomac, MD 20854
Phone:
Fax:
Email: Neilco54@aol.com

Michael Diehl Smith
2520 Hampton Avenue
Charlotte, NC 28207
Phone:
Fax:
Email: msmith@collett.biz

Lynn Hoffman Henderson
319 Greengate Lane
Charlotte, NC 28211
Phone:
Fax:
Email: Lh7667@gmail.com

In-Q-Tel, Inc.
2107 Wilson Boulevard, 11th Floor
Arlington, VA 22201
Phone:
Fax:
Email: Ssuk@iqt.org

Alexandria Equities, LLC
c/o Alexandria Real Estate Equities, Inc.
385 East Colorado Boulevard, Ste 299
Pasadena, CA 91101
Phone:
Fax:
Email: investments@are.com

STOCKHOLDERS' AGREEMENTS AMENDMENT

This Stockholders' Agreement Amendment dated as of July 11, 2014 (the "Amendment") is an amendment to (i) the Third Amended and Restated Voting Agreement, dated as of December 18, 2013, as amended by Amendment No. 1 dated February 18, 2014 (the "**Voting Agreement**"), between the Company and the investors listed therein; (ii) the Third Amended and Restated Investors' Rights Agreement, dated as of December 18, 2013 (the "**Investors' Rights Agreement**"), between the Company and the investors listed therein; and (iii) the Third Amended and Restated Right of First Refusal and Co-Sale Agreement, dated as of December 18, 2013 (the "**ROFR Agreement**" and, together with the Voting Agreement and the Investors' Rights Agreement, the "**Stockholders' Agreements**").

WHEREAS, the undersigned Stockholders are holders of 70% of the Common Stock issued or issuable upon conversion of the shares of the Company's Series A Convertible Preferred Stock, par value $0.01 per share (the "**Series A Preferred**") held by the holders thereof (voting as a single class on an as-converted basis);

WHEREAS, Section 7.8 of the Voting Agreement allows for amendment of the Voting Agreement with the written consent of the Company and the holders of 70% of the Common Stock issued or issuable upon conversion of the shares of Series A Preferred Stock held by the holders thereof (voting as a single class on an as-converted basis).

WHEREAS, Section 6.6 of the Investors' Rights Agreement allows for amendment of the Investors' Rights Agreement with the written consent of the Company and the holders of a majority of the Registrable Securities (as defined in the Investors' Rights Agreement) then outstanding.

WHEREAS, Section 6.8 of the Voting Agreement allows for amendment of the ROFR Agreement with the written consent of the Company and the holders of 70% of the Common Stock issued or issuable upon conversion of the shares of Series A Preferred Stock held by the holders thereof (voting as a single class on an as-converted basis).

WHEREAS, the Board of Directors of the Company has determined that it is advisable and in the best interests of the Company to raise an aggregate of up to $1,500,000 (the "**July Financing**") pursuant to the issuance and sale of secured convertible notes (the "**July Notes**").

WHEREAS, the July Notes will be convertible into shares of either Series A Preferred or a new series of preferred stock of the Company, with rights, preferences, privileges and obligations determined by the Board of Directors, if issued in the next financing of the Company following the July Financing (the "**New Preferred Stock**").

WHEREAS, the Company and the undersigned Stockholders desire to amend the Stockholders' Agreements to ensure that the July Notes are included in the provisions of the Stockholders' Agreements.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereby agree as follows:

1. Any references to "Notes" in the Stockholders Agreements shall be deemed to include the July Notes.

2. The definition of "Capital Stock" as set forth in the ROFR Agreement shall be amended and restated as follows:

""**Capital Stock**" means (a) shares of Common Stock and Preferred Stock (whether now outstanding or hereafter issued in any context), (b) shares of Preferred Stock issuable upon conversion of the Notes, (c) shares of Common Stock issued or issuable upon conversion of Preferred Stock; (d) shares of Common Stock issued or issuable upon exercise or conversion, as applicable, of stock options, warrants or other convertible securities of the Company; and (e) stock options, warrants or other convertible securities of the Company, including Notes, in each case now owned or subsequently acquired by any Stockholder, or their respective successors or permitted transferees or assigns. For purposes of the number of shares of Capital Stock held by a Stockholder (or any other calculation based thereon), all Notes shall be deemed to have been converted into Preferred Stock at the then-applicable conversion price, and all shares of Preferred Stock shall be deemed to have been converted into Common Stock at the then-applicable conversion price."

3. Miscellaneous.

(a) Ratification of the Stockholders' Agreement. Except as specifically amended hereby, the Stockholders' Agreement shall remain in full force and effect and is hereby ratified and confirmed in all respects.

(b) Counterparts. This Amendment may be executed in any number of counterparts (including by facsimile or other electronic transmission), each of which shall be an original, but all of which together shall constitute one instrument.

(c) Governing Law. This Amendment shall be governed by and construed in accordance with the applicable provisions of the Stockholders' Agreement.

IN WITNESS WHEREOF, the parties have executed this Amendment as of the date first above written.

COMPANY:

OPGEN, INC.

By: /s/ C. Eric Winzer
Name: C. Eric Winzer
Title: Chief Financial Officer

[Signature Page to Stockholders' Agreements Amendment]

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

STOCKHOLDERS:

CHL MEDICAL PARTNERS III, L.P.

By: CHL Medical Partners III, LLC, its General Partner

By: /s/ Timothy Howe
Name: Timothy Howe
Title: EVP

CHL MEDICAL PARTNERS III SIDE FUND, L.P.

By: CHL Medical Partners III, LLC, its General Partner

By: /s/ Timothy Howe
Name: Timothy Howe
Title: EVP

[Signature Page to Stockholders' Agreements Amendment]

STOCKHOLDERS:

HARRIS & HARRIS GROUP, INC.

By: /s/ Daniel Wolfe
Name: Daniel Wolfe
Title: President

[Signature Page to Stockholders' Agreements Amendment]

STOCKHOLDERS:

jVEN CAPITAL, LLC

By: /s/ Evan Jones
Name: Evan Jones
Title: Authorized Signatory

[Signature Page to Stockholders' Agreements Amendment]

STOCKHOLDERS:

VERSANT VENTURE CAPITAL III, L.P.

By: Versant Ventures III, LLC,
its General Partner

By: /s/ Brian Atwood
Name: Brian Atwood
Title: Managing Director

VERSANT SIDE FUND III, L.P.

By: Versant Ventures III, LLC,
its General Partner

By: /s/ Brian Atwood
Name: Brian Atwood
Title: Managing Director

SECOND STOCKHOLDERS' AGREEMENTS AMENDMENT

This Second Stockholders' Agreements Amendment dated as of February 7, 2015 (this "Amendment") is an amendment to (i) the Third Amended and Restated Voting Agreement, dated as of December 18, 2013, as amended by Amendment No. 1 dated February 18, 2014 and by the Stockholders' Agreements Amendment dated as of July 11, 2014 (the "**Voting Agreement**"), among the Company and the investors listed therein; (ii) the Third Amended and Restated Investors' Rights Agreement, dated as of December 18, 2013, as amended by the Stockholders' Agreements Amendment dated as of July 11, 2014, among the Company and the investors listed therein (the "**Investors' Rights Agreement**");and (iii) the Third Amended and Restated Right of First Refusal and Co-Sale Agreement, dated as of December 18, 2013, as amended by the Stockholders' Agreements Amendment dated as of July 11, 2014, among the Company and the investors listed therein (the "**ROFR Agreement**" and, together with the Voting Agreement and the Investors' Rights Agreement, the "**Stockholders' Agreements**").

WHEREAS, the undersigned Stockholders are holders of 70% of the Common Stock issued or issuable upon conversion of the shares of the Company's Series A Convertible Preferred Stock, par value $0.01 per share (the "**Series A Preferred Stock**") held by the holders thereof (voting as a single class on an as-converted basis);

WHEREAS, Section 7.8 of the Voting Agreement allows for amendment of the Voting Agreement with the written consent of the Company and the holders of 70% of the Common Stock issued or issuable upon conversion of the shares of Series A Preferred Stock held by the holders thereof (voting as a single class on an as-converted basis).

WHEREAS, Section 6.6 of the Investors' Rights Agreement allows for amendment of the Investors' Rights Agreement with the written consent of the Company and the holders of a majority of the Registrable Securities (as defined in the Investors' Rights Agreement) then outstanding.

WHEREAS, Section 6.7 of the ROFR Agreement allows for amendment of the ROFR Agreement with the written consent of the Company and the holders of 70% of the Common Stock issued or issuable upon conversion of the shares of Series A Preferred Stock held by the holders thereof (voting as a single class on an as-converted basis).

WHEREAS, the Board of Directors of the Company has determined that it is advisable and in the best interests of the Company to raise an aggregate of up to $1,500,000 (the "**February Financing**") pursuant to the issuance and sale of secured convertible notes (the "**February Notes**") and warrants pursuant to that certain Notes Purchase Agreement by and among the Company and the investors named therein (as the same may be amended from time to time, the "**Purchase Agreement"**).

WHEREAS, the February Notes will be convertible (i) at the option of the holder, into shares of the Company's common stock, par value $0.01 per share (the "**Common Stock**"), at any time after the closing of a QPO (as defined in the Purchase Agreement); (ii) at the option of the holder, into either (a) shares of the Common Stock, or (b) shares of the Series A Preferred Stock, at a conversion rate of 1 share for each $1.00 of principal amount remaining, at any time after the closing of an initial public offering that is not a QPO; or (iii) at the option of the holder, into shares of the Series A Preferred Stock at a conversion rate of 1.25 shares for each $1.00 of principal amount remaining, if no initial public offering has been consummated.

WHEREAS, the Company and the undersigned Stockholders desire to amend the Stockholders' Agreements to ensure that the February Notes are included in the provisions of the Stockholders' Agreements, and to add confidentiality provisions to the Investors' Rights Agreement.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereby agree as follows:

1. Any references to "Notes" in the Stockholders Agreements shall be deemed to include the February Notes.

2. The Investors' Rights Agreement is hereby amended by inserting the following provision as Section 3.4 to the Investors' Rights Agreement:

"3.4 Confidentiality. Each Investor agrees that such Investor will keep confidential and will not disclose, divulge, or use for any purpose (other than to monitor its investment in the Company) any confidential information obtained from the Company pursuant to the terms of this Agreement (including notice of the Company's intention to file a registration statement), unless such confidential information (a) is known or becomes known to the public in general (other than as a result of a breach of this Section 3.4 by such Investor), (b) is or has been independently developed or conceived by the Investor without use of the Company's confidential information, or (c) is or has been made known or disclosed to the Investor by a third party without a breach of any obligation of confidentiality such third party may have to the Company; provided, however, that an Investor may disclose confidential information (i) to its attorneys, accountants, consultants, and other professionals to the extent necessary to obtain their services in connection with monitoring its investment in the Company; (ii) to any prospective purchaser of any Registrable Securities from such Investor, if such prospective purchaser agrees to be bound by the provisions of this Section 3.4; (iii) to any Affiliate, partner, member, stockholder, or wholly owned subsidiary of such Investor in the ordinary course of business, provided that such Investor informs such Person that such information is confidential and directs such Person to maintain the confidentiality of such information; or (iv) as may otherwise be required by law, provided that the Investor promptly notifies the Company of such disclosure and takes reasonable steps to minimize the extent of any such required disclosure."

3. Miscellaneous.

(a) Ratification of the Stockholders' Agreements. Except as specifically amended hereby, the Stockholders' Agreements shall remain in full force and effect and is hereby ratified and confirmed in all respects.

(b) Counterparts. This Amendment may be executed in any number of counterparts (including by facsimile or other electronic transmission), each of which shall be an original, but all of which together shall constitute one instrument.

(c) Governing Law. This Amendment shall be governed by and construed in accordance with the applicable provisions of the Stockholders' Agreements.

IN WITNESS WHEREOF, the parties have executed this Amendment as of the date first above written.

COMPANY:

OPGEN, INC.

By: /s/ C. Eric Winzer
Name: C. Eric Winzer
Title: Chief Financial Officer

[Signature Page to Second Stockholder's Agreements Amendment]

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

STOCKHOLDERS:

CHL MEDICAL PARTNERS III, L.P.

By: CHL Medical Partners III, LLC, its General Partner

By: /s/ Timothy Howe
Name: Timothy Howe
Title: EVP

CHL MEDICAL PARTNERS III SIDE FUND, L.P.

By: CHL Medical Partners III, LLC, its General Partner

By: /s/ Timothy Howe
Name: Timothy Howe
Title: EVP

[Signature Page to Second Stockholder's Agreements Amendment]

STOCKHOLDERS:

HARRIS & HARRIS GROUP, INC.

By: /s/ Daniel Wolfe
Name: Daniel Wolfe
Title:

[Signature Page to Second Stockholder's Agreements Amendment]

STOCKHOLDERS:

jVEN CAPITAL, LLC

By: /s/ Evan Jones
Name: Evan Jones
Title: Authorized Signatory

[Signature Page to Second Stockholder's Agreements Amendment]

STOCKHOLDERS:

VERSANT VENTURE CAPITAL III, L.P.

By: Versant Ventures III, LLC,
its General Partner

By: /s/ Brian Atwood
Name: Brian Atwood
Title: Managing Director

VERSANT SIDE FUND III, L.P.

By: Versant Ventures III, LLC,
its General Partner

By: /s/ Brian Atwood
Name: Brian Atwood
Title: Managing Director

[Signature Page to Second Stockholder's Agreements Amendment]

THIS WARRANT AND THE UNDERLYING SECURITIES HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED. THEY MAY NOT BE SOLD, OFFERED FOR SALE, PLEDGED OR HYPOTHECATED IN THE ABSENCE OF AN EFFECTIVE REGISTRATION STATEMENT AS TO SUCH SECURITIES UNDER THE ACT OR AN OPINION OF COUNSEL SATISFACTORY TO THE COMPANY THAT SUCH REGISTRATION IS NOT REQUIRED.

OPGEN, INC.

WARRANT TO PURCHASE COMMON STOCK

No. _____ _____, 201_

Void After _____, 20__

THIS CERTIFIES THAT, for value received, **_____**, with its principal office located at _____, or its assigns (the "***Holder***"), is entitled to subscribe for and purchase from **OpGen, Inc.**, a Delaware corporation, with its principal office at 708 Quince Orchard Road, Gaithersburg, Maryland 20878 (the "***Company***"), the Exercise Shares (as defined below) at the Exercise Price (as defined below).

1. DEFINITIONS. As used herein, the following terms shall have the following respective meanings:

1.1 ***"Acceleration Event"*** means (i) a Deemed Liquidation Event, or (ii) an IPO (as defined in Section 7); provided, however, that a transaction shall not constitute an Acceleration Event if its sole purpose is to change the state of the Company's incorporation. Notwithstanding the prior sentence, the sale of shares of capital stock of the Company in a financing transaction other than in IPO shall not be deemed an "Acceleration Event."

1.2 ***"Deemed Liquidation Event"*** has the meaning set forth in the Restated Certificate.

1.3 ***"Exercise Period"*** means the period commencing on the date hereof and ending _____, 20__, unless sooner automatically exercised pursuant to Section 7 below. In the event the Company proposes to consummate an Acceleration Event, this Warrant shall be deemed to have occurred immediately prior to the consummation of such Acceleration Event pursuant to Section 7.

1.4 ***"Exercise Price"*** means $_____ per share.

1.5 ***"Exercise Shares"*** means _____ (_____) shares of Common Stock purchasable upon exercise of this Warrant or issuable upon conversion of this Warrant. Notwithstanding the foregoing, this Warrant shall become fully vested immediately prior to the consummation of an Acceleration Event.

1.6 ***"Restated Certificate"*** means the Ninth Amended and Restated Certificate of Incorporation of the Company, as the same may be further amended, or amended and restated.

1.7 ***"Common Stock***" means the Company's Common Stock, par value $0.01 per share.

2. EXERCISE OF WARRANT. The rights represented by this Warrant may be exercised in whole or in part at any time during the Exercise Period, by delivery of the following to the Company at its address set forth above (or at such other address as it may designate by notice in writing to the Holder):

2.1 an executed Notice of Exercise in the form attached hereto;

2.2 payment of the Exercise Price either (i) in cash or by check, (ii) by cancellation of indebtedness, (iii) by net exercise pursuant to Section 2.4 or (iv) any combination of the foregoing; and

2.3 this Warrant.

Upon the exercise of the rights represented by this Warrant, a certificate or certificates for the Exercise Shares so purchased, registered in the name of the Holder or persons affiliated with the Holder, if the Holder so designates, shall be issued and delivered to the Holder within a reasonable time after the rights represented by this Warrant shall have been so exercised. In the event that this Warrant is being exercised for less than all of the then-current number of Exercise Shares purchasable hereunder, the Company shall, concurrently with the issuance by the Company of the number of Exercise Shares for which this Warrant is then being exercised, issue a new Warrant exercisable for the remaining number of Exercise Shares purchasable hereunder.

The person in whose name any certificate or certificates for Exercise Shares are to be issued upon exercise of this Warrant shall be deemed to have become the holder of record of such shares on the date on which this Warrant was surrendered and payment of the Exercise Price was made, irrespective of the date of delivery of such certificate or certificates, except that, if the date of such surrender and payment is a date when the stock transfer books of the Company are closed, such person shall be deemed to have become the holder of such shares at the close of business on the next succeeding date on which the stock transfer books are open.

2.4 **Net Exercise**. Notwithstanding any provisions herein to the contrary, if the fair market value of one Exercise Share is greater than the Exercise Price (at the date of calculation as set forth below), in lieu of exercising this Warrant by payment of cash, the Holder may elect to receive shares equal to the value (as determined below) of this Warrant (or the portion thereof being canceled) by surrender of this Warrant at the principal office of the Company together with the properly endorsed Notice of Exercise in which event the Company shall issue to the Holder a number of Exercise Shares computed using the following formula:

$$X = \frac{Y\,(A-B)}{A}$$

Where X= the number of Exercise Shares to be issued to the Holder

Y = the number of Exercise Shares purchasable under the Warrant or, if only a portion of the Warrant is being exercised, the portion of the Warrant being canceled (at the date of such calculation)

A = the fair market value of one Exercise Share (at the date of such calculation)

B = Exercise Price (as adjusted to the date of such calculation)

For purposes of the above calculation, the fair market value of one Exercise Share shall be determined by the Company's Board of Directors in good faith; provided, however, that in the event that this Warrant is exercised pursuant to this Section 2.4 in connection with the IPO (as defined in Section 7), the fair market value per share shall be the per share offering price to the public in the IPO.

3. COVENANTS OF THE COMPANY.

3.1 **Covenants as to Exercise Shares**. The Company covenants and agrees that all Exercise Shares that may be issued upon the exercise of the rights represented by this Warrant will, upon issuance, be validly issued and outstanding, fully paid and non-assessable, and free from all taxes, liens and charges with respect to the issuance thereof. The Company further covenants and agrees that the Company will at all times during the Exercise Period, have authorized and reserved, free from preemptive rights, a sufficient number of Exercise Shares to provide for the exercise of the rights represented by this Warrant, and a sufficient number of the Company's Common Stock issuable upon conversion of such Exercise Shares. If at any time during the Exercise Period the number of authorized but unissued Exercise Shares shall not be sufficient to permit exercise of this Warrant, or the number of authorized but unissued Common Stock is insufficient to permit the issuance of such Common Stock upon conversion of the Exercise Shares, the Company will take such corporate action as may, in the opinion of its counsel, be necessary to increase its authorized but unissued Exercise Shares or Common Stock to such number of shares as shall be sufficient for such purposes.

3.2 **Notices of Record Date**. In the event of any taking by the Company of a record of the holders of any class of securities for the purpose of determining the holders thereof who are entitled to receive any dividend (other than a cash dividend which is the same as cash dividends paid in previous quarters) or other distribution, or any right to subscribe for, purchase, sell or otherwise acquire or dispose of any shares of stock of any class or any other securities or property, or to receive any other right; the Company shall mail to the Holder, at least ten (10) days prior to the date specified herein, a notice specifying the date on which any such record is to be taken for the purpose of such dividend or distribution.

4. REPRESENTATIONS OF HOLDER.

4.1 **Acquisition of Warrant for Personal Account**. The Holder represents and warrants that it is acquiring the Warrant and the Exercise Shares solely for its account for investment and not with a view to or for sale or distribution of said Warrant or Exercise Shares or any part thereof. The Holder also represents that the entire legal and beneficial interests of the Warrant and Exercise Shares the Holder is acquiring is being acquired for, and will be held for, its account only.

4.2 **Corporate Information**. The Holder has had the full and complete opportunity to discuss the Company's business, management and financial affairs with directors, officers and management of the Company and has had the full and complete opportunity to review the Company's operations and facilities. The Holder has also had the opportunity to ask questions of and receive answers from, the Company and its management regarding the terms and conditions herein.

4.3 **Economic Risk and Protection of Interest.**

(a) The Holder has substantial experience in evaluating and investing in private placement transactions of securities in companies similar to the Company so that it is capable of evaluating the merits and risks of its investment in the Company and has the capacity to protect its own interests. The Holder must bear the economic risk of this investment indefinitely unless the Exercise Shares are registered pursuant to the Securities Act of 1933, as amended (the "***Act***"), or an exemption from registration is available. The Holder understands that the Company has no present intention of registering the Exercise Shares. The Holder also understands that there is no assurance that any exemption from registration under the Act will be available and that, even if available, such exemption may not allow the Holder to transfer all or any portion of the Warrant or the Exercise Shares under the circumstances, in the amounts or at the times the Holder might propose.

(b) The Holder represents that by reason of its, or of its management's, business or financial experience, the Holder has the capacity to protect its own interests in connection with the transactions contemplated herein. Further, the Holder is aware of no publication of any advertisement in connection with the transactions contemplated herein.

4.4 **U.S. Purchasers.**

(a) **Securities Are Not Registered.**

(i) The Holder understands that the Warrant and the Exercise Shares have not been registered under the Act on the basis that no distribution or public offering of the stock of the Company is to be effected. The Holder realizes that the basis for the exemption may not be present if, notwithstanding its representations, the Holder has a present intention of acquiring the securities for a fixed or determinable period in the future, selling (in connection with a distribution or otherwise), granting any participation in, or otherwise distributing the securities. The Holder has no such present intention.

(ii) The Holder recognizes that the Warrant and the Exercise Shares must be held indefinitely unless they are subsequently registered under the Act or an exemption from such registration is available. The Holder recognizes that the Company has no obligation to register the Warrant or the Exercise Shares of the Company, or to comply with any exemption from such registration.

(iii) The Holder is aware that neither the Warrant nor the Exercise Shares may be sold pursuant to Rule 144 adopted under the Act unless certain conditions are met, including, among other things, the existence of a public market for the shares, the availability of certain current public information about the Company, the resale following the required holding period under Rule 144 and the number of shares being sold not exceeding specified limitations. Holder is aware that the conditions for resale set forth in Rule 144 have not been satisfied and that the Company presently has no plans to satisfy these conditions in the foreseeable future.

(b) **Accredited Investor**. The Holder represents that it is an "***accredited investor***" within the meaning of Regulation D under the Act.

4.5 **Foreign Holder**. The Holder is not a "U.S. Person" (as defined under Regulation S under the Act) and represents that the Warrant and the Exercise Shares to be purchased by the foreign Holder will be acquired for investment for the foreign Holder's own account, not as a nominee or agent, and not for the account or benefit of, a U.S. Person, and not with a view to the resale or distribution of any part thereof in the United States and that the foreign Holder has no present intention of selling, granting any participation in, or otherwise distributing the same.

(a) The foreign Holder understands that the Warrant and the Exercise Shares are not registered under the Act on the ground that the sale provided for in the Agreement and the issuance of securities thereunder is exempt from registration under the Act pursuant to Regulation S thereof, and that the Company's reliance on such exemption is predicated on the foreign Holder's representations set forth herein. The foreign Holder hereby agrees to resell the Warrant and the Exercise Shares only in accordance with the provisions of Regulation S, pursuant to registration under the Act, or pursuant to an exemption from registration. The foreign Holder further agrees not to engage in hedging transactions with regard to such Warrant and Exercise Shares unless in compliance with the Act.

(b) Such foreign Holder hereby represents that it has satisfied itself as to the full observance of the laws of its jurisdiction in connection with any invitation to purchase the Warrant and the Exercise Shares or any use of this Agreement, including (i) the legal requirements within its jurisdiction for the purchase of the Warrant and the Exercise Shares, (ii) any foreign exchange restrictions applicable to such purchase, (iii) any government or other consents that may need to be obtained, and (iv) the income tax and other tax consequences, if any, that may be relevant to the purchase, holding, redemption, sale or transfer of the Warrant or the Exercise Shares. Such foreign Holder's subscription and payment for and continued beneficial ownership of the Warrant and the Exercise Shares will not violate any applicable securities or other laws of such Holder's jurisdiction.

4.6 **Residence**. If the Holder is an individual, then the Holder resides in the state or province identified in the address of the Holder set forth below; if the Holder is a partnership, corporation, limited liability company or other entity, then the office or offices of the Holder in which its investment decision was made is located at the address or addresses of the Holder set forth herein.

4.7 **Disposition of Warrant and Exercise Shares.**

(a) The Holder further agrees not to make any disposition of all or any part of the Warrant or Exercise Shares in any event unless and until:

(i) the Company shall have received a letter secured by the Holder from the Securities and Exchange Commission stating that no action will be recommended to the Commission with respect to the proposed disposition;

(ii) there is then in effect a registration statement under the Act covering such proposed disposition and such disposition is made in accordance with said registration statement; or

(iii) the Holder shall have notified the Company of the proposed disposition and shall have furnished the Company with a detailed statement of the circumstances surrounding the proposed disposition, and if reasonably requested by the Company, the Holder shall have furnished the Company with an opinion of counsel, reasonably satisfactory to the Company, for the Holder to the effect that such disposition will not require registration of such Warrant or Exercise Shares under the Act or any applicable state securities laws.

Notwithstanding anything to the contrary herein, the Holder may transfer or assign this Warrant, in whole or in part, without providing the Company an opinion of counsel or any other documentation to a charitable organization if the Company becomes the subject of foreign ownership, control or influence, provided that the Holder and transferee or assignee execute and deliver the Assignment Form (attached hereto) and the transferee signs an investment letter with the representations set forth in paragraph 3 of the attached Notice of Exercise form.

(b) The Holder understands and agrees that all certificates evidencing the shares to be issued to the Holder may bear the following legend:

THESE SECURITIES HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "***ACT***"). THEY MAY NOT BE SOLD, OFFERED FOR SALE, PLEDGED OR HYPOTHECATED IN THE ABSENCE OF AN EFFECTIVE REGISTRATION STATEMENT AS TO THE SECURITIES UNDER THE ACT OR AN OPINION OF COUNSEL SATISFACTORY TO THE COMPANY THAT SUCH REGISTRATION IS NOT REQUIRED.

5. ADJUSTMENT OF EXERCISE PRICE AND NUMBER OF EXERCISE SHARES. In the event of changes in the outstanding Common Stock of the Company by reason of stock dividends, splits, recapitalizations, reclassifications, combinations or exchanges of shares, separations, reorganizations, liquidations, or the like, the number and class of Exercise Shares available under the Warrant in the aggregate and the Exercise Price shall be correspondingly adjusted to give the Holder of the Warrant, on exercise for the same aggregate Exercise Price, the total number, class, and kind of shares as the Holder would have owned had the Warrant been exercised prior to the event and had the Holder continued to hold such shares until after the event requiring adjustment. The form of this Warrant need not be changed because of any adjustment in the number of Exercise Shares subject to this Warrant.

6. FRACTIONAL SHARES. No fractional shares shall be issued upon the exercise of this Warrant as a consequence of any adjustment pursuant hereto. All Exercise Shares (including fractions) issuable upon exercise of this Warrant may be aggregated for purposes of determining whether the exercise would result in the issuance of any fractional share. If, after aggregation, the exercise would result in the issuance of a fractional share, the Company shall, in lieu of issuance of any fractional share, pay the Holder otherwise entitled to such fraction a sum in cash equal to the product resulting from multiplying the then current fair market value of an Exercise Share by such fraction.

7. EARLY EXERCISE. In the event of, at any time during the Exercise Period, an initial public offering of securities of the Company registered under the Act (an "***IPO***"), or Deemed Liquidation Event, the Company shall provide to the Holder twenty (20) days advance written notice of such IPO or Deemed Liquidation Event, and this Warrant shall be deemed exercised pursuant to Section 2 immediately prior to the date such IPO is closed or the occurrence of such Deemed Liquidation Event.

8. TRANSFER OF WARRANT. Upon the written consent of the Company, and subject to applicable laws and the restriction on transfer set forth on the first page of this Warrant, this Warrant and all rights hereunder are transferable, by the Holder in person or by duly authorized attorney, upon delivery of this Warrant and the form of assignment attached hereto to any transferee designated by Holder. The transferee shall sign an investment letter with the representations set forth in paragraph 3 of the attached Notice of Exercise form.

9. NO STOCKHOLDER RIGHTS. This Warrant in and of itself shall not entitle the Holder to any voting rights or other rights as a stockholder of the Company.

10. LOST, STOLEN, MUTILATED OR DESTROYED WARRANT. If this Warrant is lost, stolen, mutilated or destroyed, the Company may, on such terms as to indemnity or otherwise as it may reasonably impose (which shall, in the case of a mutilated Warrant, include the surrender thereof), issue a new Warrant of like denomination and tenor as the Warrant so lost, stolen, mutilated or destroyed. Any such new Warrant shall constitute an original contractual obligation of the Company, whether or not the allegedly lost, stolen, mutilated or destroyed Warrant shall be at any time enforceable by anyone.

11. NOTICES, ETC. All notices required or permitted hereunder shall be in writing and shall be deemed effectively given: (a) upon personal delivery to the party to be notified, (b) when sent by confirmed facsimile if sent during normal business hours of the recipient, if not, then on the next business day, (c) when read by electronic mail (sender shall received a read by recipient confirmation), (d) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid, or (e) one (1) business day after deposit with a nationally recognized overnight courier, specifying next day delivery, with written verification of receipt. All communications shall be sent to the Company at the address listed on the signature page and to Holder at the address listed on the signature page, or at such other address as the Company or Holder may designate by ten (10) days advance written notice to the other parties hereto.

12. ACCEPTANCE. Receipt of this Warrant by the Holder shall constitute acceptance of and agreement to all of the terms and conditions contained herein.

13. GOVERNING LAW. This Warrant and all rights, obligations and liabilities hereunder shall be governed by and construed under the laws of the State of Delaware in all respects as such laws are applied to agreements among Delaware residents entered into and performed entirely within Delaware. THE COMPANY AND THE HOLDER HEREBY WAIVE THEIR RIGHT TO A TRIAL BY JURY WITH RESPECT TO DISPUTES ARISING UNDER THIS WARRANT AND CONSENT TO A BENCH TRIAL WITH THE APPROPRIATE JUDGE ACTING AS THE FINDER OF FACT.

14. AMENDMENT AND WAIVER. Any term of this Warrant may be amended or waived with the written consent of (a) the Company and (b) the Holder.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Company has caused this Warrant to be executed by its duly authorized officer as the date first written above.

OPGEN, INC.

By:_____
Name:
Title:

Address: 708 Quince Orchard Road
Gaithersburg, Maryland 20878

Holder:
Number of Shares:
Date:

[Signature Page to Common Stock Warrant]

NOTICE OF EXERCISE

TO: OPGEN, INC.

(1) The undersigned hereby elects to purchase _____ shares of the Common Stock of **OpGen, Inc.** (the "***Company***") pursuant to the terms of the attached Warrant, and tenders herewith payment of the exercise price in full, together with all applicable transfer taxes, if any.

The undersigned hereby elects to purchase _____ shares of the Common Stock of **OpGen, Inc.** (the "***Company***") pursuant to the terms of the net exercise provisions set forth in Section 2 of the attached Warrant, and shall tender payment of all applicable transfer taxes, if any.

(2) Please issue a certificate or certificates representing said shares of Common Stock in the name of the undersigned or in such other name as is specified below:

_____
(Name)
_____
_____
(Address)

(3) The undersigned represents that (i) the aforesaid shares of Common Stock are being acquired for the account of the undersigned for investment and not with a view to, or for resale in connection with, the distribution thereof and that the undersigned has no present intention of distributing or reselling such shares; (ii) the undersigned is aware of the Company's business affairs and financial condition and has acquired sufficient information about the Company to reach an informed and knowledgeable decision regarding its investment in the Company; (iii) the undersigned is experienced in making investments of this type and has such knowledge and background in financial and business matters that the undersigned is capable of evaluating the merits and risks of this investment and protecting the undersigned's own interests; (iv) the undersigned understands that the shares of Common Stock issuable upon exercise of this Warrant have not been registered under the Securities Act of 1933, as amended (the "***Securities Act***"), by reason of a specific exemption from the registration provisions of the Securities Act, which exemption depends upon, among other things, the bona fide nature of the investment intent as expressed herein, and, because such securities have not been registered under the Securities Act, they must be held indefinitely unless subsequently registered under the Securities Act or an exemption from such registration is available; (v) the undersigned is aware that the aforesaid shares of Common Stock may not be sold pursuant to Rule 144 adopted under the Securities Act unless certain conditions are met and until the undersigned has held the shares for the number of years prescribed by Rule 144, that among the conditions for use of the Rule is the availability of current information to the public about the Company and the Company has not made such information available and has no present plans to do so; and (vi) the undersigned agrees not to make any disposition of all or any part of the aforesaid shares of Common Stock unless and until there is then in effect a registration statement under the Securities Act covering such proposed disposition and such disposition is made in accordance with said registration statement, or the undersigned has provided the Company with an opinion of counsel satisfactory to the Company, stating that such registration is not required.

_____ _____
(Date) (Signature)

_____
(Print Name)

ASSIGNMENT FORM

(To assign the foregoing Warrant, execute this form and supply required information. Do not use this form to purchase shares.)

FOR VALUE RECEIVED, the foregoing Warrant and all rights evidenced thereby are hereby assigned to

Name: _____
(Please Print)

Address: _____
(Please Print)

Dated: _____, 20___

Holder's
Signature: _____

Holder's
Address: _____

NOTE: The signature to this Assignment Form must correspond with the name as it appears on the face of the Warrant, without alteration or enlargement or any change whatever. Officers of corporations and those acting in a fiduciary or other representative capacity should file proper evidence of authority to assign the foregoing Warrant.

Ballard Spahr LLP

1735 Market Street, 51st Floor
Philadelphia, PA 19103-7599
TEL 215.665.8500
FAX 215.864.8999
www.ballardspahr.com

March 3, 2015

OpGen, Inc.
708 Quince Orchard Road
Gaithersburg, MD 20878

Re: OpGen, Inc.

Ladies and Gentlemen:

We have acted as counsel to OpGen, Inc., a Delaware corporation (the "Company") and are rendering this opinion in connection with the filing of a Registration Statement on Form S-1 (the "Registration Statement") by the Company with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), with respect to shares of the Company's common stock, par value $0.01 per share (the "Common Stock"), with a proposed maximum aggregate offering price of $30,000,000.00 (the "Initial Shares"), plus shares of Common Stock to cover a 15% over-allotment option upon exercise, if applicable (the "Over-Allotment Shares" and together with the Initial Shares, the "Shares").

We have examined originals or copies, certified or otherwise identified to our satisfaction, of (i) the Registration Statement, (ii) a form of the Tenth Amended and Restated Certificate of Incorporation of the Company, filed with the Registration Statement, and (iii) the Amended and Restated Bylaws of the Company, filed with the Registration Statement. We have also examined such corporate records and other agreements, documents and instruments, and such certificates or comparable documents of public officials and officers and representatives of the Company, and have made such inquiries of such officers and representatives and have considered such matters of law as we have deemed appropriate as the basis for the opinions hereinafter set forth.

In delivering this opinion, we have assumed the genuineness of all signatures, the legal capacity of natural persons, the authenticity of all documents submitted to us as originals, the conformity to originals of all documents submitted to us as certified, photostatic or conformed copies, the authenticity of originals of all such latter documents, and the accuracy and completeness of all records, information and statements submitted to us by officers and representatives of the Company. In making our examination of documents executed by parties other than the Company, we have assumed that such parties had the power, corporate or other, to enter into and perform all obligations thereunder and have also assumed the due authorization of all requisite action, corporate or other, and execution and delivery by such parties of such documents and the validity and binding effect thereof with respect to such parties.

Based upon and subject to the limitations, qualifications and assumptions set forth herein, we are of the opinion that the Shares to be issued and sold by the Company have been duly authorized for issuance and, when issued and paid for in accordance with the terms and conditions of the Agreement, will be validly issued, fully paid and non-assessable shares of Common Stock.

We express no opinion as to the laws of any jurisdiction other than the federal laws of the United States of America and the laws of the State of Delaware.

We hereby consent to the filing of this opinion with the Commission as an exhibit the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K promulgated under the Securities Act, and to the use of this firm's name therein and in the Registration Statement under the caption "Legal Matters." In giving such consent, we do not hereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission thereunder.

Sincerely yours,

/s/ Ballard Spahr LLP

LEASE AGREEMENT

THIS LEASE AGREEMENT ("**this Lease**") is made as of this 30th day of June, 2008, between **ARE-708 QUINCE ORCHARD, LLC**, a Delaware limited liability company ("**Landlord**"), and **OPGEN, INC.**, a Delaware corporation ("**Tenant**").

BASIC LEASE PROVISIONS

Address: Suite 220, 708 Quince Orchard Road, Gaithersburg, Maryland 20878.

Premises: That portion of the Project, containing a total of approximately 14,812 rentable square feet, as determined by Landlord, as shown on **Exhibit A**, comprised of approximately 5,818 rentable square feet located on the 1st floor ("**First Floor Premises**") and approximately 8,994 rentable square feet located on the 2nd floor.

Project: The real property on which the building ("Building") in which the Premises are located, together with all improvements thereon and appurtenances thereto as described on **Exhibit B**.

Base Rent: $26,229.58, per month

Rentable Area of Premises: 14,812 sq. ft.

Rentable Area of Project: 49,624 sq. ft.

Tenant's Share of Operating Expenses: 29.85%

Security Deposit: $52,459.17

Target Rent Commencement Date: July 1, 2008

Rent Adjustment Percentage: 3%

Base Term: Beginning on the Commencement Date and ending 38 months from the first day of the first full month following the Rent Commencement Date.

Permitted Use: research and development laboratory, laboratory production, related office and other related uses consistent with the character of the Project and otherwise in compliance with the provisions of Section 7 hereof. For purposes of this Lease, "**laboratory production**" means the packaging (but not manufacture) of materials to be used in laboratory based kits in accordance with this Lease (including, but not limited to, Section 30), and the packaging of instruments (but not the manufacture of such instruments) to be sent to third parties.

Address for Rent Payment:
Arco Plaza Station
Box No. 711029
Los Angeles, California 90071

Landlord's Notice Address:
385 E. Colorado Blvd., Suite 299
Pasadena, California 91101
Attention: Corporate Secretary

Tenant's Notice Address (before Rent Commencement Date):
OpGen, Inc.
Attention: John Henkhaus, Vice President, Operations
510 Charmany Drive
Suite 151
Madison, Wisconsin 53719

Tenant's Notice Address (from and after Rent Commencement Date):
OpGen, Inc.
Attention: John Henkhaus, Vice President, Operations
Suite 220
708 Quince Orchard Road
Gaithersburg, Maryland 20878

The following Exhibits and Addenda are attached hereto and incorporated herein by this reference:

[X] EXHIBIT A - PREMISES DESCRIPTION
[X] EXHIBIT B - DESCRIPTION OF PROJECT
[X] EXHIBIT C - LANDLORD'S WORK
[X] EXHIBIT D - COMMENCEMENT DATE
[X] EXHIBIT E - RULES AND REGULATIONS
[X] EXHIBIT F – TENANT'S PERSONAL PROPERTY

1. **Lease of Premises**. Upon and subject to all of the terms and conditions hereof, Landlord hereby leases the Premises to Tenant and Tenant hereby leases the Premises from Landlord. The portions of the Project which are for the non-exclusive use of tenants of the Project are collectively referred to herein as the "**Common Areas**." Landlord reserves the right to modify Common Areas, provided that such modifications do not materially adversely affect Tenant's use of the Premises for the Permitted Use.

2. **Delivery; Acceptance of Premises; Commencement Date**. Landlord shall use reasonable efforts to deliver the Premises to Tenant on or before the Target Rent Commencement Date ("**Delivery**" or "**Deliver**"). If Landlord fails to timely Deliver the Premises, Landlord shall not be liable to Tenant for any loss or damage resulting therefrom, and this Lease shall not be void or voidable except as provided herein. If Landlord does not Deliver the Premises within 60 days of the Target Rent Commencement Date for any reason other than Force Majeure Delays and Tenant Delays, this Lease may be terminated by Landlord or Tenant by written notice to the other, and if so terminated by either (a) the Security Deposit, or any balance thereof (i.e., after deducting therefrom all amounts to which Landlord is entitled under the provisions of this Lease), shall be returned to Tenant, and (b) neither Landlord nor Tenant shall have any further rights, duties or obligations under this Lease, except with respect to provisions which expressly survive termination of this Lease. Landlord shall use reasonable efforts to Substantially Complete Landlord's Work within 90 days after the Rent Commencement Date (subject to Force Majeure Delays and Tenant Delays), and Tenant shall cooperate with Landlord during Landlord's performance of the Landlord's Work. As used herein, (i) "**Landlord's Work**" means the work to be performed by Landlord at its sole cost and expense described on **Exhibit C**, (ii) "**Force Majeure Delays**" means delays arising by reason of any Force Majeure (as defined in Section 34), (iii) "**Tenant Delays**" means (A) Tenant's request for changes to Landlord's Work, regardless of whether any such changes are performed, (B) construction of any such changes, (C) Tenant's request for materials, finishes or installations requiring unusually long lead times, (D) Tenant's delay in reviewing, revising, or approving any plans and specifications relating to Landlord's Work, (E) Tenant's delay in providing information critical to the normal progression of the Project (Tenant shall provide such information as soon as reasonably possible, but in no event longer than one week after receipt of any request for such information from Landlord), and (F) any other act or omission by Tenant or any Tenant Party, or persons employed by any of such persons, and (iv) "**Substantially Completed**" means the substantial completion of Landlord's Work (A) in a good and workmanlike manner, (B) in accordance with the requirements described in **Exhibit C**, and (C) in accordance with all applicable Legal Requirements (including, but not limited to, obtaining the applicable building final permit for Landlord's Work), subject only to normal "punch list" items. Landlord will promptly complete such punch list items. If neither Landlord nor Tenant elects to void this Lease within 5 business days of the lapse of such 60 day period, such right to void this Lease shall be waived and this Lease shall remain in full force and effect.

The "**Commencement Date**" shall mean the date of the full execution of this Lease. The "**Rent Commencement Date**" shall be the *earliest* of: (i) the date Landlord Delivers the Premises to Tenant, and (ii) the date Tenant conducts any business in the Premises or any part thereof. Upon request of Landlord, Tenant shall execute and deliver a written acknowledgment of the Commencement Date, the Rent Commencement Date and the expiration date of the Term when such are established in the form of the "Acknowledgement of Commencement Date" attached to this Lease as **Exhibit D**; provided, however, that Tenant's failure to execute and deliver such acknowledgment shall not affect Landlord's rights hereunder. The "**Term**" of this Lease shall be the Base Term, as defined above in the Basic Lease Provisions and the Extension Term that Tenant may elect pursuant to Section 40 hereof.

Except for Landlord's Work as described in **Exhibit C**: (i) Tenant shall accept the Premises in their condition as of the Commencement Date, subject to all applicable Legal Requirements (as defined in Section 7 hereof); (ii) Landlord shall have no obligation for any defects in the Premises; and (iii) Tenant's taking possession of the Premises shall be conclusive evidence that Tenant accepts the Premises and that the Premises were in good condition at the time possession was taken, subject to the right of Tenant under **Exhibit C** to identify certain latent defects. Any occupancy of the Premises by Tenant before the Commencement Date shall be subject to all of the terms and conditions of this Lease, other than the obligation to pay Rent.

Tenant agrees and acknowledges that neither Landlord nor any agent of Landlord has made any representation or warranty with respect to the condition of all or any portion of the Premises or the Project, and/or the suitability of the Premises or the Project for the conduct of Tenant's business, and Tenant waives any implied warranty that the Premises or the Project are suitable for the Permitted Use. This Lease constitutes the complete agreement of Landlord and Tenant with respect to the subject matter hereof and supersedes any and all prior representations, inducements, promises, agreements, understandings and negotiations which are not contained herein. Landlord in executing this Lease does so in reliance upon Tenant's representations, warranties, acknowledgments and agreements contained herein.

3. **Rent**.

(a) **Base Rent**. The first month's Base Rent (which shall be credited against the first month that Base Rent is due) and the Security Deposit shall be due and payable on delivery of an executed copy of this Lease to Landlord. Beginning on the Rent Commencement Date (but subject to the rental abatement described in Section 4(a)), Tenant shall pay to Landlord in advance, without demand, abatement, deduction or set-off, monthly installments of Base Rent on or before the first day of each calendar month during the Term hereof, in lawful money of the United States of America, at the office of Landlord for payment of Rent set forth above, or to such other person or at such other place as Landlord may from time to time designate in writing upon 30 days' prior written notice to Tenant. Payments of Base Rent for any fractional calendar month shall be prorated. The obligation of Tenant to pay Base Rent and other sums to Landlord and the obligations of Landlord under this Lease are independent obligations. Tenant shall have no right at any time to abate, reduce, or set-off any Rent (as defined in Section 5) due hereunder except for any abatement as may be expressly provided in this Lease.

(b) **Additional Rent**. In addition to Base Rent, Tenant agrees to pay to Landlord as additional rent ("**Additional Rent**"): (i) Tenant's Share of "Operating Expenses" (as defined in Section 5), and (II) any and all other amounts Tenant assumes or agrees to pay under the provisions of this Lease, including, without limitation, any and all other sums that may become due by reason of any default of Tenant or failure to comply with the agreements, terms, covenants and conditions of this Lease to be performed by Tenant, after any applicable notice and cure period.

4. **Base Rent Adjustments**. Base Rent shall be increased on each anniversary of the first day of the first full month during the Term of this Lease (each an "**Adjustment Date**") by multiplying the Base Rent payable immediately before such Adjustment Date by the Rent Adjustment Percentage and adding the resulting amount to the Base Rent payable immediately before such Adjustment Date. Base Rent, as so adjusted, shall thereafter be due as provided herein. Base Rent adjustments for any fractional calendar month shall be prorated.

(a) Notwithstanding anything to the contrary contained in this Lease, but provided Tenant is not in Default hereunder, Landlord hereby grants Tenant an abatement of the Base Rent and Operating Expenses payable during the period from the Rent Commencement Date until the expiration of the second full calendar month after the calendar month in which the Rent Commencement Date occurs. Thereafter, Tenant shall pay the full amount of Base Rent and Operating Expenses due in accordance with the provisions of this Lease. Notwithstanding anything to the contrary in this Section 4(a), the adjustment in the Base Rent as set forth in this Section 4 shall be based on the full and unabated amount of Base Rent payable for the first 12 month period from and after the Rent Commencement Date.

5. **Operating Expense Payments**. Landlord shall deliver to Tenant a reasonable written estimate of Operating Expenses for each calendar year during the Term ("**Annual Estimate**"), which may be reasonably revised by Landlord from time to time during such calendar year. Beginning on the Rent Commencement Date (but subject to the rental abatement described in Section 4(a)), Tenant shall pay Landlord on or before the first day of each calendar month during the Term hereof an amount equal to 1/12th of Tenant's Share of the Annual Estimate. Payments for any fractional calendar month shall be prorated.

The term "**Operating Expenses**" means all costs and expenses of any kind or description whatsoever incurred or accrued each calendar year by Landlord with respect to the Project (including, without duplication, Taxes (as defined in Section 9), reasonable reserves consistent with good business practice for future repairs and replacements, capital repairs and improvements amortized over the lesser of 7 years and the useful life of such capital items, the costs of Landlord's third party property manager or, if there is no third party property manager, administration rent in the amount of 4% of Base Rent, and the costs and expenses for maintaining, repairing, replacing, and operating the Shared Lab Area and the Shared Lab Systems (as such terms are defined in Section 7(b)), excluding only:

(a) the original construction costs of the Project and renovation prior to the date of this Lease and costs of correcting defects in such original construction or renovation;

(b) capital expenditures for expansion of the Project;

(c) interest, principal payments of Mortgage (as defined in Section 27) debts of Landlord, financing costs and amortization of funds borrowed by Landlord, whether secured or unsecured and all payments of base rent (but not taxes or operating expenses) under any ground lease or other underlying lease of all or any portion of the Project;

(d) depreciation of the Project (except for capital improvements, the cost of which are includable in Operating Expenses);

(e) advertising, legal and space planning expenses and leasing commissions and other costs and expenses incurred in procuring and leasing space to tenants for the Project, including any leasing office maintained in the Project, free rent and construction allowances for tenants;

(f) legal and other expenses incurred in the negotiation or enforcement of leases;

(g) completing, fixturing, improving, renovating, painting, redecorating or other work, which Landlord pays for or performs for other tenants within their premises, and costs of correcting defects in such work;

(h) costs of utilities outside normal business hours sold to tenants of the Project;

(i) costs to be reimbursed by other tenants of the Project or Taxes to be paid directly by Tenant or other tenants of the Project, whether or not actually paid;

(j) salaries, wages, benefits and other compensation paid to officers and employees of Landlord who are not assigned in whole or in part to the operation, management, maintenance or repair of the Project;

(k) general organizational, administrative and overhead costs relating to maintaining Landlord's existence, either as a corporation, partnership, or other entity, including general corporate, legal and accounting expenses;

(l) costs (including reasonable attorneys" fees and costs of settlement, judgments and payments in lieu thereof) incurred in connection with disputes with tenants, other occupants, or prospective tenants, and costs and expenses, including legal fees, incurred in connection with negotiations or disputes with employees, consultants, management agents, leasing agents, purchasers or mortgagees of the Building;

(m) costs incurred by Landlord due to the violation by Landlord, its employees, agents or contractors or any tenant of the terms and conditions of any lease of space in the Project or any Legal Requirement (as defined in Section 7);

(n) penalties, fines or interest incurred as a result of Landlord's inability or failure to make payment of Taxes and/or to file any tax or informational returns when due, or from Landlord's failure to make any payment of Taxes required to be made by Landlord hereunder before delinquency;

(o) overhead and profit increment paid to Landlord or to subsidiaries or affiliates of Landlord for goods and/or services in or to the Project to the extent the same exceeds the costs of such goods and/or services rendered by unaffiliated third parties on a competitive basis;

(p) costs of Landlord's charitable or political contributions, or of fine art maintained at the Project;

(q) costs in connection with services (including electricity), items or other benefits of a type which are not standard for the Project and which are not available to Tenant without specific charges therefor, but which are provided to another tenant or occupant of the Project, whether or not such other tenant or occupant is specifically charged therefor by Landlord;

(r) costs incurred in the sale or refinancing of the Project;

(s) net income taxes of Landlord or the owner of any interest in the Project (except to the extent such net income taxes are in substitution for any Taxes payable hereunder), franchise, capital stock, gift, estate or inheritance taxes or any federal, state or local documentary taxes imposed against the Project or any portion thereof or interest therein;

(t) costs incurred in connection with environmental clean up, response action, or remediation on, in, or under or about the Project, to the extent Tenant can prove to Landlord's reasonable satisfaction that such costs relate to known conditions existing in, on or under or about the Project on or before the Commencement Date as disclosed by that certain Gene Logic Limited Exit Audit, dated January 4, 2008, prepared by ENVIRON International Corporation; and

(u) any expenses otherwise includable within Operating Expenses to the extent actually reimbursed by persons other than tenants of the Project under leases for space in the Project.

Within 90 days after the end of each calendar year (or such longer period as may be reasonably required), Landlord shall furnish to Tenant a statement (an "**Annual Statement**") showing in reasonable detail: (a) the total and Tenant's Share of actual Operating Expenses for the previous calendar year, and (b) the total of Tenants payments in respect of Operating Expenses for such year. If Tenant's Share of actual Operating Expenses for such year exceeds Tenant's payments of Operating Expenses for such year, the excess shall be due and payable by Tenant as Rent within 30 days after delivery of such Annual Statement to Tenant. If Tenant's payments of Operating Expenses for such year exceed Tenant's Share actual Operating Expenses for such year Landlord shall pay the excess to Tenant within 30 days after delivery of such Annual Statement, except that after the expiration, or earlier termination of the Term or if Tenant is delinquent in its obligation to pay Rent, Landlord shall pay the excess to Tenant after deducting all other amounts due Landlord from Tenant.

The Annual Statement shall be final and binding upon Tenant unless Tenant, within 30 days after Tenant's receipt thereof, shall contest any item therein by giving written notice to Landlord, specifying each item contested and the reason therefor. If, during such 30 day period, Tenant reasonably and in good faith questions or contests the accuracy of Landlord's statement of Tenant's Share of Operating Expenses, Landlord will provide Tenant with access to Landlord's books and records relating to the operation of the Project and such information as Landlord reasonably determines to be responsive to Tenant's questions ("**Expense Information**"). If after Tenant's review of such Expense Information, Landlord and Tenant cannot agree upon the amount of Tenant's Share of Operating Expenses, then Tenant shall have the right to have an independent public accounting firm selected by Tenant from among the 5 largest in the United States, working pursuant to a fee arrangement other than a contingent fee (at Tenant's sole cost and expense) and approved by Landlord (which approval shall not be unreasonably withheld or delayed), audit and/or review the Expense Information for the year in question ("**Independent Review**"). The results of any such Independent Review shall be binding on Landlord and Tenant. If the Independent Review shows that the payments actually made by Tenant with respect to Operating Expenses for the calendar year in question exceeded Tenant's Share of Operating Expenses for such calendar year, Landlord shall at Landlord's option either (i) credit the excess amount to the next succeeding installments of estimated Operating Expenses or (ii) pay the excess to Tenant within 30 days after delivery of such statement, except that after the expiration or earlier termination of this Lease or if Tenant is delinquent in its obligation to pay Rent, Landlord shall pay the excess to Tenant after deducting all other amounts due Landlord. If the Independent Review shows that Tenant's payments with respect to Operating Expenses for such calendar year were less than Tenant's Share of Operating Expenses for the calendar year, Tenant shall pay the deficiency to Landlord within 30 days after delivery of such statement. If the Independent Review shows that Tenant has overpaid with respect to Operating Expenses by more than 5% then Landlord shall reimburse Tenant for all costs incurred by Tenant for the Independent Review. Operating Expenses for the calendar years in which Tenant's obligation to share therein begins and ends shall be prorated.

"**Tenant's Share**" shall be the percentage set forth in the Basic Lease Provisions as Tenant's Share as reasonably adjusted by Landlord for changes in the physical size of the Premises or the Project occurring thereafter. Landlord may equitably increase Tenant's Share for any item of expense or cost reimbursable by Tenant that relates to a repair, replacement, or service that benefits only the Premises or only a portion of the Project that includes the Premises or that varies with occupancy or use. Base Rent, Tenant's Share of Operating Expenses and all other amounts payable by Tenant to Landlord hereunder are collectively referred to herein as "**Rent**."

6. **Security Deposit**. Tenant shall deposit with Landlord, upon delivery of an executed copy of this Lease to Landlord, a security deposit ("**Security Deposit**") for the performance of all of Tenant's obligations hereunder in the amount set forth in the Basic Lease Provisions, which Security Deposit shall be in the form of an unconditional and irrevocable letter of credit ("**Letter of Credit**"): (i) in form and substance satisfactory to Landlord, (ii) naming Landlord as beneficiary, (iii) expressly allowing Landlord to draw upon it at any time from time to time by delivering to the issuer notice that Landlord is entitled to draw thereunder, (iv) issued by an FDIC-insured financial institution satisfactory to Landlord, and (v) redeemable by presentation of a sight draft in the state of Landlord's choice. If Tenant does not provide Landlord with a substitute Letter of Credit complying with all of the requirements hereof at least 10 days before the stated expiration date of any then current Letter of Credit, Landlord shall have the right to draw the full amount of the current Letter of Credit and hold the funds drawn in cash without obligation for interest thereon as the Security Deposit. The Security Deposit shall be held by Landlord as security for the performance of Tenant's obligations under this Lease. The Security Deposit is not an advance Rental deposit or a measure of Landlord's damages in case of Tenant's Default. Upon each occurrence of a Default (as defined in Section 20), Landlord may use all or any part of the Security Deposit to pay delinquent payments due under this Lease, and the cost of any damage, injury, expense or liability caused by such Default, without prejudice to any other remedy provided herein or provided by law. Upon any such use of all or any portion of the Security Deposit, Tenant shalt pay Landlord on demand or provide a replacement Letter of Credit in the amount that will restore the Security Deposit to the amount set forth in the Basic Lease Provisions. Tenant hereby waives the provisions of any law, now or hereafter in force, which provide that Landlord may claim from a security deposit only those sums reasonably necessary to remedy defaults in the payment of Rent, to repair damage caused by Tenant or to clean the Premises, it being agreed that Landlord may, in addition, claim those sums reasonably necessary to compensate Landlord for any other loss, or damage, foreseeable or unforeseeable, caused by the act or omission of Tenant or any officer, employee, agent or invitee of Tenant. Upon bankruptcy or other debtor-creditor proceedings against Tenant the Security Deposit shall be deemed to be applied first to the payment of Rent and other charges due Landlord for periods prior to the filing of such proceedings. Upon any such use of all or any portion of the Security Deposit, Tenant shall, within 5 days after demand from Landlord, restore the Security Deposit to its original amount. If Tenant shall fully perform every provision of this Lease to be performed by Tenant, the Security Deposit, or any balance thereof (i.e., after deducting therefrom all amounts to which Landlord is entitled under the provisions of this Lease), shall be returned to Tenant (or, at Landlord's option, to the last assignee of Tenant's interest hereunder) within 90 days after the expiration or earlier termination of this Lease.

If Landlord transfers its interest in the Project or this Lease, Landlord shall either (a) transfer any Security Deposit then held by Landlord to a person or entity assuming Landlord's obligations under this Section 6, or (b) return to Tenant any Security Deposit then held by Landlord and remaining after the deductions permitted herein. Upon such transfer to such transferee or the return of the Security Deposit to Tenant, Landlord shall have no further obligation with respect to the Security Deposit, and Tenant's right to the return of the Security Deposit shall apply solely against Landlord's transferee. The Security Deposit is not an advance rental deposit or a measure of Landlord's damages in case of Tenant's Default. Landlord's obligation respecting the Security Deposit is that of a debtor, not a trustee, and no interest shall accrue thereon.

7. **Use**. The Premises shall be used solely for the Permitted Use set forth in the Basic Lease Provisions, and in compliance with all laws, orders, judgments, ordinances, regulations, codes, directives, permits, licenses, covenants and restrictions now or hereafter applicable to the Premises, and to the use and occupancy thereof, including, without limitation, the Americans With Disabilities Act, 42 U.S.C. § 12101, et seq. (together with the regulations promulgated pursuant thereto, "**ADA**") (collectively, "**Legal Requirements**" and each, a "**Legal Requirement**"). Tenant shall, upon 5 days' written notice from Landlord, discontinue any use of the Premises which is declared by any Governmental Authority (as defined in Section 9) having jurisdiction to be a violation of a Legal Requirement. Upon prior written notice to Landlord, Tenant may at its sole cost and expense appeal or contest such a declaration by any Governmental Authority as to a violation of a Legal Requirement by Tenant, provided that (a) Tenant prosecutes such appeal or contest with diligence and continuity, (b) such noncompliance shall not (i) constitute a crime or an offense punishable by imprisonment of Landlord, (ii) endanger the Premises or adversely affect the character or reputation of the Project, (iii) subject Landlord to any civil or criminal fine or other financial penalty or forfeiture, and (iv) increase the insurance premiums for the Project, (c) Tenant keeps Landlord apprised from time to time on the status of such appeal or contest, and (d) Tenant shall provide such reasonable security as may be requested by Landlord for the payment of any fines or penalties that may be charged by such Governmental Authority, any interest thereon, the costs of the contest on the declaration or the proceedings or suit in which such contest may be had, or for any loss or injury by reason of any such appeal or contest. Such security may be provided by Tenant's delivering or causing to be delivered to Landlord cash or other security reasonably satisfactory to Landlord, or a bond of indemnity (in form and amount reasonably satisfactory to Landlord) of a surety company reasonably acceptable to Landlord. Tenant agrees to indemnify, defend, and save Landlord harmless from and against all Claims (as defined below) incurred on account of Tenant's participation in such appeal or contest. Landlord will not be required to join any proceedings pursuant to this Section unless the provision of any applicable Legal Requirement at the time in effect requires that the proceedings be brought by or in the name of Landlord, or both. In that event Landlord shall join the proceedings or permit them to be brought in its name if Tenant pays all related expenses. Tenant will not use or permit the Premises to be used for any purpose or in any manner that would void Tenants or Landlord's insurance, increase the insurance premium, or cause the disallowance of any sprinkler or other credits. Tenant shall not permit any part of the Premises to be used as a "place of public accommodation", as defined in the ADA or any similar legal requirement. Tenant shall reimburse Landlord promptly upon demand for any additional premium charged for any such insurance policy by reason of Tenant's failure to comply with the provisions of this Section or otherwise caused by Tenants use and/or occupancy of the Premises. Tenant will use the Premises in a careful, safe and proper manner and will not commit or permit waste, overload the floor or structure of the Premises, subject the Premises to use that would damage the Premises or obstruct or interfere with the rights of Landlord or other tenants or occupants of the Project, including conducting or giving notice of any auction, liquidation, or going out of business sale on the Premises, or using or allowing the Premises to be used for any unlawful purpose. Tenant shall cause any equipment or machinery to be installed in the Premises so as to reasonably prevent sounds or vibrations from the Premises from extending into Common Areas, or other space in the Project. Tenant shall not place any machinery or equipment weighing 500 pounds or more in or upon the Premises or transport or move such items through the Common Areas of the Project or in the Project elevators without the prior written consent of Landlord, which consent shall not be unreasonably withheld, conditioned, or delayed. Tenant shall not, without the prior written consent of Landlord, use the Premises in any manner which will require ventilation, air exchange, heating, gas, steam, electricity or water beyond the existing capacity of the Project as proportionately allocated to the Premises based upon Tenant's Share as usually furnished for the Permitted Use.

(a) **Modifications to Common Areas**. Landlord shall, as an Operating Expense (to the extent such Legal Requirement is generally applicable to similar buildings in the area in which the Project is located) or at Tenant's expense (to the extent such Legal Requirement is applicable solely by reason of Tenant's, as compared to other tenants of the Project, particular use of the Premises) make any alterations or modifications to the Common Areas or the exterior of the Building that are required by applicable Legal Requirements, including the ADA. Tenant, at its sole expense, shall make any alterations or modifications to the interior portions of the Premises that are required by applicable Legal Requirements (including, without limitation, compliance of the Premises with the ADA). Notwithstanding any other provision herein to the contrary, Tenant shall be responsible for any and all demands, claims, liabilities, losses, costs, expenses, actions, causes of action, damages or judgments, and all reasonable expenses incurred in investigating or resisting the same (including, without limitation, reasonable attorneys" fees, charges and disbursements and costs of suit) (collectively, "**Claims**") arising out of or in connection with Legal Requirements, and Tenant shall indemnify, defend, hold and save Landlord harmless from and against any and all Claims arising out of or in connection with any failure of the Premises to comply with any such Legal Requirement.

(b) **Shared Lab Area**. Tenant shall have a non-exclusive license to use the Shared Lab Systems (as defined below) located in portions of the Building (such portions being referred to as the "**Shared Lab Area**") in accordance with the Legal Requirements and the terms and conditions of this paragraph. The Shared Lab Area contains certain equipment, furnishings, systems, and personal property, including a glass washer, autoclave, and bench utilities (including, but not limited to, deionized water, compressed air, and house vacuum) (collectively, the "**Shared Lab Systems**"). The license granted hereby is personal to Tenant and shall not, except as provided in the next sentence, be assigned or otherwise pledged or transferred, directly or indirectly. In the case of a Permitted Assignment, Tenant shall have no further right to use the Shared Lab Area and the Shared Lab Systems in accordance with the terms and conditions of this Lease; provided, however, that the following shall have the non-exclusive license to use the Shared Lab Systems in accordance with the terms and conditions of this Lease: (i) a subtenant approved by Landlord in accordance with the provisions of this Lease that subleases 50% or more of the Premises, and (ii) an assignee permitted under a Permitted Assignment.

(i) **Relocation/Modification of Shared Lab Area**. Landlord shall have the right at any time and from time to time in the exercise of its sole and absolute subjective discretion to reconfigure, relocate, or modify the Shared Lab Area and to revise, expand, suspend, terminate, or discontinue any of the Shared Lab Systems. Landlord shall provide reasonable notice to Tenant of the relocation, suspension, termination, or discontinuance of any Shared Lab Systems as long as Landlord has actual knowledge of any such relocation, suspension, termination, or discontinuance.

(ii) **Interference**. Tenant shall use the Shared Lab Area and the Shared Lab Systems in a manner that will not interfere with the rights of any tenants or occupants in the Building or the providers of the services associated with the Shared Lab Systems. Landlord assumes no responsibility for enforcing Tenant's rights or for protecting the Shared Lab Area from any person or entity, including, but not limited to, other tenants or occupants of the Building.

(iii) **Limitations**. Landlord's sole obligation for providing the Shared Lab Systems shall be: (A) to provide the Shared Lab Systems as is determined by Landlord in the exercise of its sole and absolute subjective discretion, and (B) to contract with one or more third parties to maintain the Shared Lab Systems that are deemed by Landlord in the exercise of its sole and absolute subjective discretion to need periodic maintenance in accordance with the manufacturer's or suppliers standard guidelines or otherwise. During any period of replacement, repair, or maintenance of the Shared Lab Systems when they are not operational (including, but not limited to, any delays thereto due to the inability to obtain parts or replacements), Landlord shall have no obligation to provide Tenant with alternative, supplemental, temporary, or back-up Shared Lab Systems. The terms and provisions of this paragraph shall survive the expiration or earlier termination of this Lease.

(iv) **No Warranties**. Landlord makes no warranties of any kind, express or implied, with respect to the Shared Lab Area and Shared Lab Systems, and Landlord disclaims any such warranties. Without limiting the foregoing, Tenant expressly acknowledges and agrees that Landlord does not guaranty or warrant that the Shared Lab Systems will be operational at all times, will be of sufficient capacity to accommodate Tenant's use thereof, will be free of Hazardous Materials, or will function or perform adequately, and Landlord shall not be liable for any damages resulting from the failure of the Shared Lab Systems.

(v) **Other Lease Provisions**. Although the Shared Lab Area does not form a part of the Premises, the provisions of this Lease (A) governing Tenant's use, operation, and enjoyment of the Premises, (B) imposing obligations on Tenant for matters occurring in, on, within, or about the Premises or arising out of the use or occupancy of the Premises (including, but not limited to, those obligations relating to insurance, indemnification, Hazardous Materials Clearance, and environmental requirements triggered by Tenant's use of the Shared Lab Area), or (C) limiting Landlord's liability, shall apply with equal force to Tenant's use of the Shared Lab Area and the Shared Lab Systems.

(vi) **Termination**. If Tenant Defaults in its obligations under this Section 7(b), Landlord shall have the right, in addition to any other rights and remedies available to Landlord for a Default by Tenant, to terminate immediately Tenant's license to use the Shared Lab Area. The expiration or earlier termination of this Lease shall automatically terminate the license hereby granted to Tenant to so use the Shared Lab Area.

8. **Holding Over**. If, with Landlord's express written consent, Tenant retains possession of the Premises after the termination or expiration of the Term, (i) unless otherwise agreed in such written consent, such possession shall be subject to immediate termination by Landlord at any time, (ii) all of the other terms and provisions of this Lease (including, without limitation, the adjustment of Base Rent pursuant to Section 4 hereof) shall remain in full force and effect (excluding any expansion or renewal option or other similar right or option) during such holdover period, (iii) Tenant shall continue to pay Base Rent in the amount payable upon the date of the expiration or earlier termination of this Lease or such other amount as Landlord may indicate, in Landlord's sole and absolute discretion, in such written consent, and (iv) all other payments shall continue under the terms of this Lease. If Tenant remains in possession of the Premises after the expiration or earlier termination of the Term without the express written consent of Landlord, (A) Tenant shall become a tenant at sufferance upon the terms of this Lease except that (y) for the initial thirty (30) day period of the holdover, the monthly Rent shall be equal to 150% of the Rent in effect during the last 30 days of the Term, and (z) from and after such 30 day period, the monthly Rent shall be equal to 200% of the Rent in effect during the last 30 days of the Term, and (B) Tenant shall be responsible for all damages suffered by Landlord resulting from or occasioned by Tenant's holding over (including consequential damages if Landlord has advised Tenant in advance of any particular consequential damages that Landlord may incur or suffer as a result of Tenant's holding over, including, without limitation, consequential damages that Landlord may incur or suffer by reason of Landlord's inability to lease the Premises or deliver occupancy to a particular tenant). No holding over by Tenant, whether with or without consent of Landlord, shall operate to extend this Lease except as otherwise expressly provided, and this Section 8 shall not be construed as consent for Tenant to retain possession of the Premises. Acceptance by Landlord of Rent after the expiration of the Term or earlier termination of this Lease shall not result in a renewal or reinstatement of this Lease.

9. **Taxes**. Landlord shall pay, as part of Operating Expenses, all taxes, levies, fees, assessments and governmental charges of any kind, existing as of the Commencement Date or thereafter enacted (collectively referred to as "**Taxes**"), imposed by any federal, state, regional, municipal, local or other governmental authority or agency, including, without limitation, quasi-public agencies (collectively, "**Governmental Authority**") during the Term, including, without limitation, all Taxes: (i) imposed on or measured by or based, in whole or in part, on rent payable to (or gross receipts received by) Landlord under this Lease and/or from the rental by Landlord of the Project or any portion thereof, or (ii) based on the square footage, assessed value or other measure or evaluation of any kind of the Premises or the Project, or (iii) assessed or imposed by or on the operation or maintenance of any portion of the Premises or the Project, including parking, or (iv) assessed or imposed by, or at the direction of, or resulting from Legal Requirements, or interpretations thereof, promulgated by any Governmental Authority, or (v) imposed as a license or other fee, charge, tax, or assessment on Landlord's business or occupation of leasing space in the Project. Landlord may contest by appropriate legal proceedings the amount, validity, or application of any Taxes or liens securing Taxes. Taxes shall not include any net income taxes imposed on Landlord except to the extent such net income taxes are in substitution for any Taxes payable hereunder. If any such Tax is levied or assessed directly against Tenant, then Tenant shall be responsible for and shall pay the same at such times and in such manner as the taxing authority shall require. Tenant shall pay, prior to delinquency, any and all Taxes levied or assessed against any personal property or trade fixtures placed by Tenant in the Premises, whether levied or assessed against Landlord or Tenant. If any Taxes on Tenant's personal property or trade fixtures are levied against Landlord or Landlord's property, or if the assessed valuation of the Project is increased by a value attributable to improvements in or alterations to the Premises, whether owned by Landlord or Tenant and whether or not affixed to the real property so as to become a part thereof, higher than the base valuation on which Landlord from time-to-time allocates Taxes to all tenants in the Project, Landlord shall have the right, but not the obligation, to pay such Taxes. Landlord's determination of any excess assessed valuation shall be binding and conclusive, absent manifest error. The amount of any such payment by Landlord shall constitute Additional Rent due from Tenant to Landlord immediately upon demand.

10. **Parking**. Subject to all Legal Requirements, Force Majeure, a Taking (as defined in Section 19 below) and the exercise by Landlord of its rights hereunder, Tenant shall have the right (at no additional cost), in common with other tenants of the Project pro rata in accordance with the rentable area of the Premises and the rentable areas of the Project occupied by such other tenants, to park in those areas designated for non-reserved parking, subject in each case to Landlord's rules and regulations in accordance with Section 26. Landlord may allocate parking spaces among Tenant and other tenants in the Project pro rata as described above if Landlord determines that such parking facilities are becoming crowded. Landlord shall not be responsible for enforcing Tenant's parking rights against any third parties, including other tenants of the Project.

11. **Utilities, Services**. Landlord shall provide, subject to the terms of this Section 11, janitorial services to the Common Areas, water, electricity, heat, light, power, telephone, sewer, and other utilities (including gas and fire sprinklers to the extent the Project is plumbed for such services), and refuse and trash collection (collectively, "**Utilities**"). Landlord shall pay, as Operating Expenses or subject to Tenant's reimbursement obligation, for all Utilities used on the Premises, ail maintenance charges for Utilities, and any storm sewer charges or other similar charges for Utilities imposed by any Governmental Authority or Utility provider, and any taxes, penalties, surcharges or similar charges thereon. Landlord may cause, at Tenant's expense, any Utilities to be separately metered or charged directly to Tenant by the provider. Tenant shall pay directly to the Utility provider, prior to delinquency, any separately metered Utilities and services which may be furnished to Tenant or the Premises during the Term. Tenant shall pay, as part of Operating Expenses, its share of all charges for jointly metered Utilities based upon consumption, as reasonably determined by Landlord. No interruption or failure of Utilities, from any cause whatsoever other than Landlord's willful misconduct, shall result in eviction or constructive eviction of Tenant, termination of this Lease or the abatement of Rent. Tenant agrees to limit use of water and sewer with respect to Common Areas to normal restroom use.

Landlord's sole obligation for either providing emergency generators or providing emergency back-up power to Tenant shall be: (i) to provide emergency generators with not less than the stated capacity of the emergency generators located in the Building as of the Commencement Date, and (ii) to contract with a third party to maintain the emergency generators as per the manufacturer's standard maintenance guidelines. Landlord shall have no obligation to provide Tenant with operational emergency generators or back-up power or to supervise, oversee or confirm that the third party maintaining the emergency generators is maintaining the generators as per the manufacturer's standard guidelines or otherwise. During any period of replacement, repair or maintenance of the emergency generators when the emergency generators are not operational, including any delays thereto due to the inability to obtain parts or replacement equipment, Landlord shall have no obligation to provide Tenant with an alternative back-up generator or generators or alternative sources of back-up power. Tenant expressly acknowledges and agrees that Landlord does not guaranty that such emergency generators will be operational at all times or that emergency power will be available to the Premises when needed.

12. **Alterations and Tenant's Property**. Any alterations, additions, or improvements made to the Premises by or on behalf of Tenant (excluding Landlord's Work), including additional locks or bolts of any kind or nature upon any doors or windows in the Premises, but excluding installation, removal or realignment of furniture systems (other than removal of furniture systems owned or paid for by Landlord) not involving any modifications to the structure or connections (other then by ordinary plugs or jacks) to Building Systems (as defined in Section 13) ("**Alterations**") shall be subject to Landlord's prior written consent, which may be given or withheld in Landlord's sole discretion if any such Alteration affects the structure or Building Systems, but which shall otherwise not be unreasonably withheld, conditioned, or delayed. Tenant may construct nonstructural Alterations in the Premises without Landlord's prior approval if the aggregate cost of all such work in any 12 month period does not exceed $10,000 (a "**Notice-Only Alteration**"), provided Tenant notifies Landlord in writing of such intended Notice-Only Alteration, and such notice shall be accompanied by plans, specifications, work contracts and such other information concerning the nature and cost of the Notice-Only Alteration as may be reasonably requested by Landlord, which notice and accompanying materials shall be delivered to Landlord not less than 15 business days in advance of any proposed construction. If Landlord approves any Alterations, Landlord may impose such conditions on Tenant in connection with the commencement, performance and completion of such Alterations as Landlord may deem appropriate in Landlord's 15 business days in advance of any proposed construction, and accompanied by plans, specifications, bid proposals, work contracts and such other information concerning the nature and cost of the alterations as may be reasonably requested by Landlord, including the identities and mailing addresses of all persons performing work or supplying materials. Landlord's right to review plans and specifications and to monitor construction shall be solely for its own benefit, and Landlord shall have no duty to ensure that such plans and specifications or construction comply with applicable Legal Requirements. Tenant shall cause, at its sole cost and expense, all Alterations to comply with insurance requirements and with Legal Requirements and shall implement at its sole cost and expense any alteration or modification required by Legal Requirements as a result of any Alterations. Tenant shall pay to Landlord, as Additional Rent, on demand an amount equal to 6% of all charges incurred by Tenant or its contractors or agents in connection with any Alteration (excluding, however, any Notice-Only Alteration) to cover Landlord's overhead and expenses for plan review, coordination, scheduling and supervision. Before Tenant begins any Alteration, Landlord may post on and about the Premises notices of non-responsibility pursuant to applicable law. Tenant shall reimburse Landlord for, and indemnify and hold Landlord harmless from, any expense incurred by Landlord by reason of faulty work done by Tenant or its contractors, delays caused by such work, or inadequate cleanup.

Tenant shall furnish security or make other arrangements satisfactory to Landlord to assure payment for the completion of all Alterations work free and clear of liens, and shall provide (and cause each contractor or subcontractor to provide) certificates of insurance (in form and substance satisfactory to Landlord; form ACORD 28 [2006/07] is not satisfactory to Landlord) for workers" compensation and other coverage in amounts and from an insurance company satisfactory to Landlord protecting Landlord against liability for personal injury or property damage during construction. Upon completion of any Alterations, Tenant shall deliver to Landlord: (i) sworn statements setting forth the names of all contractors and subcontractors who did the work and final lien waivers from all such contractors and subcontractors; and (ii) "as built" plans for any such Alteration.

Other than (i) the items, if any, listed on **Exhibit F** attached hereto, (ii) any items agreed by Landlord in writing to be included on **Exhibit F** in the future, and (iii) any trade fixtures, machinery, equipment and other personal property not paid for by Landlord that may be removed without material damage to the Premises, which damage shall be repaired (including capping or terminating utility hook-ups behind walls) by Tenant during the Term (collectively, "**Tenant's Property**"), all property of any kind paid for by Landlord, all Alterations, real property fixtures, built-in machinery and equipment, built-in casework and cabinets and other similar additions and improvements built into the Premises so as to become an integral part of the Premises such as fume hoods which penetrate the roof or plenum area, built-In cold rooms, built-in warm rooms, walk-in cold rooms, walk-in warm rooms, deionized water systems, glass washing equipment, autoclaves, chillers, built-in plumbing, electrical and mechanical equipment and systems, and any power generator and transfer switch (collectively, "**Installations**") shall be and shall remain the property of Landlord during the Term and following the expiration or earlier termination of the Term, shall not be removed by Tenant at any time during the Term and shall remain upon and be surrendered with the Premises as a part thereof in accordance with Section 28 following the expiration or earlier termination of this Lease, provided, however, that Landlord shall, at the time its approval of such Installation is requested, or at the time it receives notice of a Notice-Only Alteration, notify Tenant if it will require Tenant to remove such Installation upon the expiration or earlier termination of this Lease (it being understood that Landlord shall not require Tenant to remove any alterations, improvements, fixtures, or equipment in the Premises as of the Rent Commencement Date). If Landlord so requires, Tenant shall remove such Installation upon the expiration or earlier termination of this Lease and restore any damage caused by or occasioned as a result of such removal, including, when removing any of Tenant's Property which was plumbed, wired or otherwise connected to any of the Building Systems, capping off all such connections behind the walls of the Premises and repairing any holes. During any such restoration period, Tenant shall pay Rent to Landlord as provided herein as if said space were otherwise occupied by Tenant.

13. **Landlord's Repairs**. Landlord, as an Operating Expense, shall maintain all of the structural, exterior, parking and other Common Areas of the Project, including the Shared Lab Area, Shared Lab Systems, generators, roof, HVAC, plumbing, fire sprinklers, elevators and all other building systems serving the Premises and other portions of the Project ("**Building Systems**"), in good repair, reasonable wear and tear and uninsured losses and damages caused by Tenant, or by any of Tenant's agents, servants, employees, invitees and contractors (collectively, "**Tenant Parties**") excluded. Losses and damages caused by Tenant or any Tenant Party shall be repaired by Landlord, to the extent not covered by insurance, at Tenant's sole cost and expense. Landlord reserves the right to stop Building Systems services when necessary (i) by reason of accident or emergency, or (ii) for planned repairs, alterations or improvements, which are, in the judgment of Landlord, desirable or necessary to be made, until said repairs, alterations or improvements shall have been completed. Landlord shall have no responsibility or liability for failure to supply Building Systems services during any such period of interruption; provided, however, that Landlord shall, except in case of emergency, make a commercially reasonable effort to give Tenant 24 hours advance notice of any planned stoppage of Building Systems services for routine maintenance, repairs, alterations or improvements. Landlord shall use commercially reasonable efforts to minimize interference with the conduct of Tenant's ordinary business operations in the Premises during any access of the Premises by Landlord. Tenant shall promptly give Landlord written notice of any repair required by Landlord pursuant to this Section, after which Landlord shall have a reasonable opportunity to effect such repair, Landlord shall not be liable for any failure to make any repairs or to perform any maintenance unless such failure shall persist for an unreasonable time after Tenant's written notice of the need for such repairs or maintenance. Tenant waives its rights under any state or local law to terminate this Lease or to make such repairs at Landlord's expense and agrees that the parties" respective rights with respect to such matters shall be solely as set forth herein. Repairs required as the result of fire, earthquake, flood, vandalism, war, or similar cause of damage or destruction shall be controlled by Section 18.

14. **Tenant's Repairs**. Subject to Section 13 hereof, Tenant, at its expense, shall repair, replace and maintain in the same condition as of the Commencement Date, reasonable wear and tear, damage caused by fire or other casualty, and Landlord's repair obligations excepted, all portions of the Premises, including, without limitation, entries, doors, ceilings, interior windows, interior walls, and the interior side of demising walls. Such repair and replacement may include capital expenditures and repairs whose benefit may extend beyond the Term. Should Tenant fail to make any such repair or replacement or fail to maintain the Premises, Landlord shall give Tenant notice of such failure. If Tenant fails to commence cure of such failure within 10 days of Landlord's notice, and thereafter diligently prosecute such cure to completion, Landlord may perform such work and shall be reimbursed by Tenant within 10 days after demand therefor; provided, however, that if such failure by Tenant creates or could create an emergency, Landlord may immediately commence cure of such failure and shall thereafter be entitled to recover the costs of such cure from Tenant. Subject to Sections 17 and 18, Tenant shall bear the full uninsured cost of any repair or replacement to any part of the Project that results from damage caused by Tenant or any Tenant Party and any repair that benefits only the Premises.

15. **Mechanic's Liens**. Tenant shall discharge, by bond or otherwise, any mechanic's lien filed against the Premises or against the Project for work claimed to have been done for, or materials claimed to have been furnished to, Tenant within 10 days after notice to Tenant of the filing thereof, at Tenant's sole cost and shall otherwise keep the Premises and the Project free from any liens arising out of work performed, materials furnished or obligations incurred by Tenant. Should Tenant fail to discharge or bond off any lien described herein, Landlord shall have the right, but not the obligation, to pay such claim or post a bond or otherwise provide security to eliminate the lien as a claim against title to the Project and the cost thereof shall be immediately due from Tenant as Additional Rent. If Tenant shall lease or finance the acquisition of office equipment, furnishings, or other personal property of a removable nature utilized by Tenant in the operation of Tenant's business, Tenant warrants that any Uniform Commercial Code Financing Statement filed as a matter of public record by any lessor or creditor of Tenant will upon its face or by exhibit thereto indicate that such Financing Statement is applicable only to removable personal property and trade fixtures of Tenant located within the Premises. In no event shall the address of the Project be furnished on the statement without qualifying language as to applicability of the lien only to removable personal property, located in an identified suite held by Tenant.

16. **Indemnification**. Tenant hereby indemnifies and agrees to defend, save and hold Landlord harmless from and against any and all Claims for injury or death to persons or damage to property occurring within or about the Premises (including the Shared Lab Area), arising directly or indirectly out of use or occupancy of the Premises (including the Shared Lab Area) or a breach or Default by Tenant In the performance of any of its obligations hereunder, unless caused solely by the willful misconduct or gross negligence of Landlord. Landlord shall not be liable to Tenant for, and Tenant assumes all risk of damage to, personal property (including, without limitation, loss of records kept within the Premises). Tenant further waives any and all Claims for injury to Tenant's business or loss of income relating to any such damage or destruction of personal property (including, without limitation, any loss of records). Landlord shall not be liable for any damages arising from any act, omission or neglect of any tenant in the Project or of any other third party.

17. **Insurance**. Landlord shall maintain all risk property and, if applicable, sprinkler damage insurance covering the full replacement cost of the Project or such lesser coverage amount as Landlord may elect provided such coverage amount is not less than 90% of such full replacement cost Landlord shall further procure and maintain commercial general liability insurance with a single loss limit of not less than $2,000,000 for bodily injury and property damage with respect to the Project Landlord may, but is not obligated to, maintain such other insurance and additional coverages as it may deem necessary, including, but not limited to, flood, environmental hazard and earthquake, loss or failure of building equipment, errors and omissions, rental loss during the period of repair or rebuilding, workers" compensation insurance and fidelity bonds for employees employed to perform services and insurance for any improvements installed by Tenant or which are in addition to the standard improvements customarily furnished by Landlord without regard to whether or not such are made a part of the Project. All such insurance shall be included as part of the Operating Expenses. The Project may be included in a blanket policy (in which case the cost of such Insurance allocable to the Project will be determined by Landlord based upon the insurer's cost calculations). Tenant shall also reimburse Landlord for any increased premiums or additional insurance which Landlord reasonably deems necessary as a result of Tenant's use of the Premises.

Tenant, at its sole cost and expense, shall maintain during the Term: all risk property insurance with business interruption and extra expense coverage, covering the full replacement cost of all property and improvements installed or placed in the Premises by Tenant at Tenant's expense; workers' compensation insurance with no less than the minimum limits required by law; employer's liability insurance with such limits as required by law; and commercial general liability insurance, with a minimum limit of not less than $2,000,000 per occurrence for bodily injury and property damage with respect to the Premises. The commercial general liability insurance policy shall name Landlord and Alexandria Real Estate Equities, Inc., and its and their respective members, officers, directors, employees, managers, and agents (collectively, "**Landlord Parties**"), as additional insureds. The commercial general liability insurance policy shall insure on an occurrence and not a claims-made basis; shall be issued by insurance companies which have a rating of not less than policyholder rating of A and financial category rating of at least Class X in "Best's Insurance Guide"; shall not be cancelable for nonpayment of premium unless 30 days prior written notice shall have been given to Landlord from the insurer, contain a hostile fire endorsement and a contractual liability endorsement; and provide primary coverage to Landlord (any policy issued to Landlord providing duplicate or similar coverage shall be deemed excess over Tenant's policies). Copies of such policies (if requested by Landlord), or certificates of insurance (in form and substance satisfactory to Landlord; form ACORD 28 [2006/07] is not satisfactory to Landlord) showing the limits of coverage required hereunder and showing Landlord as an additional insured, along with reasonable evidence of the payment of premiums for the applicable period, shall be delivered to Landlord by Tenant upon commencement of the Term and upon each renewal of said insurance. Tenant's policy may be a "blanket policy" with an aggregate per location endorsement which specifically provides that the amount of insurance shall not be prejudiced by other losses covered by the policy, Tenant shall, at least 5 days prior to the expiration of such policies, furnish Landlord with renewal certificates.

In each instance where insurance is to name Landlord as an additional insured, Tenant shall upon written request of Landlord also designate and furnish certificates so evidencing Landlord as additional insured to: (i) any lender of Landlord holding a security interest in the Project or any portion thereof, (ii) the landlord under any lease wherein Landlord is tenant of the real property on which the Project is located, if the interest of Landlord is or shall become that of a tenant under a ground or other underlying lease rather than that of a fee owner, and/or (iii) any management company retained by Landlord to manage the Project.

The property insurance obtained by Landlord and Tenant shall include a waiver of subrogation by the insurers and all rights based upon an assignment from its insured, against Landlord or Tenant, and their respective officers, directors, employees, managers, agents, invitees and contractors ("**Related Parties**"), in connection with any loss or damage thereby insured against. Neither party nor its respective Related Parties shall be liable to the other for loss or damage caused by any risk insured against under property insurance required to be maintained hereunder, and each party waives any claims against the other party, and its respective Related Parties, for such loss or damage. The failure of a party to insure its property shall not void this waiver. Landlord and its respective Related Parties shall not be liable for, and Tenant hereby waives all claims against such parties for, business interruption and losses occasioned thereby sustained by Tenant or any person claiming through Tenant resulting from any accident or occurrence in or upon the Premises or the Project from any cause whatsoever, If the foregoing waivers shall contravene any law with respect to exculpatory agreements, the liability of Landlord or Tenant shall be deemed not released but shall be secondary to the other's insurer.

Landlord may require insurance policy limits to be raised to conform with requirements of Landlord's lender and/or to bring coverage limits to levels then being generally required of new tenants within the Project (as opposed to specific tenants with unique or unusual insurance risks).

18. **Restoration**. If, at any time during the Term, the Project or the Premises are damaged or destroyed by a fire or other insured casualty, Landlord shall notify Tenant within 60 days after discovery of such damage as to the amount of time Landlord reasonably estimates it will take to restore the Project or the Premises, as applicable ("**Restoration Period**"). If the Restoration Period is estimated to exceed 280 days ("**Maximum Restoration Period**"), Landlord may, in such notice, elect to terminate this Lease as of the date that is 75 days after the date of discovery of such damage or destruction; provided, however, that notwithstanding Landlord's election to restore, Tenant may elect to terminate this Lease by written notice to Landlord delivered within 10 business days of receipt of a notice from Landlord estimating a Restoration Period for the Premises longer than the Maximum Restoration Period. Unless either Landlord or Tenant so elects to terminate this Lease, Landlord shall, subject to receipt of sufficient insurance proceeds (with any deductible to be treated as a current Operating Expense), promptly restore the Premises (excluding the improvements installed by Tenant or by Landlord and paid for by Tenant), subject to delays arising from the collection of insurance proceeds, from Force Majeure events or as needed to obtain any license, clearance or other authorization of any kind required to enter into and restore the Premises issued by any Governmental Authority having jurisdiction over the use, storage, handling, treatment, generation, release, disposal, removal or remediation of Hazardous Materials (as defined in Section 30) in, on or about the Premises (collectively referred to herein as "**Hazardous Materials Clearances**"); provided, however, that if repair or restoration of the Premises is not substantially complete as of the end of the Maximum Restoration Period or, if longer, the Restoration Period, Landlord may, in its sole and absolute discretion, elect not to proceed with such repair and restoration, or Tenant may terminate this Lease by notice to Landlord given any time after the expiration of the Restoration Period (but before the substantial completion of the repair or restoration of the Premises), in either of which events Landlord shall be relieved of its obligation to make such repairs or restoration and this Lease shall terminate as of the date that is 75 days after the later of: (i) discovery of such damage or destruction, or (ii) the date all required Hazardous Materials Clearances are obtained, but Landlord shall retain any Rent paid and the right to any Rent payable by Tenant prior to such election by Landlord or Tenant.

Tenant, at its expense, shall promptly perform, subject to delays arising from the collection of insurance proceeds, from Force Majeure (as defined in Section 34) events or to obtain Hazardous Material Clearances, all repairs or restoration not required to be done by Landlord and shall promptly re-enter the Premises and commence doing business in accordance with this Lease. Notwithstanding the foregoing, Landlord or Tenant may terminate this Lease if the Premises are damaged during the last year of the Term and Landlord reasonably estimates that it will take more than 2 months to repair such damage, or if insurance proceeds are not available for such restoration. Rent shall be abated from the date all required Hazardous Material Clearances are obtained until the Premises are repaired and restored, in the proportion which the area of the Premises, if any, which is not usable by Tenant bears to the total area of the Premises, unless Landlord provides Tenant with other space during the period of repair that is suitable for the temporary conduct of Tenant's business. Such abatement shall be the sole remedy of Tenant, and except as provided in this Section 18, Tenant waives any right to terminate this Lease by reason of damage or casualty loss.

The provisions of this Lease, including this Section 18, constitute an express agreement between Landlord and Tenant with respect to any and all damage to, or destruction of, all or any part of the Premises, or any other portion of the Project, and any statute or regulation which is now or may hereafter be in effect shall have no application to this Lease or any damage or destruction to all or any part of the Premises or any other portion of the Project, the parties hereto expressly agreeing that this Section 18 sets forth their entire understanding and agreement with respect to such matters.

19. **Condemnation**. If the whole or any material part of the Premises or the Project is taken for any public or quasi-public use under governmental law, ordinance, or regulation, or by right of eminent domain, or by private purchase in lieu thereof (a "**Taking**" or "**Taken**"), and the Taking would in Landlord's reasonable judgment either prevent or materially interfere with Tenant's use of the Premises or materially interfere with or impair Landlord's ownership or operation of the Project, then upon written notice by Landlord this Lease shall terminate and Rent shall be apportioned as of said date. If part of the Premises shall be Taken, and this Lease is not terminated as provided above, Landlord shall promptly restore the Premises and the Project as nearly as is commercially reasonable under the circumstances to their condition prior to such partial Taking and the rentable square footage of the Building, the rentable square footage of the Premises, Tenant's Share of Operating Expenses and the Rent payable hereunder during the unexpired Term shall be reduced to such extent as may be fair and reasonable under the circumstances. Upon any such Taking, Landlord shall be entitled to receive the entire price or award from any such Taking without any payment to Tenant, and Tenant hereby assigns to Landlord Tenant's interest, if any, in such award. Tenant shall have the right, to the extent that same shall not diminish Landlord's award, to make a separate claim against the condemning authority (but not Landlord) for such compensation as may be separately awarded or recoverable by Tenant for moving expenses and damage to Tenant's trade fixtures, if a separate award for such items is made to Tenant. Tenant hereby waives any and all rights it might otherwise have pursuant to any provision of state law to terminate this Lease upon a partial Taking of the Premises or the Project.

20. **Events of Default**. Each of the following events shall be a default ("**Default**") by Tenant under this Lease:

(a) **Payment Defaults**. Tenant shall fail to pay any installment of Rent or any other payment hereunder when due; provided, however, that Landlord will give Tenant notice and an opportunity to cure any failure to pay Rent within 3 days of any such notice not more than once in any 12 month period and Tenant agrees that such notice shall be in lieu of and not in addition to, or shall be deemed to be, any notice required by applicable Legal Requirement.

(b) **Insurance**. Any insurance required to be maintained by Tenant pursuant to this Lease shall be canceled or terminated or shall expire or shall be reduced or materially changed, or Landlord shall receive a notice of nonrenewal of any such insurance and Tenant shall fail to obtain replacement insurance at least 20 days before the expiration of the current coverage.

(c) **Abandonment**. Tenant shall abandon the Premises without (i) the release of the Premises of all Hazardous Materials Clearances and free of any residual impact from the Tenant HazMat Operations, and (ii) complying with the provisions of Section 28.

(d) **Improper Transfer**. Tenant shall assign, sublease or otherwise transfer or attempt to transfer all or any portion of Tenant's interest in this Lease or the Premises in violation of this Lease, or Tenant's interest in this Lease shall be attached, executed upon, or otherwise judicially seized and such action is not released within 90 days of such action.

(e) **Liens**. Tenant shall fail to discharge or otherwise obtain the release of any lien placed upon the Premises in violation of this Lease within 10 days after receipt of notice from Landlord that any such lien is filed against the Premises.

(f) **Insolvency Events**. Tenant or any guarantor or surety of Tenant's obligations hereunder shall: (A) make a general assignment for the benefit of creditors; (B) commence any case, proceeding or other action seeking to have an order for relief entered on its behalf as a debtor or to adjudicate it a bankrupt or insolvent, or seeking reorganization, arrangement, adjustment, liquidation, dissolution or composition of it or its debts or seeking appointment of a receiver, trustee, custodian or other similar official for it or for all or of any substantial part of its property (collectively a "**Proceeding for Relief**"); (C) become the subject of any Proceeding for Relief which is not dismissed within 90 days of its filing or entry; or (D) die or suffer a legal disability (if Tenant, guarantor, or surety is an individual) or be dissolved or otherwise fail to maintain its legal existence (if Tenant, guarantor or surety is a corporation, partnership or other entity).

(g) **Estoppel Certificate or Subordination Agreement**. Tenant fails to execute any document required from Tenant under Sections 23 or 27 within 5 business days after a second notice requesting such document.

(h) **Other Defaults**. Tenant shall fail to comply with any provision of this Lease other than those specifically referred to in this Section 20 and, except as otherwise expressly provided herein, such failure shall continue for a period of 20 days after written notice thereof from Landlord to Tenant.

Any notice given under Section 20(h) hereof shall: (i) specify the alleged default, (ii) demand that Tenant cure such default, (iii) be in lieu of, and not in addition to, or shall be deemed to be, any notice required under any provision of applicable law, and (iv) not be deemed a forfeiture or a termination of this Lease unless Landlord elects otherwise in such notice; provided that if the nature of Tenant's default pursuant to Section 20(h) is such that it cannot be cured by the payment of money and reasonably requires more than 20 days to cure, then Tenant shall not be deemed to be in default if Tenant commences such cure within said 20 day period and thereafter diligently prosecutes the same to completion; provided, however, that such cure shall be completed no later than 45 days from the date of Landlord's notice.

21. **Landlord's Remedies**.

(a) **Interest**. Upon a Default by Tenant hereunder, Landlord may, without waiving or releasing any obligation of Tenant hereunder, make such payment or perform such act. All sums so paid or incurred by Landlord, together with interest thereon, from the date such sums were paid or incurred, at the annual rate equal to 12% per annum or the highest rate permitted by law ("**Default Rate**"), whichever is less, shall be payable to Landlord on demand as Additional Rent. Nothing herein shall be construed to create or impose a duty on Landlord to mitigate any damages resulting from Tenant's Default hereunder.

(b) **Late Payment Rent**. Late payment by Tenant to Landlord of Rent and other sums due will cause Landlord to incur costs not contemplated by this Lease, the exact amount of which will be extremely difficult and impracticable to ascertain. Such costs include, but are not limited to, processing and accounting charges and late charges which may be imposed on Landlord under any Mortgage covering the Premises. Therefore, if any installment of Rent due from Tenant is not received by Landlord within 5 days after the date such payment is due, Tenant shall pay to Landlord an additional sum of 6% of the overdue Rent as a late charge (provided that Tenant shall not be required to pay such late charge upon the first occurrence of a late payment by Tenant of Rent during each calendar year during the Term). The parties agree that this late charge represents a fair and reasonable estimate of the costs Landlord will incur by reason of late payment by Tenant. In addition to the late charge, Rent not paid when due shall bear interest at the Default Rate from the 5th day after the date due until paid.

(c) **Re-Entry**. Landlord shall have the right, immediately or at any time thereafter, without further notice to Tenant (unless otherwise provided herein), to enter the Premises, without terminating this Lease or being guilty of trespass, and do any and all acts as Landlord may deem necessary, proper or convenient to cure such Default, for the account and at the expense of Tenant, any notice to quit or notice of Landlord's intention to re-enter being hereby expressly waived, and Tenant agrees to pay to Landlord as Additional Rent all damage and/or expense incurred by Landlord in so doing, including interest at the Default Rate, from the due date until the date payment is received by Landlord.

(d) **Termination**. Landlord shall have the right to terminate this Lease and Tenant's right to possession of the Premises and, with or without legal process, take possession of the Premises and remove Tenant, any occupant and any property therefrom, using such, force as may be necessary, without being guilty of trespass and without relinquishing any rights of Landlord against Tenant any notice to quit, or notice of Landlord's intention to re-enter being hereby expressly waived. Landlord shall be entitled to recover damages from Tenant for all amounts covenanted to be paid during the remainder of the Term (except for the period of any holdover by Tenant, in which case the monthly rental rate stated at Section 8 herein shall apply), which may be accelerated by Landlord at its option, together with (i) all expenses of any proceedings (including, but not limited to, legal expenses and attorney's fees) which may be necessary in order for Landlord to recover possession of the Premises, (ii) the expenses of the re-renting of the Premises (including, but not limited to, any commissions paid to any real estate agent, advertising expense and the costs of such alterations, repairs, replacements or modifications that Landlord, in its sole judgment, considers advisable and necessary for the purpose of re-renting), and (iii) interest computed at the Default Rate from the due date until paid; provided, however, that there shall be credited against the amount of such damages all amounts received by Landlord from such re-renting of the Premises, with any overage being refunded to Tenant. Landlord shall in no event be liable in any way whatsoever for failure to re-rent the Premises or, in the event that the Premises are re-rented, for failure to collect the rent thereof under such re-renting and Tenant expressly waives any duty of the Landlord to mitigate damages. No act or thing done by Landlord shall be deemed to be an acceptance of a surrender of the Premises, unless Landlord shall execute a written agreement of surrender with Tenant. Tenant's liability hereunder shall not be terminated by the execution of a new lease of the Premises by Landlord, unless that new lease expressly so states. In the event Landlord does not exercise its option to accelerate the payment of amounts owed as provided hereinabove, then Tenant agrees to pay to Landlord, upon demand, the amount of damages herein provided after the amount of such damages for any month shall have been ascertained; provided, however, that any expenses incurred by Landlord shall be deemed to be a part of the damages for the month in which they were incurred. Separate actions may be maintained each month or at other times by Landlord against Tenant to recover the damages then due, without waiting until the end of the term of this Lease to determine the aggregate amount of such damages. Tenant hereby expressly waives any and all rights of redemption granted by or under any present or future laws in the event of Tenant being evicted or being dispossessed for any cause, or in the event of Landlord obtaining possession of the Premises by reason of the violation by Tenant of any of the covenants and conditions of this Lease.

(e) **Lien for Rent**. Upon any default by Tenant in the payment of Rent or other amounts owed hereunder, Landlord shall have a lien upon the property of Tenant in the Premises for the amount of such unpaid amounts, and Tenant hereby specifically waives any and all exemptions allowed by law. In such event, Tenant shall not remove any of Tenant's property from the Premises except with the prior written consent of Landlord, and Landlord shall have the right and privilege, at its option, to take possession of all Tenant's property in the Premises, to store the same on the Premises, or to remove it and store it in such place as may be selected by Landlord, at Tenant's risk and expense. If Tenant fails to redeem the personal property so seized, by payment of whatever sum may be due Landlord hereunder (including all storage costs), Landlord shall have the right, after twenty (20) days written notice to Tenant of its intention to do so, to sell such personal property so seized at public or private sale and upon such terms and conditions as may appear advantageous to Landlord, and after the payment of all proper charges incident to such sale, apply the proceeds thereof to the payment of any balance due to Landlord on account of rent or other obligations of Tenant pursuant to this Lease. In the event there shall then remain in the hands of Landlord any balance realized from the sale of said personal property, the same shall be paid over to Tenant. The exercise of the foregoing remedy by Landlord shall not relieve or discharge Tenant from any deficiency owed to Landlord which Landlord has the right to enforce pursuant to any of the provisions of this Lease. Tenant shall also be liable for all expenses incident to the foregoing process, including any auctioneer or attorney's fees or commissions. At Tenant's request, Landlord shall subordinate its lien rights as set forth in this paragraph to the lien, operation, and effect of any bona fide third party equipment financing pursuant to a subordination agreement in form and substance reasonably acceptable to Landlord. Such subordination shall be limited to specific items of equipment and shall not be in the form of a blanket lien subordination.

(f) **Other Remedies**. In addition to the foregoing, Landlord, at its option, without further notice or demand to Tenant, shall have all other rights and remedies provided at law or in equity.

22. **Assignment and Subletting**.

(a) **General Prohibition**. Without Landlord's prior written consent subject to and on the conditions described in this Section 22, Tenant shall not, directly or indirectly, voluntarily or by operation of law, assign this Lease or sublease the Premises or any part thereof or mortgage, pledge, or hypothecate its leasehold interest or grant any concession or license within the Premises, and any attempt to do any of the foregoing shall be void and of no effect. If Tenant is a corporation, partnership or limited liability company, the shares or other ownership interests thereof which are not actively traded upon a stock exchange or in the over-the-counter market, a transfer or series of transfers whereby 25% or more of the issued and outstanding shares or other ownership interests of such corporation are, or voting control is, transferred (but excepting transfers upon deaths of individual owners) from a person or persons or entity or entities which were owners thereof at time of execution of this Lease to persons or entities who were not owners of shares or other ownership interests of the corporation, partnership or limited liability company at time of execution of this Lease, shall be deemed an assignment of this Lease requiring the consent of Landlord as provided in this Section 22. Notwithstanding the foregoing, any public offering of shares or other ownership interest in Tenant shall not be deemed an assignment.

(b) **Permitted Transfers**. If Tenant desires to assign, sublease, hypothecate or otherwise transfer this Lease or sublet the Premises other than pursuant to a Permitted Assignment (as defined below), then at least 15 business days, but not more than 45 business days, before the date Tenant desires the assignment or sublease to be effective ("**Assignment Date**"), Tenant shall give Landlord a notice ("**Assignment Notice**") containing such information about the proposed assignee or sublessee, including the proposed use of the Premises and any Hazardous Materials proposed to be used, stored handled, treated, generated in or released or disposed of from the Premises, the Assignment Date, any relationship between Tenant and the proposed assignee or sublessee, and all material terms and conditions of the proposed assignment or sublease ("**Term Sheet**"), and such other information as Landlord may deem reasonably necessary or appropriate to its consideration whether to grant its consent. Landlord may, by giving written notice to Tenant within 15 business days after receipt of the Assignment Notice: (i) grant such consent, subject to Landlord's review and approval or disapproval of the proposed assignment or sublease in its final form (which final form shall be consistent in all material respects with the Term Sheet) prior to the effective date of any such assignment or subletting, (ii) refuse such consent, in its sole and absolute discretion, if the proposed assignment, hypothecation or other transfer or subletting concerns more than (together with all other then effective subleases) 50% of the Premises, (iii) refuse such consent, in its reasonable discretion, if the proposed subletting concerns (together with all other then effective subleases) 50% or less of the Premises, or (iv) terminate this Lease with respect to the space described in the Assignment Notice as of the Assignment Date (an "**Assignment Termination**"). If Landlord delivers notice of its election to exercise an Assignment Termination, Tenant shall have the right to withdraw such Assignment Notice by written notice to Landlord of such election within 5 business days after Landlord's notice electing to exercise the Assignment Termination. If Tenant withdraws such Assignment Notice, this Lease shall continue in full force and effect. If Tenant does not withdraw such Assignment Notice, this Lease, and the term and estate herein granted, shall terminate as of the Assignment Date with respect to the space described in such Assignment Notice. No failure of Landlord to exercise any such option to terminate this Lease, or to deliver a timely notice in response to the Assignment Notice, shall be deemed to be Landlord's consent to the proposed assignment, sublease or other transfer. Tenant shall reimburse Landlord for all of Landlord's reasonable out-of-pocket expenses in connection with its consideration of any Assignment Notice.

Notwithstanding the foregoing, (A) Tenant shall have the right to assign this Lease, upon 30 days prior written notice to Landlord but without obtaining Landlord's prior written consent, to a corporation or other entity that is a successor-in-interest to Tenant, by way of merger, consolidation, or corporate reorganization, or by the purchase of all or substantially all of the assets, stock (including options to purchase stock), or the ownership interests of Tenant provided that (i) such merger or consolidation, or such acquisition or assumption, as the case may be, is for a good business purpose and not principally for the purpose of transferring this Lease, and (ii) the net worth (as determined in accordance with generally accepted accounting principles ("**GAAP**")) of the assignee is not less than the net worth (as determined in accordance with GAAP) of Tenant as of the date of Tenant's most current quarterly or annual financial statements, and (iii) such assignee shall agree in writing to assume all of the terms, covenants, and conditions of this Lease arising after the effective date of the assignment, and (B) Landlord's consent to an assignment of this Lease or a subletting of any portion of the Premises to any entity controlling, controlled by or under common control with Tenant shall not be required, provided that Landlord shall have the right to approve the form of any such sublease or assignment (each of the transactions described in this paragraph constitute a "**Permitted Assignment**").

(c) **Additional Conditions**. As a condition to any such assignment or subletting, whether or not Landlord's consent is required, Landlord may require:

(i) that any assignee or subtenant agree, in writing at the time of such assignment or subletting, that if Landlord gives such party notice that Tenant is in Default under this Lease, such party shall thereafter make all payments otherwise due Tenant directly to Landlord, which payments will be received by Landlord without any liability except to credit such payment against those due under this Lease, and any such third party shall agree to attorn to Landlord or its successors and assigns should this Lease be terminated for any reason; provided, however, in no event shall Landlord or its successors or assigns be obligated to accept such attornment; and

(ii) A list of Hazardous Materials, certified by the proposed assignee or sublessee to be true and correct, which the proposed assignee or sublessee intends to use, store, handle, treat, generate in or release or dispose of from the Premises, together with copies of all documents relating to such use, storage, handling, treatment, generation, release or disposal of Hazardous Materials by the proposed assignee or subtenant in the Premises or on the Project prior to the proposed assignment or subletting, including, without limitation; permits; approvals; reports and correspondence; storage and management plans; plans relating to the installation of any storage tanks to be installed in or under the Project (provided, said installation of tanks shall only be permitted after Landlord has given its written consent to do so, which consent may be withheld in Landlord's sole and absolute discretion); and all closure plans or any other documents required by any and all federal, state and local Governmental Authorities for any storage tanks installed in, on or under the Project for the closure of any such tanks. Neither Tenant nor any such proposed assignee or subtenant is required, however, to provide Landlord with any portion(s) of the-such documents containing information of a proprietary nature which, in and of themselves, do not contain a reference to any Hazardous Materials or hazardous activities.

(d) **No Release of Tenant, Sharing of Excess Rents**. Notwithstanding any assignment or subletting, Tenant and any guarantor or surety of Tenant's obligations under this Lease shall at all times remain fully and primarily responsible and liable for the payment of Rent and for compliance with all of Tenant's other obligations under this Lease. If the Rent due and payable by a sublessee or assignee (or a combination of the rental payable under such sublease or assignment plus any bonus or other consideration therefor or incident thereto in any form) exceeds the sum of the rental payable under this Lease (excluding, however, any Rent payable under this Section) and actual and reasonable brokerage fees, legal costs, and any design or construction fees directly related to and required pursuant to the terms of any such sublease ("**Excess Rent**"), then Tenant shall be bound and obligated to pay Landlord as Additional Rent hereunder 50% of such Excess Rent within 10 days following receipt thereof by Tenant If Tenant shall sublet the Premises or any part thereof, Tenant hereby immediately and irrevocably assigns to Landlord, as security for Tenant's obligations under this Lease, all rent from any such subletting, and Landlord as assignee and as attorney-in-fact for Tenant, or a receiver for Tenant appointed on Landlord's application, may collect such rent and apply it toward Tenant's obligations under this Lease; except that, until the occurrence of a Default, Tenant shall have the right to collect such rent.

(e) **No Waiver**. The consent by Landlord to an assignment or subletting shall not relieve Tenant or any assignees of this Lease or any sublessees of the Premises from obtaining the consent of Landlord to any further assignment or subletting nor shall it release Tenant or any assignee or sublessee of Tenant from full and primary liability under this Lease. The acceptance of Rent hereunder, or the acceptance of performance of any other term, covenant, or condition thereof, from any other person or entity shall not be deemed to be a waiver of any of the provisions of this Lease or a consent to any subletting, assignment or other transfer of the Premises.

(f) **Prior Conduct of Proposed Transferee**. Notwithstanding any other provision of this Section 22, if (i) the proposed assignee or sublessee of Tenant has been required by any prior landlord, lender or Governmental Authority to take remedial action in connection with Hazardous Materials contaminating a property, where the contamination resulted from such party's action or use of the property in question, (ii) the proposed assignee or sublessee is subject to an enforcement order issued by any Governmental Authority in connection with the use, storage, handling, treatment, generation, release or disposal of Hazardous Materials (including, without limitation, any order related to the failure to make a required reporting to any Governmental Authority), or (iii) because of the existence of a pre-existing environmental condition in the vicinity of or underlying the Project, the risk that Landlord would be targeted as a responsible party in connection with the remediation of such pre-existing environmental condition would be materially increased or exacerbated by the proposed use of Hazardous Materials by such proposed assignee or sublessee, Landlord shall have the absolute right to refuse to consent to any assignment or subletting to any such party.

23. **Estoppel Certificate**. Tenant shall, within 10 business days of written notice from Landlord, execute, acknowledge and deliver a statement in writing in any form reasonably requested by a proposed lender or purchaser, (i) certifying that this Lease is unmodified and in full force and effect (or, if modified, stating the nature of such modification and certifying that this Lease as so modified is in full force and effect) and the dates to which the rental and other charges are paid in advance, if any, (ii) acknowledging that there are not any uncured defaults on the part of Landlord hereunder, or specifying such defaults if any are claimed, and (iii) setting forth such further factual information with respect to the status of this Lease or the Premises as may be requested thereon. Any such statement may be relied upon by any prospective purchaser or encumbrances of all or any portion of the real property of which the Premises are a part Tenant's failure to deliver such statement within such time shall, at the option of Landlord, be conclusive upon Tenant that this Lease is in full force and effect and without modification except as may be represented by Landlord in any certificate prepared by Landlord and delivered to Tenant for execution.

24. **Quiet Enjoyment**. So long as Tenant shall perform within any applicable grace or cure periods after applicable notice all of the covenants and agreements herein required to be performed by Tenant, Tenant shall, subject to the terms of this Lease, at all times during the Term, have peaceful and quiet enjoyment of the Premises against any person claiming by, through or under Landlord.

25. **Prorations**. All proration required or permitted to be made hereunder shall be made on the basis of a 360 day year and 30 day months.

26. **Rules and Regulations**. Tenant shall, at all times during the Term and any extension thereof, comply with all reasonable rules and regulations of uniform application at any time or from time to time established by Landlord covering use of the Premises and the Project. The current rules and regulations are attached hereto as **Exhibit E**. If there is any conflict between said rules and regulations and other provisions of this Lease, the terms and provisions of this Lease shall control. Landlord shall not have any liability or obligation for the breach of any rules or regulations by other tenants in the Project and shall not enforce such rules and regulations in a discriminatory manner.

27. **Subordination**. This Lease and Tenant's interest and rights hereunder are hereby made and shall be subject and subordinate at all times to the lien of any Mortgage now existing or hereafter created on or against the Project or the Premises, and all amendments, restatements, renewals, modifications, consolidations, refinancing, assignments and extensions thereof, without the necessity of any further instrument or act on the part of Tenant; provided however that so long as there is no Default hereunder, Tenant's right to possession of the Premises shall not be disturbed by the Holder of any such Mortgage. Tenant agrees, at the election of the Holder of any such Mortgage, to attorn to any such Holder. Tenant agrees upon demand to execute, acknowledge and deliver such instruments, confirming such subordination, and such instruments of attornment as shall be requested by any such Holder, provided any such instruments contain appropriate non-disturbance provisions assuring Tenant's quiet enjoyment of the Premises as set forth in Section 24 hereof. Notwithstanding the foregoing, any such Holder may at any time subordinate its Mortgage to this Lease, without Tenant's consent, by notice in writing to Tenant, and thereupon this Lease shall be deemed prior to such Mortgage without regard to their respective dates of execution, delivery or recording and in that event such Holder shall have the same rights with respect to this Lease as though this Lease had been executed prior to the execution, delivery and recording of such Mortgage and had been assigned to such Holder. On Tenant's written request, Landlord shall use its commercially reasonable efforts (but with no obligation to pay any out-of-pocket fees or sums) to obtain from any Holder of a first lien Mortgage at any time during the Term covering any or all of the Project or the Premises a non-disturbance agreement on Holders standard form in favor of Tenant assuring Tenant's quiet enjoyment of the Premises as set forth in Section 24 hereof. The term "**Mortgage**" whenever used in this Lease shall be deemed to include deeds of trust, security assignments and any other encumbrances, and any reference to the "**Holder**" of a Mortgage shall be deemed to include the beneficiary under a deed of trust and any successors and assigns, including, without limitation, any purchaser at a foreclosure sale or taker under a deed in lieu of foreclosure and its or their successors and assigns.

28. **Surrender**. Upon the expiration of the Term or earlier termination of Tenant's right of possession, Tenant shall surrender the Premises to Landlord in the same condition as received, subject to, any Alterations or Installations permitted by Landlord to remain in the Premises, free of Hazardous Materials brought upon, kept, used, stored, handled, treated, generated in, or released or disposed of from, the Premises by any person other than a Landlord Party (collectively, "**Tenant HazMat Operations**") and released of all Hazardous Materials Clearances, broom clean, ordinary wear and tear and casualty loss and condemnation covered by Sections 18 and 19, and repairs for which Landlord is responsible hereunder excepted. At least 3 months prior to the surrender of the Premises, Tenant shall deliver to Landlord a narrative description of the actions proposed (or required by any Governmental Authority) to be taken by Tenant in order to surrender the Premises (including any Installations permitted by Landlord to remain in the Premises) at the expiration or earlier termination of the Term, free from any residual impact from the Tenant HazMat Operations and otherwise released for unrestricted use and occupancy ("**Surrender Plan**"). Such Surrender Plan shall be accompanied by a current listing of (i) all Hazardous Materials licenses and permits held by or on behalf of any Tenant Party with respect to the Premises, and (ii) all Hazardous Materials used, stored, handled, treated, generated, released or disposed of from the Premises, and shall be subject to the review and approval of Landlord's environmental consultant, such approval not to be unreasonably withheld, delayed, or conditioned. In connection with the review and approval of the Surrender Plan, upon the request of Landlord, Tenant shall deliver to Landlord or its consultant such additional non-proprietary information concerning Tenant HazMat Operations as Landlord shall request. On or before such surrender, Tenant shall deliver to Landlord evidence that the approved Surrender Plan shall have been satisfactorily completed and Landlord shall have the right, subject to reimbursement at Tenant's expense as set forth below, to cause Landlord's environmental consultant to inspect the Premises and perform such additional procedures as may be deemed reasonably necessary to confirm that the Premises are, as of the effective date of such surrender or early termination of this Lease, free from any residual impact from Tenant HazMat Operations. Tenant shall reimburse Landlord, as Additional Rent, for the actual out-of pocket expense incurred by Landlord for Landlord's environmental consultant to review and approve the Surrender Plan and to visit the Premises and verify satisfactory completion of the same, which cost shall not exceed $2,500. Landlord shall have the unrestricted right to deliver such Surrender Plan and any report by Landlord's environmental consultant with respect to the surrender of the Premises to third parties.

If Tenant shall fail to prepare or submit a Surrender Plan approved by Landlord, or if Tenant shall fail to complete the approved Surrender Plan, or if such Surrender Plan, whether or not approved by Landlord, shall fail to adequately address any residual effect of Tenant HazMat Operations in, on or about the Premises, Landlord shall have the right to take such actions as Landlord may reasonably deem appropriate to assure that the Premises and the Project are surrendered free from any residual impact from Tenant HazMat Operations, the cost of which actions shall be reimbursed by Tenant as Additional Rent, without regard to the limitation set forth in the first paragraph of this Section 28.

Tenant shall immediately return to Landlord all keys and/or access cards to parking, the Project, restrooms or all or any portion of the Premises furnished to or otherwise procured by Tenant. If any such access card or key is lost, Tenant shall pay to Landlord, at Landlord's election, either the cost of replacing such lost access card or key or the cost of reprogramming the access security system in which such access card was used or changing the lock or locks opened by such lost key. Any Tenant's Property, Alterations and property not so removed by Tenant as permitted or required herein shall be deemed abandoned and may be stored, removed, and disposed of by Landlord at Tenant's expense, and Tenant waives all claims against Landlord for any damages resulting from Landlord's retention and/or disposition of such property. All obligations of Tenant hereunder not fully performed as of the termination of the Term, including the obligations of Tenant under Section 30 hereof, shall survive the expiration or earlier termination of the Term, including, without limitation, indemnity obligations, payment obligations with respect to Rent and obligations concerning the condition and repair of the Premises.

29. **Waiver of Jury Trial**. TENANT AND LANDLORD WAIVE ANY RIGHT TO TRIAL BY JURY OR TO HAVE A JURY PARTICIPATE IN RESOLVING ANY DISPUTE, WHETHER SOUNDING IN CONTRACT, TORT, OR OTHERWISE, BETWEEN LANDLORD AND TENANT ARISING OUT OF THIS LEASE OR ANY OTHER INSTRUMENT, DOCUMENT, OR AGREEMENT EXECUTED OR DELIVERED 1N CONNECTION HEREWITH OR THE TRANSACTIONS RELATED HERETO.

30. **Environmental Requirements**.

(a) **Prohibition/Compliance/Indemnity**. Tenant shall not cause or permit any Hazardous Materials (as hereinafter defined) to be brought upon, kept, used, stored, handled, treated, generated in or about, or released or disposed of from, the Premises or the Project in violation of applicable Environmental Requirements (as hereinafter defined) by Tenant or any Tenant Party. If Tenant breaches the obligation stated in the preceding sentence, or if the presence of Hazardous Materials in the Premises during the Term or any holding over results in contamination of the Premises, the Project or any adjacent property or if contamination of the Premises, the Project or any adjacent property by Hazardous Materials brought into, kept, used, stored, handled, treated, generated in or about, or released or disposed of from, the Premises by anyone other than Landlord and Landlord's employees, agents and contractors otherwise occurs during the Term or any holding over, Tenant hereby indemnifies and shall defend and hold Landlord, its officers, directors, employees, agents and contractors harmless from any and all actions (including, without limitation, remedial or enforcement actions of any kind, administrative or judicial proceedings, and orders or judgments arising out of or resulting therefrom), costs, claims, damages (including, without limitation, punitive damages and damages based upon diminution in value of the Premises or the Project, or the loss of, or restriction on, use of the Premises or any portion of the Project), expenses (including, without limitation, attorneys", consultants" and experts" fees, court costs and amounts paid in settlement of any claims or actions), fines, forfeitures or other civil, administrative or criminal penalties, injunctive or other relief (whether or not based upon personal injury, property damage, or contamination of, or adverse effects upon, the environment, water tables or natural resources), liabilities or losses (collectively, "**Environmental Claims**") which arise during or after the Term as a result of such contamination. This indemnification of Landlord by Tenant includes, without limitation, costs incurred in connection with any investigation of site conditions or any cleanup, treatment, remedial, removal, or restoration work required by any federal, state or local Governmental Authority because of Hazardous Materials present in the air, soil or ground water above, on, or under the Premises. Without limiting the foregoing, if the presence of any Hazardous Materials on the Premises, the Project or any adjacent property caused or permitted by Tenant or any Tenant Party results in any contamination of the Premises, the Project or any adjacent property, Tenant shall promptly take all actions at Its sole expense and in accordance with applicable Environmental Requirements as are necessary to return the Premises, the Project or any adjacent property to the condition existing prior to the time of such contamination, provided that Landlord's approval of such action shall first be obtained, which approval shall not unreasonably be withheld so long as such actions would not potentially have any material adverse long-term or short-term effect on the Premises or the Project.

(b) **Business**. Landlord acknowledges that it is not the intent of this Section 30 to prohibit Tenant from using the Premises for the Permitted Use. Tenant may operate its business according to prudent industry practices so long as the use or presence of Hazardous Materials is strictly and properly monitored according to all then applicable Environmental Requirements. As a material inducement to Landlord to allow Tenant to use Hazardous Materials in connection with its business, Tenant agrees to deliver to Landlord prior to the Commencement Date a list identifying each type of Hazardous Materials to be brought upon, kept, used, stored, handled, treated, generated on, or released or disposed of from, the Premises and setting forth any and all governmental approvals or permits required in connection with the presence, use, storage, handling, treatment, generation, release or disposal of such Hazardous Materials on or from the Premises ("**Hazardous Materials List**"). Tenant shall deliver to Landlord an updated Hazardous Materials List at least once a year and shall also deliver an updated list before any new Hazardous Material is brought onto, kept, used, stored, handled, treated, generated on, or released or disposed of from, the Premises. Tenant shall deliver to Landlord true and correct copies of the following documents ("**Haz Mat Documents**") relating to the use, storage, handling, treatment, generation, release or disposal of Hazardous Materials prior to the Commencement Date, or if unavailable at that time, concurrent with the receipt from or submission to a Governmental Authority: permits; approvals; reports and correspondence; storage and management plans, notice of violations of any Legal Requirements; plans relating to the installation of any storage tanks to be installed in or under the Project (provided, said installation of tanks shall only be permitted after Landlord has given Tenant its written consent to do so, which consent may be withheld in Landlord's sole and absolute discretion); all closure plans or any other documents required by any and all federal, state and local Governmental Authorities for any storage tanks installed by or on behalf of Tenant or any Tenant Party in, on or under the Project for the closure of any such tanks; and a Surrender Plan (to the extent surrender in accordance with Section 28 cannot be accomplished in 3 months). Tenant is not required, however, to provide Landlord with any portion(s) of the Haz Mat Documents containing information of a proprietary nature which, in and of themselves, do not contain a reference to any Hazardous Materials or hazardous activities. It is not the intent of this Section to provide Landlord with information which could be detrimental to Tenant's business should such information become possessed by Tenant's competitors.

(c) **Tenant Representation and Warranty**. Tenant hereby represents and warrants to Landlord that (i) neither Tenant nor to the best of its knowledge any of its legal predecessors has been required by any Governmental Authority, nor to the best of Tenant's knowledge any prior landlord or lender at any time to take remedial action in connection with Hazardous Materials contaminating a property which contamination was permitted by Tenant or such predecessor or resulted from Tenant's or such predecessors action or use of the property in question, and (ii) Tenant is not subject to any enforcement order issued by any Governmental Authority in connection with the use, storage, handling, treatment, generation, release or disposal of Hazardous Materials (including, without limitation, any order related to the failure to make a required reporting to any Governmental Authority). If Landlord determines that this representation and warranty was not true as of the date of this lease, Landlord shall have the right to terminate this Lease in Landlord's sole and absolute discretion.

(d) **Testing**. Landlord shall have the right to conduct annual tests of the Premises to determine whether any contamination of the Premises or the Project has occurred as a result of Tenant's use. Tenant shall be required to pay the cost of such annual test of the Premises; provided, however, that if Tenant conducts its own tests of the Premises using third party contractors and test procedures acceptable to Landlord which tests are certified to Landlord, Landlord shall accept such tests in lieu of the annual tests to be paid for by Tenant. In addition, at any time, and from time to time, prior to the expiration or earlier termination of the Term, Landlord shall have the right, upon 7 days' notice unless a shorter period is necessary to meet the requirements of a Governmental Authority or lender, to conduct appropriate tests of the Premises and the Project to determine if contamination has occurred as a result of Tenant's use of the Premises if Landlord reasonably believes that such contamination has occurred or If such testing is requested by Landlord's lender, a prospective purchaser, or Governmental Authority or required by applicable Legal Requirements. In connection with such testing, upon the request of Landlord, Tenant shall deliver to Landlord or its consultant such non-proprietary information concerning the use of Hazardous Materials in or about the Premises by Tenant or any Tenant Party. If contamination has occurred for which Tenant is liable under this Section 30, Tenant shall pay all costs to conduct such tests. If no such contamination is found, Landlord shall pay the costs of such tests (which shall not constitute an Operating Expense). Landlord shall provide Tenant with a copy of all third party, non-confidential reports and tests of the Premises made by or on behalf of Landlord during the Term without representation or warranty and subject to a confidentiality agreement. Tenant shall, at its sole cost and expense, promptly and satisfactorily remediate any environmental conditions identified by such testing in accordance with all Environmental Requirements, Landlord's receipt of or satisfaction with any environmental assessment in no way waives any" rights which Landlord may have against Tenant.

(e) **Underground Tanks**. If underground or other storage tanks storing Hazardous Materials located on the Premises or the Project are used by Tenant or are hereafter placed on the Premises or the Project by Tenant, Tenant shall install, use, monitor, operate, maintain, upgrade and manage such storage tanks, maintain appropriate records, obtain and maintain appropriate insurance, implement reporting procedures, properly close any underground storage tanks used or placed on the Project by Tenant or any Tenant Party, and take care or cause to be taken all other actions necessary or required under applicable state and federal Legal Requirements, as such now exists or may hereafter be adopted or amended in connection with the installation, use, maintenance, management, operation, upgrading and closure of such storage tanks used or placed on the Project by Tenant or any Tenant Party.

(f) **Tenant's Obligations**. Tenant's obligations under this Section 30 shall survive the expiration or earlier termination of this Lease. During any period of time after the expiration or earlier termination of this Lease required by Tenant or Landlord to complete the removal from the Premises of any Hazardous Materials (including, without limitation, the release and termination of any licenses or permits restricting the use of the Premises and the completion of the approved Surrender Plan), Tenant shall continue to pay the full Rent in accordance with this Lease for any portion of the Premises not relet by Landlord in Landlord's sole discretion, which Rent shall be prorated daily.

(g) **Definitions**. As used herein, the term "**Environmental Requirements**" means all applicable present and future statutes, regulations, ordinances, rules, codes, judgments, orders or other similar enactments of any Governmental Authority regulating or relating to health, safety, or environmental conditions on, under, or about the Premises or the Project, or the environment, including without limitation, the following: the Comprehensive Environmental Response, Compensation and Liability Act; the Resource Conservation and Recovery Act and all state and local counterparts thereto, and any regulations or policies promulgated or issued thereunder. As used herein, the term "**Hazardous Materials**" means and includes any substance, material, waste, pollutant, or contaminant listed or defined as hazardous or toxic, or regulated by reason of its impact or potential impact on humans, animals and/or the environment under any Environmental Requirements, asbestos and petroleum, including crude oil or any fraction thereof, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). As defined in Environmental Requirements, Tenant is and shall be deemed to be the "**operator**" of Tenant's "**facility**" and the "**owner**" of all Hazardous Materials brought on the Premises by Tenant or any Tenant Party, and the wastes, by-products, or residues generated, resulting, or produced therefrom.

(h) **Reports**. Whenever Landlord requests reports, documents, or other materials from Tenant relating to Hazardous Materials under this Lease and such reports, documents, or other materials contain Tenant's trade secret or proprietary information, as a condition to the production of such reports, Tenant may redact any trade secrets or proprietary information from such reports, documents, or other materials as long as any information regarding Hazardous Materials is not so redacted.

31. **Tenant's Remedies/Limitation of Liability**. Landlord shall not be in default hereunder unless Landlord fails to perform any of its obligations hereunder within 30 days after written notice from Tenant specifying such failure (unless such performance will, due to the nature of the obligation, require a period of time in excess of 30 days, then after such period of time as is reasonably necessary). Upon any default by Landlord, Tenant shall give notice by registered or certified mail to any Holder of a Mortgage covering the Premises and to any landlord of any lease of property in or on which the Premises are located and Tenant shall offer such Holder and/or landlord a reasonable opportunity to cure the default, including time to obtain possession of the Project by power of sale or a judicial action if such should prove necessary to effect a cure; provided Landlord shall have furnished to Tenant in writing the names and addresses of all such persons who are to receive such notices. All obligations of Landlord hereunder shall be construed as covenants, not conditions; and, except as may be otherwise expressly provided in this Lease, Tenant may not terminate this Lease for breach of Landlord's obligations hereunder.

All obligations of Landlord under this Lease will be binding upon Landlord only during the period of its ownership of the Premises and not thereafter. The term "**Landlord**" in this Lease shall mean only the owner for the time being of the Premises. Upon the transfer by such owner of its interest in the Premises, such owner shall thereupon be released and discharged from all obligations of Landlord thereafter accruing, but such obligations shall be binding during the Term upon each new owner for the duration of such owner's ownership.

32. **Inspection and Access**. Landlord and its agents, representatives, and contractors may enter the Premises at any reasonable time to inspect the Premises and to make such repairs as may be required or permitted pursuant to this Lease and for any other business purpose, Landlord and Landlord's representatives may enter the Premises during business hours on not less than 48 hours advance written notice (except in the case of emergencies in which case no such notice shall be required and such entry may be at any time) for the purpose of effecting any such repairs, inspecting the Premises, showing the Premises to prospective purchasers and, during the last year of the Term, to prospective tenants or for any other business purpose. Landlord may erect a suitable sign on the Premises stating the Premises are available to let or that the Project is available for sale. Landlord may grant easements, make public dedications, designate Common Areas and create restrictions on or about the Premises, provided that no such easement, dedication, designation or restriction materially, adversely affects Tenant's use or occupancy of the Premises for the Permitted Use. At Landlord's request, Tenant shall execute such instruments as may be necessary for such easements, dedications or restrictions. Tenant shall at all times, except in the case of emergencies, have the right to accompany Landlord or its agents, representatives, contractors or guests while the same are in the Premises, provided such escort does not materially and adversely affect Landlord's access rights hereunder.

33. **Security**. Tenant acknowledges and agrees that security devices and services, if any, while intended to deter crime may not in given instances prevent theft or other criminal acts and that Landlord is not providing any security services with respect to the Premises. Tenant agrees that Landlord shall riot be liable to Tenant for, and Tenant waives any claim against Landlord with respect to, any loss by theft or any other damage suffered or incurred by Tenant in connection with any unauthorized entry into the Premises or any other breach of security with respect to the Premises: Tenant shall be solely responsible for the personal safety of Tenant's officers, employees, agents, contractors, guests and invitees while any such person is in, on or about the Premises and/or the Project. Tenant shall at Tenant's cost obtain insurance coverage to the extent Tenant desires protection against such criminal acts.

34. **Force Majeure**. Neither party shall be responsible or liable for delays in the performance of its obligations hereunder when caused by, related to, or arising out of acts of God, strikes, lockouts, or other labor disputes, embargoes, quarantines, weather, national, regional, or local disasters, calamities, or catastrophes, inability to obtain labor or materials (or reasonable substitutes therefor) at reasonable costs or failure of, or inability to obtain, utilities necessary for performance, governmental restrictions, orders, limitations, regulations, or controls, national emergencies, delay in issuance or revocation of permits, enemy or hostile governmental action, terrorism, insurrection, riots, civil disturbance or commotion, fire or other casualty, and other causes or events beyond the reasonable control of Landlord ("**Force Majeure**"); provided, however, that in no event shall Force Majeure excuse Tenant from performing any monetary obligation under this Lease.

35. **Brokers**. Landlord and Tenant each represents and warrants that it has not dealt with any broker, agent or other person (collectively, "**Broker**") in connection with this transaction and that no Broker brought about this transaction, other than Scheer Partners, Inc. ("**SPI**"). Landlord and Tenant each hereby agree to indemnify and hold the other harmless from and against any claims by any Broker, other than SPI, if any named in this Section 35, claiming a commission or other form of compensation by virtue of having dealt with Tenant or Landlord, as applicable, with regard to this leasing transaction. Landlord shall pay the commission of SPI pursuant to a separate agreement between Landlord and SPI, and Landlord agrees to indemnify and hold Tenant harmless from and against any claims by SPI for a commission or other form of compensation by virtue of having dealt with Tenant or Landlord, as applicable, with regard to this leasing transaction.

36. **Limitation on Landlord's Liability**. NOTWITHSTANDING ANYTHING SET FORTH HEREIN OR IN ANY OTHER AGREEMENT BETWEEN LANDLORD AND TENANT TO THE CONTRARY: (A) LANDLORD SHALL NOT BE LIABLE TO TENANT OR ANY OTHER PERSON FOR (AND TENANT AND EACH SUCH OTHER PERSON ASSUME ALL RISK OF) LOSS, DAMAGE OR INJURY, WHETHER ACTUAL OR CONSEQUENTIAL TO: TENANT'S PERSONAL PROPERTY OF EVERY KIND AND DESCRIPTION, INCLUDING, WITHOUT LIMITATION TRADE FIXTURES, EQUIPMENT, INVENTORY, SCIENTIFIC RESEARCH, SCIENTIFIC EXPERIMENTS, LABORATORY ANIMALS, PRODUCT, SPECIMENS, SAMPLES, AND/OR SCIENTIFIC, BUSINESS, ACCOUNTING AND OTHER RECORDS OF EVERY KIND AND DESCRIPTION KEPT AT THE PREMISES AND ANY AND ALL INCOME DERIVED OR DERIVABLE THEREFROM; (B) THERE SHALL BE NO PERSONAL RECOURSE TO LANDLORD FOR ANY ACT OR OCCURRENCE IN, ON OR ABOUT THE PREMISES OR ARISING IN ANY WAY UNDER THIS LEASE OR ANY OTHER AGREEMENT BETWEEN LANDLORD AND TENANT WITH RESPECT TO THE SUBJECT MATTER HEREOF AND ANY LIABILITY OF LANDLORD HEREUNDER SHALL BE STRICTLY LIMITED SOLELY TO LANDLORD'S INTEREST IN THE PROJECT OR ANY PROCEEDS FROM SALE OR CONDEMNATION THEREOF AND ANY INSURANCE PROCEEDS PAYABLE IN RESPECT OF LANDLORD'S INTEREST IN THE PROJECT OR IN CONNECTION WITH ANY SUCH LOSS; AND (C) IN NO EVENT SHALL ANY PERSONAL LIABILITY BE ASSERTED AGAINST ANY OF LANDLORD'S OFFICERS, DIRECTORS, EMPLOYEES, AGENTS OR CONTRACTORS. UNDER NO CIRCUMSTANCES SHALL LANDLORD OR ANY OF LANDLORD'S OFFICERS, DIRECTORS, EMPLOYEES, AGENTS OR CONTRACTORS BE LIABLE FOR INJURY TO TENANT'S BUSINESS OR FOR ANY LOSS OF INCOME OR PROFIT THEREFROM.

37. **Severability**. If any clause or provision of this Lease is illegal, invalid or unenforceable under present or future laws, then and in that event, it is the intention of the parties hereto that the remainder of this Lease shall not be affected thereby. It is also the intention of the parties to this Lease that in lieu of each clause or provision of this Lease that is illegal, invalid or unenforceable, there be added, as a part of this Lease, a clause or provision as similar in effect to such illegal, invalid or unenforceable clause or provision as shall be legal, valid and enforceable. This Lease, including the exhibits attached hereto, constitutes the entire agreement between Landlord and Tenant pertaining to the subject matter hereof and supersedes all prior agreements, understandings, letters of intent, negotiations, and discussions, whether oral or written, of the parties, and there are no warranties, representations, or other agreements, express or implied, made to either party by the other party in connection with the subject matter hereof except as specifically set forth herein or in the documents delivered pursuant hereto or in connection herewith. Any amendments or modifications of this Lease shall be in writing and signed by both Landlord and Tenant, and any other attempted amendment or modification of this Lease shall be void.

38. **Signs; Exterior Appearance**. Tenant shall not, without the prior written consent of Landlord, which may be granted or withheld in Landlord's sole discretion: (i) attach any awnings, exterior lights, decorations, balloons, flags, pennants, banners, painting or other projection to any outside wall of the Project, (ii) use any curtains, blinds, shades or screens other than Landlord's standard window coverings, (iii) coat or otherwise sunscreen the interior or exterior of any windows, (iv) place any bottles, parcels, or other articles on the window sills, (v) place any equipment, furniture or other items of personal property on any exterior balcony, or (vi) paint, affix or exhibit on any part of the Premises or the Project any signs, notices, window or door lettering, placards, decorations, or advertising media of any type which can be viewed from the exterior of the Premises. Interior signs on doors and the directory tablet shall be inscribed, painted or affixed for Tenant by Landlord at the sole cost and expense of Tenant, and shall be of a size, color and type acceptable to Landlord. Nothing may be placed on the exterior of corridor walls or corridor doors other than Landlords standard lettering. The directory tablet shall be provided exclusively for the display of the name and location of tenants. Tenant shall have the right, at Landlord's expense, to install a sign on the existing pylon sign serving the Project facing Quince Orchard Road, with the exact location to be mutually agreed-upon by both Landlord and Tenant. Such Tenant signage shall be of a size, style, and appearance reasonably acceptable to Landlord and shall comply with all applicable Legal Requirements.

39. **Right to Expand**.

(a) **Expansion In the Project**. Tenant shall have the right, but not the obligation, to expand the Premises ("**Expansion Right**") to include the Available Space in the Project upon the terms and conditions in this Section. For purposes of this Section 39(a), "**Available Space**" shall mean the space on the first floor of the Project adjacent to the First Floor Premises containing approximately 5,466 rentable square feet of space as shown on **Exhibit A** attached hereto that is not occupied by a tenant or that is occupied by an existing tenant whose lease is expiring within 6 months or less and such tenant does not wish to renew (regardless of whether such tenant has a right to renew) its occupancy of such space. The Expansion Right shall expire in all events on the first anniversary of the Rent Commencement Date. If there is any Available Space in the Project, Landlord shall, at such time as Landlord shall elect so long as Tenant's rights hereunder are preserved, deliver to Tenant written notice ("**Expansion Notice**") of such Available Space and the date when the Available Space will become available. The lease of the Expansion Space shall be on the same terms and conditions of this Lease; provided, however, that the duration of the rental abatement specified in Section 4(a) shall be proportionately reduced based on the remaining duration of the Base Term. Tenant shall have 10 business days following delivery of the Expansion Notice to deliver to Landlord written notification of Tenant's exercise of the Expansion Right. Provided that no right to expand is exercised by any tenant with superior rights, Tenant shall be entitled to lease such Available Space upon the terms and conditions set forth in the Expansion Notice.

(b) **Amended Lease**. If: (i) Tenant fails to timely deliver notice accepting the terms of an Expansion Notice, or (ii) after the expiration of a period of 30 days from the date Tenant gives notice accepting Landlord's offer to lease such Available Space, no lease amendment or lease agreement for the Available Space has been executed, and Landlord tenders to Tenant an amendment to this Lease setting forth the terms for the rental of the Available Space consistent with those set forth in the Expansion Notice and otherwise consistent with the terms of this Lease and Tenant fails to execute such Lease amendment within 10 business days following such tender, Tenant shall be deemed to have waived its right to lease such Available Space.

(c) **Exceptions**. Notwithstanding the above, the Expansion Right shall not be in effect and may not be exercised by Tenant: (i) during any period of time that Tenant is in Default under any provision of this Lease; or (ii) if Tenant has been in Default under any provision of this Lease 3 or more times, whether or not the Defaults are cured, during the 12 month period prior to the date on which Tenant seeks to exercise the Expansion Right.

(d) **Termination**. The Expansion Right shall terminate and be of no further force or effect even after Tenant's due and timely exercise of the Expansion Right, if, after such exercise, but prior to the commencement date of the lease of such Available Space, (i) Tenant fails to timely cure any default by Tenant under this Lease; or (ii) Tenant has Defaulted 3 or more times during the period from the date of the exercise of the Expansion Right to the date of the commencement of the lease of the Available Space, whether or not such Defaults are cured.

(e) **Subordinate**. Tenant's rights in connection with the Expansion Right are and shall be subject to and subordinate to any expansion or extension rights granted in the Project to other tenants leasing space in the Project as of the Commencement Date. As of the Commencement Date, no other tenant has any such superior rights.

(f) **Rights Personal**. The Expansion Right is personal to Tenant and is not assignable without Landlord's consent, which consent may be granted or withheld in Landlord's sole discretion separate and apart from any consent by Landlord to an assignment of Tenant's interest in this Lease.

(g) **No Extension**. The period of time within which the Expansion Right may be exercised shall not be extended or enlarged by reason of Tenant's inability to exercise the Expansion Right.

40. **Right to Extend Term**. Tenant shall have the right to extend the Term of this Lease upon the following terms and conditions:

(a) **Extension Right**. Tenant shall have the right ("**Extension Right**") to extend the Base Term of this Lease for 5 years ("**Extension Term**") on the same terms and conditions as this Lease (other than Base Rent) by giving Landlord written notice of its election to exercise the Extension Right at least 9 months prior, and no earlier than 12 months prior, to the expiration of the Base Term of this Lease. Base Rent shall be adjusted on the commencement date of the Extension Term and on each anniversary of the commencement of the Extension Term by multiplying the Base Rent payable immediately before such adjustment by the Rent Adjustment Percentage and adding the resulting amount to the Base Rent payable immediately before such adjustment.

(b) **Right Personal**. The Extension Right is personal to Tenant and is not assignable without Landlord's consent, which may be granted or withheld in Landlord's sole discretion separate and apart from any consent by Landlord to an assignment of Tenant's interest in this Lease, except that the Extension Right may be assigned in connection with any Permitted Assignment of this Lease.

(c) **Exceptions**. Notwithstanding anything set forth above to the contrary, the Extension Right shall not be in effect and Tenant may not exercise the Extension Right: (i) during any period of time that Tenant is in Default under any provision of this Lease; or (ii) if Tenant has been in Default under any provision of this Lease 3 or more times, regardless of whether the Defaults are cured, during the 12 month period immediately prior to the date that Tenant intends to exercise an Extension Right, regardless of whether the Defaults are cured.

(d) **No Extension**. The period of time within which Tenant may exercise the Extension Right shall not be extended or enlarged by reason of Tenant's inability to exercise the Extension Right.

(e) **Termination**. The Extension Right shall terminate and be of no further force or effect even after Tenant's due and timely exercise of the Extension Right, if, after such exercise, but prior to the commencement date of the Extension Term, (i) Tenant fails to timely cure any default by Tenant under this Lease; or (ii) Tenant has Defaulted 3 or more times during the period from the date of the exercise of the Extension Right to the date of the commencement of the Extension Term, regardless of whether such Defaults are cured.

41. **Roof Equipment**. As long as Tenant is not in Default under this Lease, Tenant shall have the right at its sole cost and expense, subject to compliance with all Legal Requirements, to install, maintain, and remove on the top of the roof of the Building (based on Tenant's proportionate share of the space available on the roof) directly above the Premises one or more satellite dishes, communication antennae, or other equipment for the transmission or reception of communication of signals as Tenant may from time to time desire (collectively, "**Roof Equipment**") on the following terms and conditions:

(a) **Requirements**. Tenant shall submit to Landlord (i) the plans and specifications for the installation of the Roof Equipment, (ii) list of all required governmental and quasi-governmental permits, licenses, and authorizations that Tenant will and must obtain at its own expense, with the cooperation of Landlord, if necessary for the installation and operation of the Roof Equipment, and (iii) an insurance policy or certificate of insurance evidencing insurance coverage as required by this Lease and any other insurance as reasonably required by Landlord for the installation and operation of the Roof Equipment. Landlord shall not unreasonably withhold or delay its approval for the installation and operation of the Roof Equipment; provided, however, that Landlord may reasonably withhold its approval if the installation or operation of the Roof Equipment (A) may damage the structural integrity of the Building, (B) may void, terminate, or invalidate any applicable roof warranty, (C) may interfere with any service provided by Landlord or any tenant of the Building, (D) may reduce the leaseable space in the Building, or (E) is not properly screened from the viewing public.

(b) **No Damage to Roof**. If installation of the Roof Equipment requires Tenant to make any roof cuts or perform any other roofing work, such cuts shall only be made to the roof area of the Building located directly above the Premises and only in the manner designated in writing by Landlord; and any such installation work (including any roof cuts or other roofing work) shall be performed by Tenant, at Tenant's sole cost and expense, by a roofing contractor designated by Landlord. If Tenant or its agents shall otherwise cause any damage to the roof during the installation, operation, and removal of the Roof Equipment such damage shall be repaired promptly at Tenant's expense and the roof shall be restored in the same condition it was in before the damage. Landlord shall not charge Tenant Additional Rent for the installation and use of the Roof Equipment. If, however, Landlord's insurance premium or Tax assessment increases as a result of the Roof Equipment, Tenant shall pay such increase as Additional Rent within ten (10) days after receipt of a reasonably detailed invoice from Landlord. Tenant shall not be entitled to any abatement or reduction in the amount of Rent payable under this Lease if for any reason Tenant is unable to use the Roof Equipment In no event whatsoever shall the installation, operation, maintenance, or removal of the Roof Equipment by Tenant or Its agents void, terminate, or invalidate any applicable roof warranty.

(c) **Protection**. The installation, operation, and removal of the Roof Equipment shall be at Tenant's sole risk. Tenant shall indemnify, defend, and hold Landlord harmless from and against any and all Claims of every kind and description that may arise out of or be connected in any way with Tenant's installation, operation, or removal of the Roof Equipment.

(d) **Removal**. At the expiration or earlier termination of this Lease or the discontinuance of the use of the Roof Equipment by Tenant, Tenant shall, at its sole cost and expense, remove the Roof Equipment from the Building. Tenant shall leave the portion of the roof where the Roof Equipment was located in good order and repair, reasonable wear and tear excepted. If Tenant does not so remove the Roof Equipment, Tenant hereby authorizes Landlord to remove and dispose of the Roof Equipment and charge Tenant as Additional Rent for all costs and expenses incurred by Landlord in such removal and disposal. Tenant agrees that Landlord shall not be liable for any Roof Equipment or related property disposed of or removed by Landlord.

(e) **No Interference**. The Roof Equipment shall not interfere with the proper functioning of any telecommunications equipment or devices that have been installed by Landlord or for any other tenant of the Building before the date of the installation of the Roof Equipment. Tenant acknowledges that other tenant(s) may have approval rights over the installation and operation of telecommunications equipment and devices on or about the roof, and that Tenant's right to install and operate the Roof Equipment is subject and subordinate to the rights of such other tenants. Tenant agrees that any other tenant of the Building that currently has or in the future takes possession of any portion of the Building Will be permitted to install such telecommunication equipment that is of a type and frequency that will not cause unreasonable interference to the Roof Equipment.

(f) **Relocation**. Landlord shall have the right, at its expense and after 60 days prior notice to Tenant, to relocate the Roof Equipment to another site on the roof of the Building as long as such site reasonably meets Tenant's sight line and interference requirements and does not unreasonably interfere with Tenant's use and operation of the Roof Equipment.

(g) **Access**. Landlord grants to Tenant the right of ingress and egress on a 24 hour 7 day per week basis to install, operate, and maintain the Roof Equipment. Before receiving access to the roof of the Building, Tenant shall give Landlord at least 24 hours' advance written or oral notice, except in emergency situations, in which case 2 hours' advance oral notice shall be given by Tenant. Landlord shall supply Tenant with the name, telephone, and pager numbers of the contact individual(s) responsible for providing access during emergencies.

(h) **Appearance**. If permissible by Legal Requirements, and only to the extent reasonably practical and without interfering with the performance or operation of the Roof Equipment, the Roof Equipment shall be painted the same color as the Building with the intent to render the Roof Equipment virtually invisible from ground level.

(i) **No Assignment**. The right of Tenant to use and operate the Roof Equipment shall be personal solely to OpGen, Inc., and (i) no other person or entity shall have any right to use or operate the Roof Equipment, and (ii) Tenant shall not assign, convey, or otherwise transfer to any person or entity any right, title, or interest in all or any portion of the Roof Equipment or the use and operation thereof.

42. **Miscellaneous**.

(a) **Notices**. All notices or other communications between the parties shall be in writing and shall be deemed duly given upon delivery or refusal to accept delivery by the addressee thereof if delivered in person, or upon actual receipt if delivered by reputable overnight guaranty courier, addressed and sent to the parties at their addresses set forth above. Landlord and Tenant may from time to time by written notice to the other designate another address for receipt of future notices.

(b) **Joint and Several Liability**. If and when included within the term "Tenant," as used in this instrument, there is more than one person or entity, each shall be jointly and severally liable for the obligations of Tenant.

(c) **Financial Information**. At Landlord's request from time to time (not more frequently than on an annual basis, unless Holder requires such information), Tenant shall furnish Landlord with true and complete copies of (i) Tenant's most recent audited annual financial statements (or, if audited statements are not available, unaudited financial statements), and (ii) any other financial information or summaries that Tenant typically provides to its lenders or shareholders. Landlord agrees to keep all materials described in this Section 42(c) confidential and that Landlord will not disclose any such materials to third parties other than Landlord's affiliates, lenders, prospective purchasers, employees, officers, directors, authorized representatives, advisors, and accountants. The foregoing confidentiality obligations shall not apply to information that (w) was in the public domain at the time it was disclosed to Landlord, (x) entered the public domain after the time it was disclosed to Landlord, through no fault of Landlord, (y) was in Landlord's possession free of any obligation of confidence imposed on Landlord at the time or after the time it was disclosed to Landlord, or (z) was disclosed by Tenant to a third party without any confidentiality restrictions. Landlord may also disclose such information, without violating this Section 42(c) to the extent the disclosure is reasonably necessary (I) for Landlord to enforce its rights or defend itself under this Lease; (II) for submissions to any Governmental Authority; (III) for purposes of administering this Lease; (IV) in connection with Landlord's ownership of the Project; or (V) for compliance with a valid order of a court or other Governmental Authority or with any Legal Requirement.

(d) **Recordation**. Neither this Lease nor a memorandum of lease shall be filed by or on behalf of Tenant in any public record. Landlord may prepare and file, and upon request by Landlord Tenant will execute, a memorandum of lease.

(e) **Interpretation**. The normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Lease or any exhibits or amendments hereto. Words of any gender used in this Lease shall be held and construed to include any other gender, and words in the, singular number shall be held to include the plural, unless the context otherwise requires. The captions inserted in this Lease are for convenience only and in no way define, limit or otherwise describe the scope or intent of this Lease, or any provision hereof, or in any way affect the interpretation of this Lease.

(f) **Not Binding Until Executed**. The submission by Landlord to Tenant of this Lease shall have no binding force or effect, shall not constitute an option for the leasing of the Premises, nor confer any right or impose any obligations upon either party until execution and delivery of this Lease by both parties.

(g) **Limitations on Interest**. It is expressly the intent of Landlord and Tenant at all times to comply with applicable law governing the maximum rate or amount of any interest payable on or in connection with this Lease. If applicable law is ever judicially interpreted so as to render usurious any interest called for under this. Lease, or contracted for, charged, taken, reserved, or received with respect to this Lease, then it is Landlord's and Tenant's express intent that all excess amounts theretofore collected by Landlord be credited on the applicable obligation (or, if the obligation has been or would thereby be paid in full, refunded to Tenant), and the provisions of this Lease immediately shall be deemed reformed and the amounts thereafter collectible hereunder reduced, without the necessity of the execution of any new document, so as to comply with the applicable law, but so as to permit the recovery of the fullest amount otherwise called for hereunder.

(h) **Choice of Law**. Construction and interpretation of this Lease shall be governed by the internal laws of the state in which the Premises are located, excluding any principles of conflicts of laws.

(i) **Time**. Time is of the essence as to the performance of each party's obligations under this Lease.

(j) **OFAC**. Tenant, and all beneficial owners of Tenant, are currently (a) in compliance with and shall at all times during the Term of this Lease remain in compliance with the regulations of the Office of Foreign Assets Control ("**OFAC**") of the U.S. Department of Treasury and any statute, executive order, or regulation relating thereto (collectively, the "**OFAC Rules**"), (b) not listed on, and shall not during the Term of this Lease be listed on, the Specially Designated Nationals and Blocked Persons List maintained by OFAC and/or on any other similar list maintained by OFAC or other governmental authority pursuant to any authorizing statute, executive order, or regulation, and (c) not a person or entity with whom a U.S. person is prohibited from conducting business under the OFAC Rules.

(k) **Incorporation by Reference**. All exhibits and addenda attached hereto are hereby incorporated into this Lease and made a part hereof. If there is any conflict between such exhibits or addenda and the terms of this Lease, such exhibits or addenda shall control.

(l) **Hazardous Activities**. Notwithstanding any other provision of this Lease, Landlord, for itself and its employees, agents and contractors, reserves the right to refuse to perform any repairs or services in any portion of the Premises which, pursuant to Tenant's routine safety guidelines, practices or custom or prudent industry practices, require any form of protective clothing or equipment other than safety glasses. In any such case, Tenant shall contract with parties who are acceptable to Landlord, in Landlord's reasonable discretion, for all such repairs and services, and Landlord shall, to the extent required, equitably adjust Tenant's Share of Operating Expenses in respect of such repairs or services to reflect that Landlord is not providing such repairs or services to Tenant.

(m) **Attorneys' Fees**. If any action is brought by either party against the other party, relating to or arising out of this Lease or the enforcement hereof, the prevailing party shall be entitled to recover from the other party reasonable attorneys' fees, costs and expenses incurred in connection with the prosecution or defense of such action. For purposes of this Lease, the term "**attorneys' fees**" or "**attorneys' fees and costs**" shall mean the fees and expenses of counsel to the parties hereto, which may include printing, photostating, duplicating and other expenses, air freight charges, and fees billed for law clerks, paralegals and other persons not admitted to the bar but performing services under the supervision of an attorney, and the costs and fees incurred in connection With the enforcement or collection of any judgment obtained in any such proceeding. The provisions of this Section shall survive the entry of any judgment, and shall not merge, or be deemed to have merged, into any judgment.

[Signatures on next page]

IN WITNESS WHEREOF, Landlord and Tenant have executed this Lease as of the day and year first above written.

TENANT:

OpGen, Inc.,
a Delaware corporation

By: /s/ Noel Doheny
Name: Noel Doheny
Title: Chief Executive Officer
Date: June 30, 2008

LANDLORD:

ARE-708 QUINCE ORCHARD, LLC,
a Delaware limited liability company

By: ARE-GP 708 Quince Orchard QRS CORP., a Maryland corporation, managing member

By: /s/ Jackie Clem
Name: Jackie Clem
Title: VP – RE Legal Affairs

EXHIBIT A TO LEASE
DESCRIPTION OF PREMISES

(see attached)

EXHIBIT B TO LEASE
DESCRIPTION OF PROJECT

(see attached)

EXHIBIT B TO LEASE
DESCRIPTION OF PROJECT

All that lot or parcel of land located in the 9th Election District of Montgomery County, Maryland and described as follows:

Lot Numbered Six (6) in Block Letter "C" in the subdivision known as "Diamond Farm" as per plat filed in Plat Book 116 as Plat No. 13679 among the Land Records of Montgomery County, Maryland.

Together with the Easement for Ingress and Egress as established and shown on plat recorded in Plat Book 116 as Plat No. 13679.

Parcel I.D. No. 9-206-2153278

EXHIBIT C TO LEASE
LANDLORD'S WORK

General:

- Landlord, at its sole cost and expense, shall fully demise the Premises using materials and workmanship of similar or greater quality to other tenants in the Building. At Tenant's option, any doors to the Premises currently opening into a common corridor may be reoriented to be accessed directly from the interior of the Premises.

- Landlord shall provide and install new floor covering and paint throughout Premises.

- Landlord, at its sole cost and expense, shall ensure that all maximum travel distances per applicable code are met for the Premises.

1st Floor:

- Rooms 163 and 164 will be combined by demolishing the separating wall. The new room will be built out as a kitchenette including: VCT floor covering (colors TBD by Tenant), sink (with hot water), a dishwasher, above-and-below cabinets and related counter tops.

- Rooms 148 and 149 will be combined by demolishing the separating wall.

2nd Floor:

- Rooms 215 (dark room) and 216 (work room) will be combined by demolishing the separating wall and a second door will be installed to be accessed directly from the lab.

- The emergency showers shall be moved to a location inside of the labs.

- A 4-foot chemical fume hood will be installed in room 206 (production lab).

- Repair countertops and casework to the extent possible and/or practical.

Tenant shall have 60 days after Landlord's delivery of the Premises to Tenant to reasonably identify any latent defects in the mechanical, electrical and plumbing systems serving the Premises. For purposes of this paragraph, "**latent defects**" means those material defects in such systems that could not have been identified or discovered through a reasonable inspection of such systems conducted by a qualified technician. Landlord will promptly repair such identified defects.

EXHIBIT D TO LEASE
ACKNOWLEDGMENT OF COMMENCEMENT DATE

THIS ACKNOWLEDGMENT OF COMMENCEMENT DATE is made as of this _____ day of _____, 2008, between **ARE-708 QUINCE ORCHARD, LLC**, a Delaware limited liability company ("**Landlord**"), and **OPGEN, INC.**, a Delaware corporation ("**Tenant**"), and is attached to and made a part of the Lease dated as of July ____, 2008 ("**Lease**"), by and between Landlord and Tenant. Any initially capitalized terms used but not defined herein shall have the meanings given them in the Lease.

Landlord and Tenant hereby acknowledge and agree that the Commencement Date of the Base Term of the Lease is July ___, 2008, the Rent Commencement Date is _____ , 2008 (subject to the applicable abatement set forth in Section 4(a) of the Lease), and the expiration date of the Base Term of the Lease shall be midnight on _____, _____. In case of a conflict between the terms of the Lease and the terms of this Acknowledgement of Commencement Date, this Acknowledgement of Commencement Date shall control for all purposes.

IN WITNESS WHEREOF, Landlord and Tenant have executed this ACKNOWLEDGMENT OF COMMENCEMENT DATE to be effective on the date first above written.

TENANT:

OpGen, Inc.,
a Delaware corporation

By: _____
Name: _____
Title: _____
Date: _____

LANDLORD:

ARE-708 QUINCE ORCHARD, LLC,
a Delaware limited liability company

By: ARE-GP 708 Quince Orchard QRS CORP., a Maryland corporation, managing member

By: _____
Name: _____
Title: _____

EXHIBIT E TO LEASE

Rules and Regulations

1. The sidewalk, entries, and driveways of the Project shall not be obstructed by Tenant, or any Tenant Party, or used by them for any purpose other than ingress and egress to and from the Premises.

2. Tenant shall not place any objects, including antennas, outdoor furniture, etc., in the parking areas, landscaped areas or other areas outside of its Premises, or on the roof of the Project.

3. Except for animals assisting the disabled, no animals shall be allowed in the offices, halls, or corridors in the Project.

4. Tenant shall not disturb the occupants of the Project or adjoining buildings by the use of any radio or musical instrument or by the making of loud or improper noises.

5. If Tenant desires telegraphic, telephonic or other electric connections in the Premises, Landlord or its agent will direct the electrician as to where and how the wires may be introduced; and, without such direction, no boring or cutting of wires will be permitted. Any such installation or connection shall be made at Tenant's expense.

6. Tenant shall not install or operate any steam or gas engine or boiler, or other mechanical apparatus in the Premises, except as specifically approved in the Lease. The use of oil, gas or inflammable liquids for heating, lighting or any other purpose is expressly prohibited. Explosives or other articles deemed extra hazardous shall not be brought into the Project.

7. Parking any type of recreational vehicles is specifically prohibited on or about the Project. Except for the overnight parking of operative vehicles, no vehicle of any type shall be stored in the parking areas at any time. In the event that a vehicle is disabled, it shall be removed within 48 hours. There shall be no "For Sale" or other advertising signs on or about any parked vehicle. All vehicles shall be parked in the designated parking areas in conformity with all signs and other markings. All parking will be open parking, and no reserved parking, numbering or lettering of individual spaces will be permitted except as specified by Landlord.

8. Tenant shall maintain the Premises free from rodents, insects and other pests.

9. Landlord reserves the right to exclude or expel from the Project any person who, in the judgment of Landlord, is intoxicated or under the influence of liquor or drugs or who shall in any manner do any act in violation of the Rules and Regulations of the Project.

10. Tenant shall not cause any unnecessary labor by reason of Tenant's carelessness or indifference in the preservation of good order and cleanliness. Landlord shall not be responsible to Tenant for any loss of property on the Premises, however occurring, or for any damage done to the effects of Tenant by the janitors or any other employee or person.

11. Tenant shall give Landlord prompt notice of any defects in the water, lawn sprinkler, sewage, gas pipes, electrical lights and fixtures, heating apparatus, or any other service equipment affecting the Premises.

12. Tenant shall not permit storage outside the Premises, including without limitation, outside storage of trucks and other vehicles, or dumping of waste or refuse or permit any harmful materials to be placed in any drainage system or sanitary system in or about the Premises.

13. All moveable trash receptacles provided by the trash disposal firm for the Premises must be kept in the trash enclosure areas, if any, provided for that purpose.

14. No auction, public or private, will be permitted on the Premises or the Project.

15. No awnings shall be placed over the windows in the Premises except with the prior written consent of Landlord.

16. The Premises shall not be used for lodging, sleeping or cooking or for any immoral or illegal purposes or for any purpose other than that specified in the Lease. No gaming devices shall be operated in the Premises.

17. Tenant shall ascertain from Landlord the maximum amount of electrical current which can safely be used in the Premises, taking into account the capacity of the electrical wiring in the Project and the Premises and the needs of other tenants, and shall not use more than such safe capacity. Landlord's consent to the installation of electric equipment shall not relieve Tenant from the obligation not to use more electricity than such safe capacity.

18. Tenant assumes full responsibility for protecting the Premises from theft, robbery and pilferage.

19. Tenant shall not install or operate on the Premises any machinery or mechanical devices of a nature not directly related to Tenant's ordinary use of the Premises and shall keep all such machinery free of vibration, noise and air waves which may be transmitted beyond the Premises.

EXHIBIT F TO LEASE
TENANT'S PERSONAL PROPERTY

None except as set forth below:

NONE

EXHIBIT D TO LEASE
ACKNOWLEDGMENT OF COMMENCEMENT DATE

THIS ACKNOWLEDGMENT OF COMMENCEMENT DATE is made as of this 8th day of August, 2008, between **ARE-708 QUINCE ORCHARD, LLC**, a Delaware limited liability company ("**Landlord**"), and **OPGEN, INC.**, a Delaware corporation ("**Tenant**"), and is attached to and made a part of the Lease dated as of June 30, 2008 ("**Lease**"), by and between Landlord and Tenant. Any initially capitalized terms used but not defined herein shall have the meanings given them in the Lease.

Landlord and Tenant hereby acknowledge and agree that the Commencement Date of the Base Term of the Lease is June 30, 2008, the Rent Commencement Date is July 19, 2008 (subject to the applicable abatement set forth in Section 4(a) of the Lease), and the expiration date of the Base Term of the Lease shall be midnight on September 30, 2011. In case of a conflict between the terms of the Lease and the terms of this Acknowledgement of Commencement Date, this Acknowledgement of Commencement Date shall control for all purposes.

IN WITNESS WHEREOF, Landlord and Tenant have executed this ACKNOWLEDGMENT OF COMMENCEMENT DATE to be effective on the date first above written.

TENANT:

OpGen, Inc.,
a Delaware corporation

By:/s/ John K. Henkhaus
Name: John K. Henkhaus
Title: V.P. Operations

LANDLORD:

ARE-708 QUINCE ORCHARD, LLC,
a Delaware limited liability company

By: ARE-GP 708 Quince Orchard QRS CORP., a Maryland corporation, managing member

By: /s/ Jennifer Pappas
Name: Jennifer Pappas
Title: SVP

FIRST AMENDMENT TO LEASE

THIS FIRST AMENDMENT TO LEASE (this "**First Amendment**") is made as of April 4, 2011 ("**Effective Date**") by and between **ARE-708 QUINCE ORCHARD, LLC**, a Delaware limited liability company ("**Landlord**"), and **OPGEN, INC.**, a Delaware corporation ("**Tenant**").

RECITALS

A. Landlord and Tenant are parties to that certain Lease Agreement dated as of June 30, 2008 (the "**Lease**"). Pursuant to the Lease, Tenant leases approximately 14,812 rentable square feet as more particularly described in Exhibit A to the Lease (the "**Original Premises**") in a building located at 708 Quince Orchard Road, Gaithersburg, Maryland. Capitalized terms used herein without definition shall have the meanings defined for such terms in the Lease.

B. Landlord and Tenant desire, subject to the terms and conditions set forth herein, to, among other things, amend the Lease to (a) extend the Term until September 30, 2014, and (b) expand the Premises by adding approximately 5,901 rentable square feet (the "**Expansion Premises**") to the Original Premises for a total of approximately 20,713 rentable square feet as more particularly described on Exhibit A to this First Amendment.

NOW, THEREFORE, in consideration of the foregoing Recitals, which are incorporated herein by this reference, the mutual promises and conditions contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant hereby agree as follows:

1. Term. The definition of Term set forth on page 1 of the Lease is hereby deleted in its entirety and replaced with the following:

> "**Base Term**: With respect to the Original Premises, beginning on the Commencement Date and ending on September 30, 2014. With respect to the Expansion Premises, beginning on the Expansion Rent Commencement Date and ending on September 30, 2014."

2. Base Rent. Tenant shall pay Base Rent and Additional Rent in accordance with the Lease until the Expansion Rent Commencement Date (defined below). As of the Expansion Rent Commencement Date, Base Rent shall be increased to $40,217.74 per month. Thereafter, Base Rent shall be adjusted in accordance with Section 4 of the Lease. Notwithstanding the foregoing, so long as Tenant is not in Default under the Lease, Base Rent shall be deemed abated for the first 5 full, calendar months after the Expansion Rent Commencement Date; provided, however, that commencing on January l, 2012 and thereafter on the first day of each month during the Term, Tenant shall pay to Landlord the amount of $1,218.72 per month as Additional Rent which amount shall be in addition to any other amounts due as Additional Rent under the Lease including, without limitation, Tenant's Share of Operating Expenses.

3. Other Changes to Defined Terms. As of the Expansion Rent Commencement Date, the following amendments shall be deemed made to definitions contained on page 1 of the Lease:

(i) The definition of "**Premises**" shall be deleted in its entirety and replaced with the following: "**Premises**: That portion of the Project, containing a total of approximately 20,713 rentable square feet, as determined by Landlord, as shown on Exhibit A, comprised of (i) approximately 5,818 rentable square feet, located on the 1st floor and approximately 8,994 rentable square feet located on the 2nd floor (together, the "**Original Premises**") and (ii) approximately 5,901 rentable square feet located on the 2nd floor (the "**Expansion Premises**")";

(ii) Exhibit A to the Lease shall be replaced with Exhibit A to this First Amendment; and

(iii) The defined term "**Tenant's Share**" shall be increased to 41.74%.

4. Delivery; Acceptance of Expansion Premises; Expansion Rent Commencement Date.

(a) Landlord shall, at Landlord's sole cost and expense (subject to the following sentence), construct the tenant improvements in the Expansion Premises shown on Exhibit B to this First Amendment ("**Landlord's Work**"). If Landlord determines that Landlord's Work requires any alterations to the Building, then Tenant shall pay to Landlord the cost of such alterations to the Building as Additional Rent. Landlord shall deliver the Expansion Premises to Tenant with Landlord's Work substantially completed, subject to normal "punch list" items of a non-material nature that do not interfere with the use of the Expansion Premises ("**Delivery**," "**Deliver**," or "**Delivered**").

(b) The "**Expansion Rent Commencement Date**" shall be the earliest of: (i) the date Landlord Delivers the Expansion Premises to Tenant; (ii) the date Landlord could have Delivered the Expansion Premises but for Tenant Delays (defined below) and (iii) the date Tenant conducts any business in the Expansion Premises or any part thereof. Notwithstanding the foregoing, in no event shall the Expansion Rent Commencement Date occur earlier than April 1, 2011. The term "**Tenant Delay**" shall mean any act or omission of Tenant that delays the occurrence of the Expansion Rent Commencement Date.

(c) Upon the request of Landlord, Tenant shall execute and deliver a written acknowledgment of the Expansion Rent Commencement Date when such is established in the form of the "Acknowledgement of Expansion Rent Commencement Date" attached to this First Amendment as Exhibit C; provided, however, Tenant's failure to execute and deliver such acknowledgment shall not affect Landlord's rights hereunder.

(d) Tenant acknowledges that Landlord shall require access to portions of the Original Premises in order to complete Landlord's Work. Landlord and its contractors and agents shall have the right to enter the Original Premises to complete Landlord's Work and Tenant shall cooperate with Landlord in connection with the same. Tenant acknowledges that Landlord's completion of Landlord's Work may adversely affect Tenant use and occupancy of the Original Premise. Tenant waives all claims against Landlord in connection with Landlord's Work including, without limitation, claims for rent abatement.

(e) Effective as of the Expansion Rent Commencement Date: (i) Tenant shall accept the Expansion Premises in their condition as of such date; (ii) Landlord shall have no obligation for any defects in the Expansion Premises; and (iii) Tenant's taking possession of the Expansion Premises shall be conclusive evidence that Tenant accepts the Expansion Premises and that the Expansion Premises were in good condition at the time of Delivery. Any occupancy of the Expansion Premises by Tenant before the Expansion Rent Commencement Date shall be subject to all of the terms and conditions of this Lease.

(f) Tenant agrees and acknowledges that neither Landlord nor any agent of Landlord has made any representation or warranty with respect to the condition of all or any portion of the Expansion Premises or the Project, and/or the suitability of the Expansion Premises or the Project for the conduct of Tenant's business, and Tenant waives any implied warranty that the Expansion Premises or the Project are suitable for the Permitted Use. Landlord shall have no obligation to obtain any permits, approval or entitlements related to Tenant's use of or conduct of business in the Expansion Premises. This Lease constitutes the complete agreement of Landlord and Tenant with respect to the subject matter hereof and supersedes any and all prior representations, inducements, promises, agreements, understandings and negotiations which are not contained herein.

5. Right to Expand.

(a) Section 39(a) of the Lease is hereby deleted in its entirety and replaced with the following:

"(a) **Expansion in the Project**. Tenant shall have the right, but not the obligation, to expand the Premises (the "**Expansion Right**") to include any Available Space in the Project upon the terms and conditions in this Section 39. For purposes of this Section 39(a), "**Available Space**" shall mean any space on the second floor of the Project which is not occupied by a tenant or which is occupied by an existing tenant whose lease is expiring within 6 months or less and such tenant does not wish to renew (whether or not such tenant has a right to renew) its occupancy of such space. If there is any Available Space in the Project during the Term (including any extension of the Base Term pursuant to Section 40), Landlord shall, at such time as Landlord shall elect so long as Tenant's rights hereunder are preserved, deliver to Tenant written notice (the "**Expansion Notice**") of such Available Space, together with the terms and conditions on which Landlord is prepared to lease Tenant such Available Space. Tenant shall have 10 business days following delivery of the Expansion Notice to deliver to Landlord written notification of Tenant's exercise of the Expansion Right. Provided that no right to expand is exercised by any tenant with superior rights, Tenant shall be entitled to lease such Available Space upon the terms and conditions set forth in the Expansion Notice.

(b) Section 39(e) of the Lease is hereby deleted in its entirety and replaced with the following:

"(e) **Subordinate**. Tenant's rights in connection with the Expansion Right are and shall be subject and subordinate to any expansion or extension rights granted in the Project to other tenants leasing space in the Project as of the Effective Date of the First Amendment to this

Lease. As of the Effective Date of the First Amendment to this Lease, no other tenant has such superior rights."

6. Broker. Landlord and Tenant each represents and warrants that it has not dealt with any broker, agent or other person (collectively, "**Broker**") in connection with the transaction reflected in this First Amendment and that no Broker brought about this transaction. Landlord and Tenant each hereby agree to indemnify and hold the other harmless from and against any claims by any Broker claiming a commission or other form of compensation by virtue of having dealt with Tenant or Landlord, as applicable, with regard to this leasing transaction.

7. Miscellaneous.

(a) This First Amendment is the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior and contemporaneous oral and written agreements and discussions. This First Amendment may be amended only by an agreement in writing, signed by the parties hereto.

(b) This First Amendment is binding upon and shall inure to the benefit of the parties hereto, their respective agents, employees, representatives, officers, directors, divisions, subsidiaries, affiliates, assigns, heirs, successors in interest and shareholders.

(c) This First Amendment may be executed in any number of counterparts, each of which shall be deemed an original, but all of which when taken together shall constitute one and the same instrument. The signature page of any counterpart may be detached therefrom without impairing the legal effect of the signature(s) thereon provided such signature page is attached to any other counterpart identical thereto except having additional signature pages executed by other parties to this First Amendment attached thereto.

(d) Except as amended and/or modified by this First Amendment, the Lease is hereby ratified and confirmed and all other terms of the Lease shall remain in full force and effect, unaltered and unchanged by this First Amendment. In the event of any conflict between the provisions of this First Amendment and the provisions of the Lease, the provisions of this First Amendment shall prevail. Whether or not specifically amended by this First Amendment, all of the terms and provisions of the Lease are hereby amended to the extent necessary to give effect to the purpose and intent of this First Amendment.

[Signatures are on the next page.]

IN WITNESS WHEREOF, the parties hereto have executed this First Amendment as of the Effective Date.

LANDLORD:

ARE-708 QUINCE ORCHARD, LLC,
a Delaware limited liability company

By: ARE-GP 708 Quince Orchard QRS CORP., a Maryland corporation, managing member

By: /s/ Jackie Clem
Jackie Clern
VP Real Estate Legal Affairs

TENANT:

OPGEN, INC.,
a Delaware corporation

By: /s/ C. Douglas White
Its: CEO

EXHIBIT A

Premises

See Attached

EXHIBIT B

Landlord's Work

(see attached)

General Conditions -
Project Manager (1 week) and Job site superintendent supervision (4 weeks) are included in the scope of work. Fine clean and administrative coverage associated with O&M, permitting and contract/documents.

Demolition -
The scope of work will include:

Front Lab Space

- Removal 144LF of wall
- Removal of 2 welded frames/viewing panes
- Removal of 1 left handed door with welded frame and two side lights/viewing panes
- Removal of 1 right handed door with welded frame and two side lights/viewing panes
- Removal of 1 left handed door with welded frame and two side lights/viewing panes
- Removal and salvage of 3 existing left handed doors for reuse frames will not be re-used. Removal and salvage of 2 existing right handed doors for reuse new frames to be hollow metal knock down
- Disconnect all utilities and removal of Fume Hood, leaving connection for owner furnished and installed clean room (OpGen to pay $1750 for fume hood relocation and reconnection- 3/11/11)
- Removal of *three (3) sinks* and plumbing disconnects for return to owner (no disposal)
- Removal of 124 LF of cabinetry/millwork *disconnecting and reconnecting wiremold electrical with allowance for gas/vac/air demo and put back*
- Removal of 76 LF of systems furniture
- Removal and salvage of 57 LF of existing lab casework work for reuse

Back Lab Space

- Removal 54 LF of wall
- Removal and salvage of 1 left handed welded door and frame for reuse
- Removal and salvage of 1 right handed welded door and frame for reuse
- Removal of 16 LF of existing lab casework

Concrete, Fire Safing, Roofing -
The scope of work will include:

- Floor patching associated with sink demo

Millwork & Carpentry -
The scope of work will include:

Front Lab Space

- Not included in scope of work

Back Lab Space

- Reinstall 114 LF of existing work areas from demo'd inventory front lab space
- Furnish and Install 4' of laminate cabinetry and laminate top in new conference room for refreshments (plumbing is excluded for this item)
- *Install only (owner provided) projection screen (GC to give size spec to OpGen) in new conference room (provided as an alternate)*

Doors, Frames, Hardware and Glass -
The scope of work will include:

Front Lab Space

- Install 4(four) existing doors and hardware. (3 (three) left handed, l(one) right handed) all relocated
- Furnish and install 1 (one) new double door frame and hardware from loading dock to shipping & receiving
- Furnish & Install 2 (two) unequal pair of doors, l (one) left handed active, 1 (one) right handed active and hardware
- All frames to be new, new frames to be hollow metal knock down
- All hardware to be reused

Back Lab Space

- Furnish and Install 2 (two) doors re-used and hardware (1 left banded, 1 right handed)
- Furnish and Install 2 (two) new hollow knock down frames

Partitions -
The scope of work will include:

Front Lab Space

- Install 50 LF of floor to ceiling drywall

Back Lab Space

- Install 28 LF of floor to ceiling drywall

Ceilings -
The scope of work will include:

- Only areas affected by demolition of walls and new construction will be modified using existing materials
- Front lab area to have existing sheetrock ceilings demo'd and replaced with like 2x2 office grid and ACT (OpGen to be $350 - 3/11/11)

Painting -
The scope of work will include:

Front Lab Space

- All new partitions to receive two coats of semi gloss (in lab areas), flat (in offices) latex paint.
- All new doors and frames will be painted to match existing.
- *All Owner Requested ALL walls to be painted (ARE to pay for this item)*

Back Lab Space

- All new partitions to receive two coats of semi-gloss (in lab areas), flat (in offices) latex paint.
- All new doors and frames will be painted to match existing.

Flooring -
The scope of work will include:

Front Lab Space

- Patch VCT as needed in areas directly affected by partitions
- Furnish and Install typical office space carpet (Patcraft, Socrates 11-28 #10069, Searle #00108)
- Furnish and Install 96 LF vinyl base (Johnsonite 18-Navy Blue)
- *(Alternate Owner Requested) Demo and replace ALL VCT in front lab area (ARE to pay for this item)*

Back Lab Space

- Patch VCT as needed in areas directly affected by partitions
- Furnish and Install typical conference room carpet (Patcraft, Jazz Review-36 #10140, Carnegie Hall #00157) conference area
- Furnish and Install 72 LF vinyl base (Johnsonite 18-Navy Blue)

Equipment -
The scope of work will include:

Front Lab Space

- Furnish and Install-20 (+/- *3 degrees*) Freezer (re-furbished) on backup power
  - Includes Watlow microprocessor temperature controller, audible alarm, and control relay
  - Using existing roof curbing assumed to be sufficient to equip new unit
- Furnish and Install 1 (one) card reader at the loading dock. Installation only monitoring contract responsibility of tenant for signature prior to inspection of this project to Datawatch directly.

Back Lab Space

- Not included in scope of work

HVAC -
The scope of work will include:

Front Lab Space

- Leave in place duct from existing roof exhaust fan to room preparing for future fume hood

Back Lab Space

- Additional diffuser and plenum return for new conference room tied into existing building system
- Air balance as required by City of Gaithersburg

Plumbing -
The scope of work will include:

Front Lab Space

- Demo only of 3 (three) sinks

Back Lab Space

- Water line to be brought to new counter top area for coffee maker (OpGen to pay $95) for plumbing permitting, and installation of line not including connection to be made by coffee vendor-3/11/11)

Life Safety (Sprinkler) -
The scope of work will include:

Front and Back Lab Space

- As required by modifications made to partitions

Electrical –
LIGHTING
The scope of work will include:

Front Lab Space

- No new lighting is included
- Same 3-3way switch (offices, shipping & receiving)
- Re-switch lab and front area

Back Lab Space

- No new lighting is included
- Re-switching and conference room required (4 (four) locations)

POWER
Not included in scope of work until site survey confirms existing

FIRE ALARM
The scope of work includes:

- Modifications to existing as required by demo, add one (1) to conference room in back lab area

Architectural/Engineering/Permitting
The scope of work will include:

- Provide Architectural and Engineering plans in accordance with landlord approval and for submission to the city of Gaithersburg Planning & Code
- A/E and construction management meetings will include three (3) meetings with the tenant.
- Obtain building and trade permits.

Exclusions/Clarifications/Assumptions
EXCLUSIONS-
Pricing assumes: existing building systems to be operational and sufficient to supply: hot and cold air, water and power. (Both normal & back up power)

ASSUMPTIONS/NOTES:
We exclude lab safety equipment (eye washes, and showers)
We exclude any steam (other than internal).
Lab Area assumed to receive standard AZ Rock
VCT
All office doors assumed to match to existing.
All lab doors to be assumed to be paint grade
wood (use metal doors in lab areas- 3/11/11)

We exclude specialty flooring, specialty painting,
lab grade lighting, medical grade conduit,
security/low voltage or HEPA filtration.
All equipment shown on plans is to be provided by tenant, including clean rooms (freezer to be an alternate)
We exclude room pressurization.
We exclude DI or RODI water.

EXHIBIT C

ACKNOWLEDGMENT OF EXPANSION RENT COMMENCEMENT DATE

This **ACKNOWLEDGMENT OF EXPANSION RENT COMMENCEMENT DATE** is made as of this ___ day of _____ 20_, between **ARE-708 QUINCE ORCHARD, LLC**, a Delaware limited liability company ("**Landlord**"), and OPGEN, INC., a Delaware corporation ("**Tenant**"), and is attached to and made a part of the Lease dated as of June 30, 2008, as amended by the First Amendment dated as of _____, 2011 (as amended, the "**Lease**"), by and between Landlord and Tenant. Any initially capitalized terms used but not defined herein shall have the meanings given them in the Lease.

Landlord and Tenant hereby acknowledge and agree, for all purposes of the Lease, that the "**Expansion Rent Commencement Date**" is _____, _____ and the termination date of the Base Term of the Lease shall be midnight on September 30, 2014. In case of a conflict between this Acknowledgment of Expansion Rent Commencement Date and the Lease, this Acknowledgment of Expansion Rent Commencement Date shall control for all purposes.

IN WITNESS WHEREOF, Landlord and Tenant have executed this ACKNOWLEDGMENT OF EXPANSION RENT COMMENCEMENT DATE to be effective on the date first above written.

LANDLORD:

ARE-708 QUINCE ORCHARD, LLC,
a Delaware limited liability company

By: ARE-GP 708 Quince Orchard QRS CORP., a Maryland corporation, managing member

By:

TENANT:

OPGEN, INC.,
a Delaware corporation

By:
Its:

SECOND AMENDMENT TO LEASE AGREEMENT

THIS SECOND AMENDMENT TO LEASE AGREEMENT ("**this Second Amendment**") is dated as of August 15, 2012 ("**Effective Date**"), by and between **ARE-708 QUINCE ORCHARD, LLC**, a Delaware limited liability company, having an address at 385 E. Colorado Blvd., Suite 299, Pasadena, California 91101 ("**Landlord**"), and OPGEN, INC., a Delaware corporation, having an address at Suite 220, 708 Quince Orchard Road, Gaithersburg, Maryland 20878 ("**Tenant**").

RECITALS

A. Landlord and Tenant have entered into that certain Lease Agreement ("**Original Lease**") dated as of June 30, 2008, as amended by a First Amendment to Lease dated as of April 4, 2011 ("**First Amendment**"; the Original Lease and the First Amendment are hereinafter collectively referred to as the "**Lease**"), wherein Landlord leased to Tenant certain premises located at Suite 220, 708 Quince Orchard Road, Gaithersburg, Maryland 20878, as more particularly described in the Lease.

B. Landlord and Tenant desire to amend the Lease, among other things, to clarify the provisions in the Lease dealing with Permitted Uses and the Hazardous Materials List.

AGREEMENT

Now, therefore, the parties hereto agree that the Lease is amended as follows:

1. **Permitted Uses**. The definition of "**Permitted Uses**" in the Basic Lease Provisions is hereby amended by deleting that provision in its entirety and replacing it with the following new definition:

(a) research and development laboratory, laboratory production, related office and other related uses consistent with the character of the Project and otherwise in compliance with the provisions of Section 7 hereof. For purposes of this Lease, "**laboratory production**" means the manufacture and packaging of materials to be used in laboratory based kits in accordance with this Lease (including, but not limited to, Section 30), and the manufacture and packaging of instruments to be sent to third parties.

2. **Hazardous Materials List**. Section 30(b) of the Lease is hereby amended by deleting that provision in its entirety and replacing it with the following new Section 30(b):

> **Business**. Landlord acknowledges that it is not the intent of this Section 30 to prohibit Tenant from using the Premises for the Permitted Use. Tenant may operate its business according to prudent industry practices so long as the use or presence of Hazardous Materials is strictly and properly monitored according to all then applicable Environmental Requirements. As a material inducement to Landlord to allow Tenant to use Hazardous Materials in connection with its business, Tenant shall from time to time, (i) within 10 days after request from Landlord, deliver to Landlord a list identifying each type of Hazardous Materials to be brought upon, kept, used, stored, handled, treated, generated on, or released or disposed of from, the Premises and setting forth any and all governmental approvals or permits required in connection with the presence, use, storage, handling, treatment, generation, release or disposal of such Hazardous Materials on or from the Premises ("**Hazardous Materials List**"), and (ii) concurrent with the receipt from or submission to a Governmental Authority or otherwise within 10 days after request from Landlord, deliver to Landlord true and correct copies of the following documents ("**Haz Mat Documents**") relating to the use, storage, handling, treatment, generation, release or disposal of Hazardous Materials: permits; approvals; reports and correspondence; storage and management plans, notice of violations of any Legal Requirements; plans relating to the installation of any storage tanks to be installed in or under the Project (provided, said installation of tanks shall only be permitted after Landlord has given Tenant its written consent to do so, which consent may be withheld in Landlord's sole and absolute discretion); all closure plans or any other documents required by any and all federal, state and local Governmental Authorities for any storage tanks installed by or on behalf of Tenant or any Tenant Party in, on or under the Project for the closure of any such tanks; and a Surrender Plan (to the extent surrender in accordance with Section 28 cannot be accomplished in 3 months). Tenant is not required, however, to provide Landlord with any portion(s) of the Haz Mat Documents containing information of a proprietary nature which, in and of themselves, do not contain a reference to any Hazardous Materials or hazardous activities. It is not the intent of this Section to provide Landlord with information which could be detrimental to Tenant's business should such information become possessed by Tenant's competitors.

3. **Miscellaneous**.

(a) Terms used in this Second Amendment and not otherwise defined shall have the meanings ascribed to them in the Lease.

(b) This Second Amendment is the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior and contemporaneous oral and written agreements and discussions. This Second Amendment may be amended only by an agreement in writing, signed by the parties hereto.

(c) This Second Amendment is binding upon and shall inure to the benefit of the parties hereto, their respective agents, employees, representatives, officers, directors, divisions, subsidiaries, affiliates, assigns, heirs, successors in interest and shareholders.

(d) This Second Amendment may be executed in any number of counterparts, each of which shall be deemed an original, but all of which when taken together shall constitute one and the same instrument. The signature page of any counterpart may be detached therefrom without impairing the legal effect of the signature(s) thereon provided such signature page is attached to any other counterpart identical thereto except having additional signature pages executed by other parties to this Second Amendment attached thereto.

(e) Landlord and Tenant each represents and warrants that it has not dealt with any broker, agent or other person (collectively, "**Broker**") in connection with this Second Amendment and that no Broker brought about this transaction. Landlord and Tenant each hereby agree to indemnify and hold the other harmless from and against any claims by any Broker claiming a commission or other form of compensation by virtue of having dealt with Tenant or Landlord, as applicable, with regard to this Second Amendment.

(f) Except as amended and/or modified by this Second Amendment, the Lease is hereby ratified and confirmed and all other terms of the Lease shall remain in full force and effect, unaltered and unchanged by this Second Amendment. In the event of any conflict between the provisions of this Second Amendment and the provisions of the Lease, the provisions of this Second Amendment shall prevail. Regardless of whether specifically amended by this Second Amendment, all of the terms and provisions of the Lease are hereby amended to the extent necessary to give effect to the purpose and intent of this Second Amendment.

[Signatures on Next Page]

IN WITNESS WHEREOF, the parties hereto have executed this Second Amendment under seal as of the day and year first above written.

TENANT:

OPGEN, INC.,
a Delaware corporation

By: /s/ C. Douglas White(SEAL)
Name: C. Douglas White
Title: CEO

LANDLORD:

ARE-708 QUINCE ORCHARD, LLC,
a Delaware limited liability company

By: ARE-GP 708 Quince Orchard QRS CORP.,
a Maryland corporation, managing member

By: /s/ Jackie Clem(SEAL)
Name: Jackie Clem
Title: VP Real Estate Legal Affairs

THIRD AMENDMENT TO LEASE

THIS THIRD AMENDMENT TO LEASE (this "**Third Amendment**") is made as of December 30, 2013 ("**Effective Date**") by and between **ARE-708 QUINCE ORCHARD, LLC**, a Delaware limited liability company ("**Landlord**"), and **OPGEN, INC**., a Delaware corporation ("**Tenant**").

RECITALS

A. Landlord and Tenant are parties to that certain Lease Agreement dated as of June 30, 2008, as amended by that certain First Amendment to Lease dated as of April 4, 2011, and that certain Second Amendment to Lease dated as of August 15,2012 (as amended, the "**Lease**"). Pursuant to the Lease, Tenant leases approximately 20,713 rentable square feet (the "**Premises**") in a building located at 708 Quince Orchard Road, Gaithersburg, Maryland. Capitalized terms used herein without definition shall have the meanings defined for such terms in the Lease.

B. Landlord and Tenant desire, subject to the terms and conditions set forth herein, to among other things, amend the Lease to extend the outside date on which Tenant is required to give Landlord notice of its election to exercise the Extension Right by an additional two months.

NOW, THEREFORE, in consideration of the foregoing Recitals, which are incorporated herein by this reference, the mutual promises and conditions contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord and Tenant hereby agree as follows:

1. **Right to Extend Term**. The first sentence of Section 40(a) of the Lease is hereby deleted in its entirety and replaced with the following:

> "(a) **Extension Right.** Tenant shall have the right ("**Extension Right**") to extend the Base Term of this Lease for 5 years ("**Extension Term**") on the same terms and conditions as this Lease (other than Base Rent) by giving Landlord written notice of its election to exercise the Extension Right at least 7 months prior, and no earlier than 12 months prior, to the expiration of the Base Term of this Lease."

2. **Broker**. Landlord and Tenant each represents and warrants that it has not dealt with any broker, agent or other person (collectively, "**Broker**") in connection with the transaction reflected in this Third Amendment and that no Broker brought about this transaction. Landlord and Tenant each hereby agree to indemnify and hold the other harmless from and against any claims by any Broker claiming a commission or other form of compensation by virtue of having dealt with Tenant or Landlord, as applicable, with regard to this leasing transaction.

3. **Miscellaneous**.

(a) This Third Amendment is the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior and contemporaneous oral and written agreements and discussions. This Third Amendment may be amended only by an agreement in writing, signed by the parties hereto.

(b) This Third Amendment is binding upon and shall inure to the benefit of the parties hereto, their respective agents, employees, representatives, officers, directors, divisions, subsidiaries, affiliates, assigns, heirs, successors in interest and shareholders.

(c) This Third Amendment may be executed in any number of counterparts, each of which shall be deemed an original, but all of which when taken together shall constitute one and the same instrument. The signature page of any counterpart may be detached therefrom without impairing the legal effect of the signature(s) thereon provided such signature page is attached to any other counterpart identical thereto except having additional signature pages executed by other parties to this Third Amendment attached thereto.

(d) Except as amended and/or modified by this Third Amendment, the Lease is hereby ratified and confirmed and all other terms of the Lease shall remain in full force and effect, unaltered and unchanged by this Third Amendment. In the event of any conflict between the provisions of this Third Amendment and the provisions of the Lease, the provisions of this Third Amendment shall prevail. Whether or not specifically amended by this Third Amendment, all of the terms and provisions of the Lease are hereby amended to the extent necessary to give effect to the purpose and intent of this Third Amendment.

[Signatures are on the next page.]

IN WITNESS WHEREOF, the parties hereto have executed this Third Amendment as of the Effective Date.

LANDLORD:

ARE-708 QUINCE ORCHARD, LLC,
a Delaware limited liability company

By: ARE-GP 708 Quince Orchard QRS CORP.,
a Maryland corporation,
managing member

By: /s/ Jennifer Banks
Jennifer Banks
EVP, General Counsel

TENANT:

OPGEN, INC.,
a Delaware corporation

By: /s/ C. E. Winzer
Its: CFO

FOURTH AMENDMENT TO LEASE AGREEMENT

1. **THIS FOURTH AMENDMENT TO LEASE AGREEMENT** ("**this Fourth Amendment**") is dated as of March 21, 2014 ("**Effective Date**"), by and between **ARE-708 QUINCE ORCHARD, LLC**, a Delaware limited liability company, having an address at 385 E. Colorado Blvd., Suite 299, Pasadena, California 91101 ("**Landlord**"), and **OPGEN, INC**., a Delaware corporation, having an address at Suite 220, 708 Quince Orchard Road, Gaithersburg, Maryland 20878 ("**Tenant**").

RECITALS

B. Landlord and Tenant have entered into that certain Lease Agreement ("**Original Lease**") dated as of June 30, 2008, as amended by a First Amendment to Lease dated as of April 4, 2011 ("**First Amendment**"), a Second Amendment to Lease Agreement dated as of August 15, 2012 ("**Second Amendment**"), and a Third Amendment to Lease Agreement dated as of December 30, 2013 ("**Third Amendment**"; the Original Lease, the First Amendment, the Second Amendment, and the Third Amendment are hereinafter collectively referred to as the "**Lease**"), wherein Landlord leased to Tenant certain premises located at Suite 220, 708 Quince Orchard Road, Gaithersburg, Maryland 20878, as more particularly described in the Lease.

C. Landlord and Tenant desire to amend the Lease, among other things, to extend the Term of the Lease for a period of 7 months and to grant Tenant the right to reduce the area of the Premises.

AGREEMENT

Now, therefore, the parties hereto agree that the Lease is amended as follows:

1. **Extension of Term**. The Term shall be extended for a period of 7 months ("**First Extension Term**"), beginning on October 1, 2014 and, unless earlier terminated in accordance with the terms and conditions of the Lease, expiring on April 30, 2015. For purposes of the Lease, "**Term**" shall mean the Base Term and the First Extension Term. The Base Rent for the First Extension Term shall be adjusted on the Adjustment Date by multiplying the Base Rent payable immediately before such adjustment by the Rent Adjustment Percentage and adding the resulting amount to the Base Rent payable immediately before such adjustment; provided, however, that the Base Rent for the first 2 months of the First Extension Term (i.e., the Base Rent due and payable for October and November 2014) shall be reduced by an amount equal to 50%.

2. **Right to Surrender Portion of Premises**. Tenant shall have the one-time right to surrender ("**Surrender Right**") to Landlord all or a portion of the Premises located on the first floor of the Building as long as Tenant satisfies the following conditions: (a) Tenant exercises the Surrender Right at any time during the First Extension Term by giving Landlord at least 30 days' prior written notice of the area to be surrendered and the surrender date (which shall not be earlier than 30 days after the date of such notice), (b) the portion of the Premises to be surrendered is located on the first floor of the Building and satisfies one of the following criteria ("**Surrendered Area**"): (i) the remaining portion of the Premises located on the first floor contains at least 2,000 contiguous rentable square feet, (ii) Tenant surrenders at least 2,000 contiguous rentable square feet, or (iii) Tenant surrenders that entire portion of the Premises located on the first floor, (c) the Surrendered Area follows the contours of existing demising walls within the rooms so that no additional demising walls will be necessary to separate the remaining Premises from the Surrendered Area (but a demising structure may be installed by Landlord at its expense within an existing hallway or doorway to effectuate such separation, the location of which structure shall be reasonably acceptable to Landlord), and (d) Tenant complies with the applicable provisions of the Lease governing the surrender of all or any portion of the Premises; provided, however, that Tenant shall not be obligated to prepare a Surrender Plan for the Surrendered Area (but such obligation shall remain intact for the balance of the Premises). As soon as reasonably possible after the date on which Tenant surrenders the Surrendered Area to Landlord and satisfies the conditions set forth in this paragraph, Landlord and Tenant shall execute and deliver an amendment to the Lease amending those provisions contained in the Basic Lease Provisions that need to be revised to reflect the reduction in the area of the Premises based on the Surrendered Area, including, but not limited to, the Base Rent, the Rentable Area of the Premises, and Tenant's Share of Operating Expenses.

3. **Test Fit**. Promptly after Tenant's request, Landlord will at its cost engage Gaudreau, Inc. to prepare a test fit for Tenant based on Tenant's projected space requirements at the Project. Landlord and Tenant shall review the test fit and explore available options that would allow Tenant to continue its tenancy at the Project based on such test fit. Landlord makes no guaranty or assurance that the Project will be able to accommodate Tenant's projected space requirements at the Project.

4. **Deletion of Expansion Right**. As of the Effective Date, Section 39 (Right to Expand) of the Lease is hereby deleted in its entirety and replaced with "Intentionally Deleted."

5. **Miscellaneous**.

a. Terms used in this Fourth Amendment and not otherwise defined shall have the meanings ascribed to them in the Lease.

b. This Fourth Amendment is the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior and contemporaneous oral and written agreements and discussions. This Fourth Amendment may be amended only by an agreement in writing, signed by the parties hereto.

c. This Fourth Amendment is binding upon and shall inure to the benefit of the parties hereto, their respective agents, employees, members, representatives, officers, directors, divisions, subsidiaries, affiliates, assigns, heirs, successors in interest and shareholders.

d. This Fourth Amendment may be executed in any number of counterparts, each of which shall be deemed an original, but all of which when taken together shall constitute one and the same instrument. The signature page of any counterpart may be detached therefrom without impairing the legal effect of the signature(s) thereon provided such signature page is attached to any other counterpart identical thereto except having additional signature pages executed by other parties to this Fourth Amendment attached thereto.

e. Landlord and Tenant each represents and warrants that it has not dealt with any broker, agent or other person (collectively, "**Broker**") in connection with this Fourth Amendment and that no Broker brought about this transaction. Landlord and Tenant each hereby agree to indemnify and hold the other harmless from and against any claims by any Broker claiming a commission or other form of compensation by virtue of having dealt with Tenant or Landlord, as applicable, with regard to this Fourth Amendment.

f. Except as amended and/or modified by this Fourth Amendment, the Lease is hereby ratified and confirmed and all other terms of the Lease shall remain in full force and effect, unaltered and unchanged by this Fourth Amendment. In the event of any conflict between the provisions of this Fourth Amendment and the provisions of the Lease, the provisions of this Fourth Amendment shall prevail. Regardless of whether specifically amended by this Fourth Amendment, all of the terms and provisions of the Lease are hereby amended to the extent necessary to give effect to the purpose and intent of this Fourth Amendment.

[Signatures on Next Page]

IN WITNESS WHEREOF, the parties hereto have executed this Fourth Amendment under seal as of the day and year first above written.

TENANT:

OPGEN, INC.,
a Delaware corporation

By: /s/ C. E. Winzer(SEAL)
Name: C. Eric Winzer
Title: Chief Financial Officer

LANDLORD:

ARE-708 QUINCE ORCHARD, LLC,
a Delaware limited liability company

By: ARE-GP 708 Quince Orchard QRS CORP., a Maryland corporation, managing member

By: /s/ Jackie Clem(SEAL)
Name: Jackie Clem
Title: VP Real Estate Legal Affairs

INDEMNIFICATION AGREEMENT

THIS INDEMNIFICATION AGREEMENT (the **"Agreement"**) is made and entered into as of _____, 201_ between OpGen, Inc., a Delaware corporation (the **"Company"**), and _____ (**"Indemnitee"**).

WITNESSETH THAT:

WHEREAS, highly competent persons have become more reluctant to serve corporations as directors or in other capacities unless they are provided with adequate protection through insurance or adequate indemnification against inordinate risks of claims and actions against them arising out of their service to and activities on behalf of the corporation;

WHEREAS, the Board of Directors of the Company (the **"Board"**) has determined that, in order to attract and retain qualified individuals, the Company will attempt to maintain on an ongoing basis, at its sole expense, liability insurance to protect persons serving the Company and its subsidiaries from certain liabilities. Although the furnishing of such insurance has been a customary and widespread practice among United States-based corporations and other business enterprises, the Company believes that, given current market conditions and trends, such insurance may be available to it in the future only at higher premiums and with more exclusions. At the same time, directors, officers, and other persons in service to corporations or business enterprises are being increasingly subjected to expensive and time-consuming litigation relating to, among other things, matters that traditionally would have been brought only against the Company or business enterprise itself. The By-laws and Certificate of Incorporation of the Company require indemnification of the officers and directors of the Company. Indemnitee may also be entitled to indemnification pursuant to the General Corporation Law of the State of Delaware (**"DGCL"**). The By-laws and Certificate of Incorporation and the DGCL expressly provide that the indemnification provisions set forth therein are not exclusive, and thereby contemplate that contracts may be entered into between the Company and members of the board of directors, officers and other persons with respect to indemnification;

WHEREAS, the uncertainties relating to such insurance and to indemnification have increased the difficulty of attracting and retaining such persons;

WHEREAS, the Board has determined that the increased difficulty in attracting and retaining such persons is detrimental to the best interests of the Company's stockholders and that the Company should act to assure such persons that there will be increased certainty of such protection in the future;

WHEREAS, it is reasonable, prudent and necessary for the Company contractually to obligate itself to indemnify, and to advance expenses on behalf of, such persons to the fullest extent permitted by applicable law so that they will serve or continue to serve the Company free from undue concern that they will not be so indemnified;

WHEREAS, this Agreement is a supplement to and in furtherance of the By-laws and Certificate of Incorporation of the Company and any resolutions adopted pursuant thereto, and shall not be deemed a substitute therefor, nor to diminish or abrogate any rights of Indemnitee thereunder; and

WHEREAS, Indemnitee does not regard the protection available under the Company's By-laws and Certificate of Incorporation and insurance as adequate in the present circumstances, and may not be willing to serve as an officer or director without adequate protection, and the Company desires Indemnitee to serve in such capacity. Indemnitee is willing to serve, continue to serve and to take on additional service for or on behalf of the Company on the condition that he be so indemnified; and

[WHEREAS, Indemnitee has certain rights to indemnification and/or insurance provided by [_____] and its affiliates which Indemnitee and [_____] and its affiliates intend to be secondary to the primary obligation of the Company to indemnify Indemnitee as provided herein, with the Company's acknowledgement and agreement to the foregoing being a material condition to Indemnitee's willingness to serve on the Board.]

NOW, THEREFORE, in consideration of Indemnitee's agreement to serve as an director from and after the date hereof, the parties hereto agree as follows:

1. Indemnity of Indemnitee. The Company hereby agrees to hold harmless and indemnify Indemnitee to the fullest extent permitted by law, as such may be amended from time to time. In furtherance of the foregoing indemnification, and without limiting the generality thereof:

(a) Proceedings Other Than Proceedings by or in the Right of the Company. Indemnitee shall be entitled to the rights of indemnification provided in this Section 1(a) if, by reason of his Corporate Status (as hereinafter defined), the Indemnitee is, or is threatened to be made, a party to or participant in any Proceeding (as hereinafter defined) other than a Proceeding by or in the right of the Company. Pursuant to this Section 1(a), Indemnitee shall be indemnified against all Expenses (as hereinafter defined), judgments, penalties, fines and amounts paid in settlement actually and reasonably incurred by him, or on his behalf, in connection with such Proceeding or any claim, issue or matter therein, if the Indemnitee acted in good faith and in a manner the Indemnitee reasonably believed to be in or not opposed to the best interests of the Company, and with respect to any criminal Proceeding, had no reasonable cause to believe the Indemnitee's conduct was unlawful.

(b) Proceedings by or in the Right of the Company. Indemnitee shall be entitled to the rights of indemnification provided in this Section 1(b) if, by reason of his Corporate Status, the Indemnitee is, or is threatened to be made, a party to or participant in any Proceeding brought by or in the right of the Company. Pursuant to this Section 1(b), Indemnitee shall be indemnified against all Expenses actually and reasonably incurred by the Indemnitee, or on the Indemnitee's behalf, in connection with such Proceeding if the Indemnitee acted in good faith and in a manner the Indemnitee reasonably believed to be in or not opposed to the best interests of the Company; provided, however, if applicable law so provides, no indemnification against such Expenses shall be made in respect of any claim, issue or matter in such Proceeding as to which Indemnitee shall have been adjudged to be liable to the Company unless and to the extent that the Court of Chancery of the State of Delaware shall determine that such indemnification may be made.

(c) Indemnification for Expenses of a Party Who is Wholly or Partly Successful. Notwithstanding any other provision of this Agreement, to the extent that Indemnitee is, by reason of his Corporate Status, a party to and is successful, on the merits or otherwise, in any Proceeding, he shall be indemnified to the maximum extent permitted by law, as such may be amended from time to time, against all Expenses actually and reasonably incurred by him or on his behalf in connection therewith. If Indemnitee is not wholly successful in such Proceeding but is successful, on the merits or otherwise, as to one or more but less than all claims, issues or matters in such Proceeding, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by him or on his behalf in connection with each successfully resolved claim, issue or matter. For purposes of this Section and without limitation, the termination of any claim, issue or matter in such a Proceeding by dismissal, with or without prejudice, shall be deemed to be a successful result as to such claim, issue or matter.

2. Additional Indemnity. In addition to, and without regard to any limitations on, the indemnification provided for in Section 1 of this Agreement, the Company shall and hereby does indemnify and hold harmless Indemnitee against all Expenses, judgments, penalties, fines and amounts paid in settlement actually and reasonably incurred by him or on his behalf if, by reason of his Corporate Status, he is, or is threatened to be made, a party to or participant in any Proceeding (including a Proceeding by or in the right of the Company), including, without limitation, all liability arising out of the negligence or active or passive wrongdoing of Indemnitee. The only limitation that shall exist upon the Company's obligations pursuant to this Agreement shall be that the Company shall not be obligated to make any payment to Indemnitee that is finally determined (under the procedures, and subject to the presumptions, set forth in Sections 6 and 7 hereof) to be unlawful.

3. Contribution.

(a) Whether or not the indemnification provided in Sections 1 and 2 hereof is available, in respect of any threatened, pending or completed action, suit or proceeding in which the Company is jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding), the Company shall pay, in the first instance, the entire amount of any judgment or settlement of such action, suit or proceeding without requiring Indemnitee to contribute to such payment and the Company hereby waives and relinquishes any right of contribution it may have against Indemnitee. The Company shall not enter into any settlement of any action, suit or proceeding in which the Company is jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding) unless such settlement provides for a full and final release of all claims asserted against Indemnitee.

(b) Without diminishing or impairing the obligations of the Company set forth in the preceding subparagraph, if, for any reason, Indemnitee shall elect or be required to pay all or any portion of any judgment or settlement in any threatened, pending or completed action, suit or proceeding in which the Company is jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding), the Company shall contribute to the amount of Expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred and paid or payable by Indemnitee in proportion to the relative benefits received by the Company and all officers, directors or employees of the Company, other than Indemnitee, who are jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding), on the one hand, and Indemnitee, on the other hand, from the transaction from which such action, suit or proceeding arose; provided, however, that the proportion determined on the basis of relative benefit may, to the extent necessary to conform to law, be further adjusted by reference to the relative fault of the Company and all officers, directors or employees of the Company other than Indemnitee who are jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding), on the one hand, and Indemnitee, on the other hand, in connection with the events that resulted in such expenses, judgments, fines or settlement amounts, as well as any other equitable considerations which the Law may require to be considered. The relative fault of the Company and all officers, directors or employees of the Company, other than Indemnitee, who are jointly liable with Indemnitee (or would be if joined in such action, suit or proceeding), on the one hand, and Indemnitee, on the other hand, shall be determined by reference to, among other things, the degree to which their actions were motivated by intent to gain personal profit or advantage, the degree to which their liability is primary or secondary and the degree to which their conduct is active or passive.

(c) The Company hereby agrees to fully indemnify and hold Indemnitee harmless from any claims of contribution which may be brought by officers, directors or employees of the Company, other than Indemnitee, who may be jointly liable with Indemnitee.

(d) To the fullest extent permissible under applicable law, if the indemnification provided for in this Agreement is unavailable to Indemnitee for any reason whatsoever, the Company, in lieu of indemnifying Indemnitee, shall contribute to the amount incurred by Indemnitee, whether for judgments, fines, penalties, excise taxes, amounts paid or to be paid in settlement and/or for Expenses, in connection with any claim relating to an indemnifiable event under this Agreement, in such proportion as is deemed fair and reasonable in light of all of the circumstances of such Proceeding in order to reflect (i) the relative benefits received by the Company and Indemnitee as a result of the event(s) and/or transaction(s) giving cause to such Proceeding; and/or (ii) the relative fault of the Company (and its directors, officers, employees and agents) and Indemnitee in connection with such event(s) and/or transaction(s).

4. Indemnification for Expenses of a Witness. Notwithstanding any other provision of this Agreement, to the extent that Indemnitee is, by reason of his Corporate Status, a witness, or is made (or asked to) respond to discovery requests, in any Proceeding to which Indemnitee is not a party, he shall be indemnified against all Expenses actually and reasonably incurred by him or on his behalf in connection therewith.

5. Advancement of Expenses. Notwithstanding any other provision of this Agreement, the Company shall advance all Expenses incurred by or on behalf of Indemnitee in connection with any Proceeding by reason of Indemnitee's Corporate Status within thirty (30) days after the receipt by the Company of a statement or statements from Indemnitee requesting such advance or advances from time to time, whether prior to or after final disposition of such Proceeding. Such statement or statements shall reasonably evidence the Expenses incurred by Indemnitee and shall include or be preceded or accompanied by a written undertaking by or on behalf of Indemnitee to repay any Expenses advanced if it shall ultimately be determined that Indemnitee is not entitled to be indemnified against such Expenses. Any advances and undertakings to repay pursuant to this Section 5 shall be unsecured and interest free.

6. Procedures and Presumptions for Determination of Entitlement to Indemnification. It is the intent of this Agreement to secure for Indemnitee rights of indemnity that are as favorable as may be permitted under the DGCL and public policy of the State of Delaware. Accordingly, the parties agree that the following procedures and presumptions shall apply in the event of any question as to whether Indemnitee is entitled to indemnification under this Agreement:

(a) To obtain indemnification under this Agreement, Indemnitee shall submit to the Company a written request, including therein or therewith such documentation and information as is reasonably available to Indemnitee and is reasonably necessary to determine whether and to what extent Indemnitee is entitled to indemnification. The Secretary of the Company shall, promptly upon receipt of such a request for indemnification, advise the Board of Directors in writing that Indemnitee has requested indemnification. Notwithstanding the foregoing, any failure of Indemnitee to provide such a request to the Company, or to provide such a request in a timely fashion, shall not relieve the Company of any liability that it may have to Indemnitee unless, and to the extent that, such failure actually and materially prejudices the interests of the Company.

(b) Upon written request by Indemnitee for indemnification pursuant to the first sentence of Section 6(a) hereof, a determination with respect to Indemnitee's entitlement thereto shall be made in the specific case by one of the following four methods, which shall be at the election of the board: (1) by a majority vote of the disinterested directors, even though less than a quorum, (2) by a committee of disinterested directors designated by a majority vote of the disinterested directors, even though less than a quorum, (3) if there are no disinterested directors or if the disinterested directors so direct, by independent legal counsel in a written opinion to the Board of Directors, a copy of which shall be delivered to the Indemnitee, or (4) if so directed by the Board of Directors, by the stockholders of the Company. For purposes hereof, disinterested directors are those members of the board of directors of the Company who are not parties to the action, suit or proceeding in respect of which indemnification is sought by Indemnitee.

(c) If the determination of entitlement to indemnification is to be made by Independent Counsel pursuant to Section 6(b) hereof, the Independent Counsel shall be selected as provided in this Section 6(c). The Independent Counsel shall be selected by the Board of Directors. Indemnitee may, within 10 days after such written notice of selection shall have been given, deliver to the Company a written objection to such selection; provided, however, that such objection may be asserted only on the ground that the Independent Counsel so selected does not meet the requirements of "**Independent Counsel**" as defined in Section 13 of this Agreement, and the objection shall set forth with particularity the factual basis of such assertion. Absent a proper and timely objection, the person so selected shall act as Independent Counsel. If a written objection is made and substantiated, the Independent Counsel selected may not serve as Independent Counsel unless and until such objection is withdrawn or a court has determined that such objection is without merit. If, within 20 days after submission by Indemnitee of a written request for indemnification pursuant to Section 6(a) hereof, no Independent Counsel shall have been selected and not objected to, either the Company or Indemnitee may petition the Court of Chancery of the State of Delaware or other court of competent jurisdiction for resolution of any objection which shall have been made by the Indemnitee to the Company's selection of Independent Counsel and/or for the appointment as Independent Counsel of a person selected by the court or by such other person as the court shall designate, and the person with respect to whom all objections are so resolved or the person so appointed shall act as Independent Counsel under Section 6(b) hereof. The Company shall pay any and all reasonable fees and expenses of Independent Counsel incurred by such Independent Counsel in connection with acting pursuant to Section 6(b) hereof, and the Company shall pay all reasonable fees and expenses incident to the procedures of this Section 6(c), regardless of the manner in which such Independent Counsel was selected or appointed.

(d) In making a determination with respect to entitlement to indemnification hereunder, the person or persons or entity making such determination shall presume that Indemnitee is entitled to indemnification under this Agreement. Anyone seeking to overcome this presumption shall have the burden of proof and the burden of persuasion by clear and convincing evidence. Neither the failure of the Company (including by its directors or independent legal counsel) to have made a determination prior to the commencement of any action pursuant to this Agreement that indemnification is proper in the circumstances because Indemnitee has met the applicable standard of conduct, nor an actual determination by the Company (including by its directors or independent legal counsel) that Indemnitee has not met such applicable standard of conduct, shall be a defense to the action or create a presumption that Indemnitee has not met the applicable standard of conduct.

(e) Indemnitee shall be deemed to have acted in good faith if Indemnitee's action is based on the records or books of account of the Enterprise, including financial statements, or on information supplied to Indemnitee by the officers of the Enterprise (as hereinafter defined) in the course of their duties, or on the advice of legal counsel for the Enterprise or on information or records given or reports made to the Enterprise by an independent certified public accountant or by an appraiser or other expert selected with reasonable care by the Enterprise. In addition, the knowledge and/or actions, or failure to act, of any director, officer, agent or employee of the Enterprise shall not be imputed to Indemnitee for purposes of determining the right to indemnification under this Agreement. Whether or not the foregoing provisions of this Section 6(e) are satisfied, it shall in any event be presumed that Indemnitee has at all times acted in good faith and in a manner he reasonably believed to be in or not opposed to the best interests of the Company. Anyone seeking to overcome this presumption shall have the burden of proof and the burden of persuasion by clear and convincing evidence.

(f) If the person, persons or entity empowered or selected under Section 6 to determine whether Indemnitee is entitled to indemnification shall not have made a determination within sixty (60) days after receipt by the Company of the request therefor, the requisite determination of entitlement to indemnification shall be deemed to have been made and Indemnitee shall be entitled to such indemnification absent (i) a misstatement by Indemnitee of a material fact, or an omission of a material fact necessary to make Indemnitee's statement not materially misleading, in connection with the request for indemnification, or (ii) a prohibition of such indemnification under applicable law; provided, however, that such 60-day period may be extended for a reasonable time, not to exceed an additional thirty (30) days, if the person, persons or entity making such determination with respect to entitlement to indemnification in good faith requires such additional time to obtain or evaluate documentation and/or information relating thereto; and provided, further, that the foregoing provisions of this Section 6(g) shall not apply if the determination of entitlement to indemnification is to be made by the stockholders pursuant to Section 6(b) of this Agreement and if (A) within fifteen (15) days after receipt by the Company of the request for such determination, the Board of Directors or the Disinterested Directors, if appropriate, resolve to submit such determination to the stockholders for their consideration at an annual meeting thereof to be held within seventy-five (75) days after such receipt and such determination is made thereat, or (B) a special meeting of stockholders is called within fifteen (15) days after such receipt for the purpose of making such determination, such meeting is held for such purpose within sixty (60) days after having been so called and such determination is made thereat.

(g) Indemnitee shall cooperate with the person, persons or entity making such determination with respect to Indemnitee's entitlement to indemnification, including providing to such person, persons or entity upon reasonable advance request any documentation or information which is not privileged or otherwise protected from disclosure and which is reasonably available to Indemnitee and reasonably necessary to such determination. Any Independent Counsel, member of the Board of Directors or stockholder of the Company shall act reasonably and in good faith in making a determination regarding the Indemnitee's entitlement to indemnification under this Agreement. Any costs or expenses (including attorneys' fees and disbursements) incurred by Indemnitee in so cooperating with the person, persons or entity making such determination shall be borne by the Company (irrespective of the determination as to Indemnitee's entitlement to indemnification) and the Company hereby indemnifies and agrees to hold Indemnitee harmless therefrom.

(h) The Company acknowledges that a settlement or other disposition short of final judgment may be successful if it permits a party to avoid expense, delay, distraction, disruption and uncertainty. In the event that any action, claim or proceeding to which Indemnitee is a party is resolved in any manner other than by adverse judgment against Indemnitee (including, without limitation, settlement of such action, claim or proceeding with or without payment of money or other consideration) it shall be presumed that Indemnitee has been successful on the merits or otherwise in such action, suit or proceeding. Anyone seeking to overcome this presumption shall have the burden of proof and the burden of persuasion by clear and convincing evidence.

(i) The termination of any Proceeding or of any claim, issue or matter therein, by judgment, order, settlement or conviction, or upon a plea of nolo contendere or its equivalent, shall not (except as otherwise expressly provided in this Agreement) of itself adversely affect the right of Indemnitee to indemnification or create a presumption that Indemnitee did not act in good faith and in a manner which he reasonably believed to be in or not opposed to the best interests of the Company or, with respect to any criminal Proceeding, that Indemnitee had reasonable cause to believe that his conduct was unlawful.

7. Remedies of Indemnitee.

(a) In the event that (i) a determination is made pursuant to Section 6 of this Agreement that Indemnitee is not entitled to indemnification under this Agreement, (ii) advancement of Expenses is not timely made pursuant to Section 5 of this Agreement, (iii) no determination of entitlement to indemnification is made pursuant to Section 6(b) of this Agreement within 90 days after receipt by the Company of the request for indemnification, (iv) payment of indemnification is not made pursuant to this Agreement within ten (10) days after receipt by the Company of a written request therefor or (v) payment of indemnification is not made within ten (10) days after a determination has been made that Indemnitee is entitled to indemnification or such determination is deemed to have been made pursuant to Section 6 of this Agreement, Indemnitee shall be entitled to an adjudication in an appropriate court of the State of Delaware, or in any other court of competent jurisdiction, of Indemnitee's entitlement to such indemnification. Indemnitee shall commence such proceeding seeking an adjudication within 180 days following the date on which Indemnitee first has the right to commence such proceeding pursuant to this Section 7(a). The Company shall not oppose Indemnitee's right to seek any such adjudication.

(b) In the event that a determination shall have been made pursuant to Section 6(b) of this Agreement that Indemnitee is not entitled to indemnification, any judicial proceeding commenced pursuant to this Section 7 shall be conducted in all respects as a de novo trial on the merits, and Indemnitee shall not be prejudiced by reason of the adverse determination under Section 6(b).

(c) If a determination shall have been made pursuant to Section 6(b) of this Agreement that Indemnitee is entitled to indemnification, the Company shall be bound by such determination in any judicial proceeding commenced pursuant to this Section 7, absent (i) a misstatement by Indemnitee of a material fact, or an omission of a material fact necessary to make Indemnitee's misstatement not materially misleading in connection with the application for indemnification, or (ii) a prohibition of such indemnification under applicable law.

(d) In the event that Indemnitee, pursuant to this Section 7, seeks a judicial adjudication of his rights under, or to recover damages for breach of, this Agreement, or to recover under any directors' and officers' liability insurance policies maintained by the Company, the Company shall pay on his behalf, in advance, any and all expenses (of the types described in the definition of Expenses in Section 13 of this Agreement) actually and reasonably incurred by him in such judicial adjudication, regardless of whether Indemnitee ultimately is determined to be entitled to such indemnification, advancement of expenses or insurance recovery.

(e) The Company shall be precluded from asserting in any judicial proceeding commenced pursuant to this Section 7 that the procedures and presumptions of this Agreement are not valid, binding and enforceable and shall stipulate in any such court that the Company is bound by all the provisions of this Agreement. The Company shall indemnify Indemnitee against any and all Expenses and, if requested by Indemnitee, shall (within ten (10) days after receipt by the Company of a written request therefore) advance, to the extent not prohibited by law, such expenses to Indemnitee, which are incurred by Indemnitee in connection with any action brought by Indemnitee for indemnification or advance of Expenses from the Company under this Agreement or under any directors' and officers' liability insurance policies maintained by the Company, regardless of whether Indemnitee ultimately is determined to be entitled to such indemnification, advancement of Expenses or insurance recovery, as the case may be.

(f) Notwithstanding anything in this Agreement to the contrary, no determination as to entitlement to indemnification under this Agreement shall be required to be made prior to the final disposition of the Proceeding.

8. Non-Exclusivity; Survival of Rights; Insurance; Primacy of Indemnification; Subrogation.

(a) The rights of indemnification as provided by this Agreement shall not be deemed exclusive of any other rights to which Indemnitee may at any time be entitled under applicable law, the Certificate of Incorporation, the By-laws, any agreement, a vote of stockholders, a resolution of directors or otherwise, of the Company. No amendment, alteration or repeal of this Agreement or of any provision hereof shall limit or restrict any right of Indemnitee under this Agreement in respect of any action taken or omitted by such Indemnitee in his Corporate Status prior to such amendment, alteration or repeal. To the extent that a change in the DGCL, whether by statute or judicial decision, permits greater indemnification than would be afforded currently under the Certificate of Incorporation, By-laws and this Agreement, it is the intent of the parties hereto that Indemnitee shall enjoy by this Agreement the greater benefits so afforded by such change. No right or remedy herein conferred is intended to be exclusive of any other right or remedy, and every other right and remedy shall be cumulative and in addition to every other right and remedy given hereunder or now or hereafter existing at law or in equity or otherwise. The assertion or employment of any right or remedy hereunder, or otherwise, shall not prevent the concurrent assertion or employment of any other right or remedy.

(b) To the extent that the Company maintains an insurance policy or policies providing liability insurance for directors, officers, employees, or agents or fiduciaries of the Company or of any other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise that such person serves at the request of the Company, Indemnitee shall be covered by such policy or policies in accordance with its or their terms to the maximum extent of the coverage available for any director, officer, employee, agent or fiduciary under such policy or policies. If, at the time of the receipt of a notice of a claim pursuant to the terms hereof, the Company has director and officer liability insurance in effect, the Company shall give prompt notice of the commencement of such proceeding to the insurers in accordance with the procedures set forth in the respective policies. The Company shall thereafter take all necessary or desirable action to cause such insurers to pay, on behalf of the Indemnitee, all amounts payable as a result of such proceeding in accordance with the terms of such policies.

(c) [The Company hereby acknowledges that Indemnitee has certain rights to indemnification, advancement of expenses and/or insurance provided by [_____] and its affiliates (collectively, the "**Fund Indemnitors**"). The Company hereby agrees (i) that it is the indemnitor of first resort (i.e., its obligations to Indemnitee are primary and any obligation of the Fund Indemnitors to advance expenses or to provide indemnification for the same expenses or liabilities incurred by Indemnitee are secondary), (ii) that it shall be required to advance the full amount of expenses incurred by Indemnitee and shall be liable for the full amount of all Expenses, judgments, penalties, fines and amounts paid in settlement to the extent legally permitted and as required by the terms of this Agreement and the Certificate of Incorporation or Bylaws of the Company (or any other agreement between the Company and Indemnitee), without regard to any rights Indemnitee may have against the Fund Indemnitors, and, (iii) that it irrevocably waives, relinquishes and releases the Fund Indemnitors from any and all claims against the Fund Indemnitors for contribution, subrogation or any other recovery of any kind in respect thereof. The Company further agrees that no advancement or payment by the Fund Indemnitors on behalf of Indemnitee with respect to any claim for which Indemnitee has sought indemnification from the Company shall affect the foregoing and the Fund Indemnitors shall have a right of contribution and/or be subrogated to the extent of such advancement or payment to all of the rights of recovery of Indemnitee against the Company. The Company and Indemnitee agree that the Fund Indemnitors are express third party beneficiaries of the terms of this Section 8(c).]

(d) [Except as provided in paragraph (c) above,] in the event of any payment under this Agreement, the Company shall be subrogated to the extent of such payment to all of the rights of recovery of Indemnitee [(other than against the Fund Indemnitors)], who shall execute all papers required and take all action necessary to secure such rights, including execution of such documents as are necessary to enable the Company to bring suit to enforce such rights.

(e) [Except as provided in paragraph (c) above,] the Company shall not be liable under this Agreement to make any payment of amounts otherwise indemnifiable hereunder if and to the extent that Indemnitee has otherwise actually received such payment under any insurance policy, contract, agreement or otherwise.

(f) [Except as provided in paragraph (c) above,] the Company's obligation to indemnify or advance Expenses hereunder to Indemnitee who is or was serving at the request of the Company as a director, officer, employee or agent of any other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise shall be reduced by any amount Indemnitee has actually received as indemnification or advancement of expenses from such other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise.

9. Exception to Right of Indemnification. Notwithstanding any provision in this Agreement, the Company shall not be obligated under this Agreement to make any indemnity in connection with any claim made against Indemnitee:

(a) for which payment has actually been made to or on behalf of Indemnitee under any insurance policy or other indemnity provision, except with respect to any excess beyond the amount paid under any insurance policy or other indemnity provision, provided, that the foregoing shall not affect the rights of Indemnitee [or the Fund Indemnitors set forth in Section 8(c) above]; or

(b) for an accounting of profits made from the purchase and sale (or sale and purchase) by Indemnitee of securities of the Company within the meaning of Section 16(b) of the Securities Exchange Act of 1934, as amended, or similar provisions of state statutory law or common law; or

(c) in connection with any Proceeding (or any part of any Proceeding) initiated by Indemnitee, including any Proceeding (or any part of any Proceeding) initiated by Indemnitee against the Company or its directors, officers, employees or other indemnitees, unless (i) the Board of Directors of the Company authorized the Proceeding (or any part of any Proceeding) prior to its initiation or (ii) the Company provides the indemnification, in its sole discretion, pursuant to the powers vested in the Company under applicable law.

10. Duration of Agreement. All agreements and obligations of the Company contained herein shall continue during the period Indemnitee is an officer or director of the Company (or is or was serving at the request of the Company as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise) and shall continue thereafter until and terminate upon the later of: (a) ten (10) years after the date that Indemnitee shall have ceased to serve as a director of the Company or (b) one (1) year after the final termination of any Proceeding (or any proceeding commenced under Section 7 hereof) then pending in respect of which Indemnitee is granted rights of indemnification or advancement of Expenses hereunder. This Agreement shall be binding upon and inure to the benefit of and be enforceable by the parties hereto and their respective successors (including any direct or indirect successor by purchase, merger, consolidation or otherwise to all or substantially all of the business or assets of the Company), assigns, spouses, heirs, executors and personal and legal representatives.

11. Security. To the extent requested by Indemnitee and approved by the Board of Directors of the Company, the Company may at any time and from time to time provide security to Indemnitee for the Company's obligations hereunder through an irrevocable bank line of credit, funded trust or other collateral. Any such security, once provided to Indemnitee, may not be revoked or released without the prior written consent of the Indemnitee.

12. Enforcement.

(a) The Company expressly confirms and agrees that it has entered into this Agreement and assumes the obligations imposed on it hereby in order to induce Indemnitee to serve as an officer or director of the Company, and the Company acknowledges that Indemnitee is relying upon this Agreement in serving as an officer or director of the Company.

(b) This Agreement constitutes the entire agreement between the parties hereto with respect to the subject matter hereof and supersedes all prior agreements and understandings, oral, written and implied, between the parties hereto with respect to the subject matter hereof including, without limitation, the Original Agreement.

13. Definitions. For purposes of this Agreement:

(a) **"Corporate Status"** describes the status of a person who is or was a director, officer, employee, agent or fiduciary of the Company or of any other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise that such person is or was serving at the express written request of the Company.

(b) **"Disinterested Director"** means a director of the Company who is not and was not a party to the Proceeding in respect of which indemnification is sought by Indemnitee.

(c) **"Enterprise"** shall mean the Company and any other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise that Indemnitee is or was serving at the express written request of the Company as a director, officer, employee, agent or fiduciary.

(d) **"Expenses"** shall include all reasonable attorneys' fees, retainers, court costs, transcript costs, fees of experts, witness fees, travel expenses, duplicating costs, printing and binding costs, telephone charges, postage, delivery service fees and all other disbursements or expenses of the types customarily incurred in connection with prosecuting, defending, preparing to prosecute or defend, investigating, participating, or being or preparing to be a witness in a Proceeding, or responding to, or objecting to, a request to provide discovery in any Proceeding. Expenses also shall include Expenses incurred in connection with any appeal resulting from any Proceeding and any federal, state, local or foreign taxes imposed on the Indemnitee as a result of the actual or deemed receipt of any payments under this Agreement, including without limitation the premium, security for, and other costs relating to any cost bond, supersede as bond, or other appeal bond or its equivalent. Expenses, however, shall not include amounts paid in settlement by Indemnitee or the amount of judgments or fines against Indemnitee.

(e) "**Independent Counsel**" means a law firm, or a member of a law-firm, that is experienced in matters of corporation law and neither presently is, nor in the past five years has been, retained to represent: (i) the Company or Indemnitee in any matter material to either such party (other than with respect to matters concerning Indemnitee under this Agreement, or of other indemnitees under similar indemnification agreements), or (ii) any other party to the Proceeding giving rise to a claim for indemnification hereunder. Notwithstanding the foregoing, the term "Independent Counsel" shall not include any person who, under the applicable standards of professional conduct then prevailing, would have a conflict of interest in representing either the Company or Indemnitee in an action to determine Indemnitee's rights under this Agreement. The Company agrees to pay the reasonable fees of the Independent Counsel referred to above and to fully indemnify such counsel against any and all Expenses, claims, liabilities and damages arising out of or relating to this Agreement or its engagement pursuant hereto.

(f) "**Proceeding**" includes any threatened, pending or completed action, suit, arbitration, alternate dispute resolution mechanism, investigation, inquiry, administrative hearing or any other actual, threatened or completed proceeding, whether brought by or in the right of the Company or otherwise and whether civil, criminal, administrative or investigative, in which Indemnitee was, is or will be involved as a party or otherwise, by reason of the fact that Indemnitee is or was an officer or director of the Company, by reason of any action taken by him or of any inaction on his part while acting as an officer or director of the Company, or by reason of the fact that he is or was serving at the request of the Company as a director, officer, employee, agent or fiduciary of another corporation, partnership, joint venture, trust or other Enterprise; in each case whether or not he is acting or serving in any such capacity at the time any liability or expense is incurred for which indemnification can be provided under this Agreement; including one pending on or before the date of this Agreement, but excluding one initiated by an Indemnitee pursuant to Section 7 of this Agreement to enforce his rights under this Agreement.

14. Severability. The invalidity or unenforceability of any provision hereof shall in no way affect the validity or enforceability of any other provision. Without limiting the generality of the foregoing, this Agreement is intended to confer upon Indemnitee indemnification rights to the fullest extent permitted by applicable laws. In the event any provision hereof conflicts with any applicable law, such provision shall be deemed modified, consistent with the aforementioned intent, to the extent necessary to resolve such conflict.

15. Modification and Waiver. No supplement, modification, termination or amendment of this Agreement shall be binding unless executed in writing by both of the parties hereto. No waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provisions hereof (whether or not similar) nor shall such waiver constitute a continuing waiver.

16. Notice By Indemnitee. Indemnitee agrees promptly to notify the Company in writing upon being served with or otherwise receiving any summons, citation, subpoena, complaint, indictment, information or other document relating to any Proceeding or matter which may be subject to indemnification covered hereunder. The failure to so notify the Company shall not relieve the Company of any obligation which it may have to Indemnitee under this Agreement or otherwise unless and only to the extent that such failure or delay materially prejudices the Company.

17. Notices. All notices and other communications given or made pursuant to this Agreement shall be in writing and shall be deemed effectively given: (a) upon personal delivery to the party to be notified, (b) when sent by confirmed electronic mail or facsimile if sent during normal business hours of the recipient, and if not so confirmed, then on the next business day, (c) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid, or (d) one (1) day after deposit with a nationally recognized overnight courier, specifying next day delivery, with written verification of receipt. All communications shall be sent:

(a) To Indemnitee at the address set forth below Indemnitee signature hereto.

(b) To the Company at:

OpGen, Inc.
708 Quince Orchard Road
Gaithersburg, Maryland 20878
Attention: Chief Executive Officer

or to such other address as may have been furnished to Indemnitee by the Company or to the Company by Indemnitee, as the case may be.

18. Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same Agreement. This Agreement may also be executed and delivered by facsimile signature and in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

19. Headings. The headings of the paragraphs of this Agreement are inserted for convenience only and shall not be deemed to constitute part of this Agreement or to affect the construction thereof.

20. Governing Law and Consent to Jurisdiction. This Agreement and the legal relations among the parties shall be governed by, and construed and enforced in accordance with, the laws of the State of Delaware, without regard to its conflict of laws rules. The Company and Indemnitee hereby irrevocably and unconditionally (i) agree that any action or proceeding arising out of or in connection with this Agreement shall be brought only in the Chancery Court of the State of Delaware (the "**Delaware Court**"), and not in any other state or federal court in the United States of America or any court in any other country, (ii) consent to submit to the exclusive jurisdiction of the Delaware Court for purposes of any action or proceeding arising out of or in connection with this Agreement, (iii) waive any objection to the laying of venue of any such action or proceeding in the Delaware Court, and (iv) waive, and agree not to plead or to make, any claim that any such action or proceeding brought in the Delaware Court has been brought in an improper or inconvenient forum.

SIGNATURE PAGE FOLLOWS

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on and as of the day and year first above written.

COMPANY

OPGEN, INC.

By: _____
Name:
Title:

INDEMNITEE

_____
Name:

Address:

OPGEN, INC
2008 STOCK OPTION AND RESTRICTED STOCK PLAN

1. DEFINED TERMS

Exhibit A, which is incorporated by reference, defines the terms used in the Plan and sets forth certain operational rules related to those terms.

2. PURPOSE

The Plan has been established to advance the interests of the Company by providing for the grant to Participants of Restricted Stock and Stock Options.

3. ADMINISTRATION

The Administrator has discretionary authority, subject only to the express provisions of the Plan, to interpret the Plan; determine eligibility for and grant Awards; determine, modify or waive the terms and conditions of any Award; prescribe forms, rules and procedures; and otherwise do all things necessary to carry out the purposes of the Plan. Determinations of the Administrator made under the Plan will be conclusive and will bind all parties.

4. LIMITS ON AWARDS UNDER THE PLAN

(a) **Number of Shares**. A maximum of 5,983,900 shares of Stock may be delivered in satisfaction of Awards under the Plan.

(b) **Type of Shares**. Stock delivered by the Company under the Plan may be authorized but unissued Stock or previously issued Stock acquired by the Company. No fractional shares of Stock will be delivered under the Plan.

5. ELIGIBILITY AND PARTICIPATION

The Administrator will select Participants from among those key Employees and directors of, and consultants and advisors to, the Company or its Affiliates who, in the opinion of the Administrator, are in a position to make a significant contribution to the success of the Company and its Affiliates. Eligibility for ISOs is limited to employees of the Company or of a "parent corporation" or "subsidiary corporation" of the Company as those terms are defined in Section 424 of the Code.

6. RULES APPLICABLE TO AWARDS

(a) ALL AWARDS

(1) **Award Provisions**. The Administrator will determine the terms of all Awards, subject to the limitations provided herein.

(2) **Transferability**. Neither ISOs nor, except as the Administrator otherwise expressly provides, other Awards may be transferred other than by will or by the laws of descent and distribution, and during a Participant's lifetime neither ISOs nor, except as the Administrator otherwise expressly provides, other Stock Options may be exercised only by the Participant.

(3) Taxes. The Administrator will make such provision for the withholding of taxes as it deems necessary. The Administrator may, but need not, hold back shares of Stock from an Award or permit a Participant to tender previously owned shares of Stock in satisfaction of tax withholding requirements (but not in excess of the minimum withholding required by law).

(4) Dividend Equivalents, Etc. The Administrator may provide for the payment of amounts in lieu of cash dividends or other cash distributions with respect to Stock subject to an Award.

(5) Rights Limited. Nothing in the Plan will be construed as giving any person the right to continued employment or service with the Company or its Affiliates, or any rights as a stockholder except as to shares of Stock actually issued under the Plan. The loss of existing or potential profit in Awards will not constitute an element of damages in the event of termination of employment or service for any reason, even if the termination is in violation of an obligation of the Company or Affiliate to the Participant.

(b) STOCK OPTIONS

(1) Vesting and Exercisability. The Administrator may determine the time or times at which a Stock Option will vest or become exercisable and the terms on which the Stock Option will remain exercisable. Without limiting the foregoing, the Administrator may at any time accelerate the vesting or exercisability of an Award, regardless of any adverse or potentially adverse tax consequences resulting from such acceleration. Unless the Administrator expressly provides otherwise: immediately upon the cessation of the Participant's Employment the unvested portion of any Stock Option held by the Participant or the Participant's permitted transferee, if any, will terminate and the balance, to the extent exercisable, will remain exercisable for the lesser of (i) a period of three months or (ii) the period ending on the latest date on which such Stock Option could have been exercised without regard to this Section 6(b)(1), and will thereupon terminate subject to the following:

(A) all Stock Options held by a Participant or the Participant's permitted transferee, if any, immediately prior to the Participant's death, to the extent then exercisable, will remain exercisable for the lesser of (i) the one year period ending with the first anniversary of the Participant's death or (ii) the period ending on the latest date on which such Stock Option could have been exercised without regard to this Section 6(b)(1), and will thereupon terminate; and

(B) all Stock Options held by a Participant or the Participant's permitted transferee, if any, immediately prior to the cessation of the Participant's Employment will immediately terminate upon such cessation if the Administrator in its sole discretion determines that such cessation of Employment has resulted for reasons that cast such discredit on the Participant as to justify immediate termination of the Award.

(2) Time And Manner Of Exercise. Unless the Administrator expressly provides otherwise, a Stock Option will not be deemed to have been exercised until the Administrator receives a notice of exercise (in form acceptable to the Administrator) signed by the appropriate person and accompanied by any payment required under the Award. If the Award is exercised by any person other than the Participant, the Administrator may require satisfactory evidence that the person exercising the Award has the right to do so.

(3) Exercise Price. The Administrator will determine the exercise price of each Stock Option, which will not be less than the fair market value of the Stock subject to the Stock Option determined as of the date of grant.

(4) Payment Of Exercise Price. Where the exercise of a Stock Option is to be accompanied by payment, the Administrator may determine the required or permitted forms of payment, subject to the following: (a) all payments will be by cash or check acceptable to the Administrator, or, if so permitted by the Administrator, (i) through the delivery of shares of Stock that have been outstanding for at least six months (unless the Administrator approves a shorter period) and that have a fair market value equal to the exercise price, (ii) by delivery to the Company of a promissory note of the person exercising the Stock Option, payable on such terms as are specified by the Administrator, (iii) at such time, if any, as the Stock is publicly traded, through a broker-assisted exercise program acceptable to the Administrator, or (iv) by any combination of the foregoing permissible forms of payment; and (b) where shares of Stock issued under a Stock Option are part of an original issue of shares, the Stock Option will require that at least so much of the exercise price as equals the par value of such shares be paid other than by delivery of a promissory note or its equivalent. The delivery of shares in payment of the exercise price under clause (a)(i) above may be accomplished either by actual delivery or by constructive delivery through attestation of ownership, subject to such rules as the Administrator may prescribe.

(c) RESTRICTED STOCK

(1) Grant or Sale. The Administrator may grant or sell Restricted Stock to any Participant (including, but not limited to, upon exercise of Stock Options) on such conditions and restrictions and for such purchase price, if any, as the Administrator determines.

(2) Payment. Awards of Restricted Stock may be made in exchange for past services or other lawful consideration.

(3) Risk of Forfeiture. Except as otherwise determined by the Administrator, upon termination for any reason, including death, of a Participant's Employment with the Company the Company will have the right (but not the obligation) to reacquire any shares of Restricted Stock outstanding at the time of death at the Participant's original purchase price, if any, for such shares. If there is no purchase price, then the Restricted Stock will be forfeited upon such termination.

(4) Rights as Shareholder. Subject to the other provisions of this Section 6(c), a Participant will have all the rights of a shareholder with respect to shares of Restricted Stock granted or sold to the Participant hereunder.

7. EFFECT OF CERTAIN TRANSACTIONS

(a) MERGERS, ETC. Except as otherwise provided in an Award, the following provisions shall apply in the event of a Covered Transaction:

(1) Assumption or Substitution. If the Covered Transaction is one in which there is an acquiring or surviving entity, the Administrator may provide for the assumption of some or all outstanding Awards, or for the grant of new awards in substitution therefor, by the acquiror or survivor or an affiliate of the acquiror or survivor, in each case on such terms and subject to such conditions as the Administrator determines.

(2) Cash-Out of Awards. If the Covered Transaction is one in which holders of Stock will receive upon consummation a payment (whether cash, non-cash or a combination of the foregoing), the Administrator may provide for payment (a "cash-out"), with respect to some or all Awards or any portion thereof, equal in the case of each affected Award or portion thereof to the excess, if any, of (A) the fair market value of one share of Stock (as determined by the Administrator in its reasonable discretion) times the number of shares of Stock subject to the Award or such portion, over (B) the aggregate exercise or purchase price, if any, under the Award or such portion, in each case on such payment terms (which need not be the same as the terms of payment to holders of Stock) and other terms, and subject to such conditions, as the Administrator determines; provided, that the Administrator shall not exercise its discretion under this Section 7(a)(2) with respect to an Award or portion thereof providing for "nonqualified deferred compensation" subject to Section 409A in a manner that would constitute an extension or acceleration of, or other change in, payment terms if such change would be inconsistent with the applicable requirements of Section 409A

(3) Other Actions. If the Covered Transaction (whether or not there is an acquiring or surviving entity) is one in which there is no assumption, substitution or cash-out, all outstanding Awards requiring exercise will cease to be exercisable and all Awards providing for the future delivery of Stock shall expire, in each case after such payment or other consideration, if any, as the Administrator deems equitable in the circumstances, as of the effective time of the Covered Transaction.

(4) Termination of Awards Upon Consummation of Covered Transaction. Each Award will terminate upon consummation of the Covered Transaction, other than the following: (i) Awards assumed pursuant to Section 7(a)(1) above; (ii) Awards converted pursuant to the proviso in Section 7(a)(3) above into an ongoing right to receive payment other than Stock; and (iii) outstanding shares of Restricted Stock (which shall be treated in the same manner as other shares of Stock, subject to Section 7(a)(5) below)

(5) Additional Limitations. Any share of Stock and any cash or other property delivered pursuant to Section 7(a)(2) or Section 7(a)(3) above with respect to an Award may, in the discretion of the Administrator, contain such restrictions, if any, as the Administrator deems appropriate to reflect any performance or other vesting conditions to which the Award was subject and that did not lapse (and were not satisfied) in connection with the Covered Transaction. In the case of Restricted Stock that does not vest in connection with the Covered Transaction, the Administrator may require that any amounts delivered, exchanged or otherwise paid in respect of such Stock in connection with the Covered Transaction be placed in escrow or otherwise made subject to such restrictions as the Administrator deems appropriate to carry out the intent of the Plan.

(b) CHANGES IN AND DISTRIBUTIONS WITH RESPECT TO THE STOCK

(1) Basic Adjustment Provisions. In the event of a stock dividend, stock split or combination of shares (including reverse stock split), recapitalization or other change in the Company's capital structure, the Administrator will make appropriate adjustments to the maximum number of shares that may be delivered under the Plan under Section 4(a) and to the maximum share limits described in Section 4(c), and will also make appropriate adjustments to the number and kind of shares of stock or securities subject to Awards then outstanding or subsequently granted, any exercise prices relating to Awards and any other provision of Awards affected by such change.

(2) Certain Other Adjustments. To the extent consistent with qualification of ISOs under Section 422 of the Code, the Administrator may also make adjustments of the type described in paragraph (1) above to take into account distributions to stockholders other than those provided for in Section 7(a) and 7(b)(1), or any other event, if the Administrator determines that adjustments are appropriate to avoid distortion in the operation of the Plan and to preserve the value of Awards made hereunder.

(3) Continuing Application of Plan Terms. References in the Plan to shares of Stock will be construed to include any stock or securities resulting from an adjustment pursuant to this Section 7.

8. LEGAL CONDITIONS ON DELIVERY OF STOCK

The Company will not be obligated to deliver any shares of Stock pursuant to the Plan or to remove any restriction from shares of Stock previously delivered under the Plan until: (i) the Company is satisfied that all legal matters in connection with the issuance and delivery of such shares have been addressed and resolved; (ii) if the outstanding Stock is at the time of delivery listed on any stock exchange or national market system, the shares to be delivered have been listed or authorized to be listed on such exchange or system upon official notice of issuance; and (iii) all conditions of the Award have been satisfied or waived. If the sale of Stock has not been registered under the Securities Act of 1933, as amended, the Company may require, as a condition to exercise of the Award, such representations or agreements as counsel for the Company may consider appropriate to avoid violation of such Act. The Company may require that certificates evidencing Stock issued under the Plan bear an appropriate legend reflecting any restriction on transfer applicable to such Stock, and the Company may hold the certificates pending lapse of the applicable restrictions.

9. AMENDMENT AND TERMINATION

The Administrator may at any time or times amend the Plan or any outstanding Award for any purpose which may at the time be permitted by law, and may at any time terminate the Plan as to any future grants of Awards; *provided*, that except as otherwise expressly provided in the Plan the Administrator may not, without the Participant's consent, alter the terms of an Award so as to affect adversely the Participant's rights under the Award, unless the Administrator expressly reserved the right to do so at the time of the Award.

10. OTHER COMPENSATION ARRANGEMENTS

The existence of the Plan or the grant of any Award will not in any way affect the Company's right to Award a person bonuses or other compensation in addition to Awards under the Plan.

EXHIBIT A

Definition of Terms

The following terms, when used in the Plan, will have the meanings and be subject to the provisions set forth below:

"Administrator": The committee appointed by the Board to administer the Plan, or if no such committee is appointed, the Board. The Administrator may delegate ministerial tasks to such persons as it deems appropriate.

"Affiliate": Any corporation or other entity owning, directly or indirectly, 50% or more of the outstanding Stock of the Company, or in which the Company or any such corporation or other entity owns, directly or indirectly, 50% of the outstanding capital stock (determined by aggregate voting rights) or other voting interests.

"Award": The grant of Stock Options or Restricted Stock to a Participant pursuant to such terms, conditions, performance requirements, and limitations as the Administrator may establish in order to fulfill the objectives of the Plan.

"Board": The Board of Directors of the Company.

"Code": The U.S. Internal Revenue Code of 1986 as from time to time amended and in effect, or any successor statute as from time to time in effect.

"Company": OpGen, Inc., a Delaware corporation.

"Covered Transaction": Any of (i) a consolidation, merger, or similar transaction or series of related transactions in which the Company is not the surviving corporation or which results in the acquisition of all or substantially all of the Company's then outstanding common stock by a single person or entity or by a group of persons and/or entities acting in concert, (ii) a sale or transfer of all or substantially all the Company's assets, or (iii) a dissolution or liquidation of the Company**.** Where a Covered Transaction involves a tender offer that is reasonably expected to be followed by a merger described in clause (i) (as determined by the Administrator), the Covered Transaction shall be deemed to have occurred upon consummation of the tender offer.

"Employee": Any person who is employed by the Company or an Affiliate.

"Employment": A Participant's employment or other service relationship with the Company and its Affiliates. Employment will be deemed to continue, unless the Administrator expressly provides otherwise, so long as the Participant is employed by, or otherwise is providing services in a capacity described in Section 5 to, the Company or its Affiliates. If a Participant's employment or other service relationship is with an Affiliate and that entity ceases to be an Affiliate, the Participant's Employment will be deemed to have terminated when the entity ceases to be an Affiliate unless the Participant transfers Employment to the Company or its remaining Affiliates.

"ISO": A Stock Option intended to be an "incentive stock option" within the meaning of Section 422 of the Code. Each option granted pursuant to the Plan will be treated as providing by its terms that it is to be a non-incentive option unless, as of the date of grant, it is expressly designated as an ISO.

"Participant": A person who is granted an Award under the Plan.

"Plan": The OpGen, Inc. 2008 Stock Option and Restricted Stock Plan as from time to time amended and in effect.

"Restricted Stock": An Award of Stock for so long as the Stock remains subject to restrictions requiring that it be redelivered or offered for sale to the Company if specified conditions are not satisfied.

"Stock": Common Stock of the Company, par value $0.01 per share.

"Stock Options": An Award of options entitling the recipient to acquire shares of Stock upon payment of the exercise price.

OPGEN, INC.

AMENDMENT NO. 2009-01 TO
2008 STOCK OPTION AND RESTRICTED STOCK PLAN

EFFECTIVE JANUARY 22, 2009

This Amendment No. 2009-01 (the "Amendment"), dated and effective January 22, 2009 (the "Effective Date"), is an amendment to the 2008 Stock Option and Restricted Stock Plan (the "Plan"), of OpGen, Inc., a Delaware corporation (the "Company"). All capitalized terms used in this Amendment without definition have the meanings set forth in the Plan.

WHEREAS, on January 22, 2009, the Board of Directors of the Company (the "Board") approved an increase in the number of shares of Stock available for Awards under the Plan by 924,000 shares of Stock.

NOW, THEREFORE, intending to be legally bound, and in accordance with the approvals set forth in the WHEREAS clause, which is incorporated by reference into this Amendment, the Company amends the Plan as follows:

1. Section 4(a) of the Plan is deleted in it entirety and is replaced by the following:

   "4. **LIMITS ON AWARDS UNDER THE PLAN**

   (a) Number of Shares. A maximum of 6,907,900 shares of Stock may be delivered in satisfaction of Awards under the Plan."

2. Except as amended by this Amendment, the Plan continues in full force and effect.

3. In the event of a conflict between this Amendment and the Plan, this Amendment shall govern.

OPGEN, INC.

AMENDMENT NO. 2011-01 TO
2008 STOCK OPTION AND RESTRICTED STOCK PLAN

EFFECTIVE FEBRUARY 11, 2011

This Amendment No. 2011-01 (the "Amendment"), dated and effective February 11, 2011 (the "Effective Date"), is an amendment to the 2008 Stock Option and Restricted Stock Plan (the "Plan"), of OpGen, Inc., a Delaware corporation (the "Company"). All capitalized terms used in this Amendment without definition have the meanings set forth in the Plan.

WHEREAS, Section 9 authorizes the Compensation Committee of the Board of Directors of the Company (the "Administrator") to make amendments to the Plan for any purpose which may be permitted by law.

WHEREAS, on September 21, 2010, each of the Board of Directors and the then-current stockholders of the Company holding more than a majority of the outstanding capital stock of the Company approved changes to the Plan to increase the number of shares of Stock available for Awards under the Plan to equal ten percent (10%) of the Common Stock of the Company on a fully diluted basis after completion of all stock issuances under that certain Series B Preferred Stock Purchase Agreement dated as of September 21, 2010.

WHEREAS, the Administrator, at its meeting held on February 11, 2011, approved an increase in the number of shares of Stock available for Awards under the Plan by 9,165,096 shares of Stock so as to increase the number of shares of Stock available for issuance upon the exercise and/or vesting of outstanding and future Awards under the Plan as of the Effective Date of the Amendment to 14,643,000, which represents 10% of the fully diluted shares of Common Stock of the Company as of the Effective Date.

NOW, THEREFORE, intending to be legally bound, and in accordance with the approvals set forth in the WHEREAS clauses, which are incorporated by reference into this Amendment, the Company amends the Plan as follows:

1. Section 4(a) of the Plan is deleted in it entirety and is replaced by the following:

   "4. **LIMITS ON AWARDS UNDER THE PLAN**

   (a) Number of Shares. A maximum of 16,072,996 shares of Stock may be delivered in satisfaction of Awards under the Plan, which, as of February 11, 2011, leaves a maximum of 14,643,000 shares of Stock that may be delivered in satisfaction of outstanding and future Awards under the Plan."

2. Except as amended by this Amendment, the Plan continues in full force and effect.

3. In the event of a conflict between this Amendment and the Plan, this Amendment shall govern.

OPGEN, INC.

AMENDMENT NO. 2012-01 TO
2008 STOCK OPTION AND RESTRICTED STOCK PLAN, AS AMENDED

EFFECTIVE MARCH 5, 2012

This Amendment No. 2012-01 (the "Amendment"), effective March 5, 2012 (the "Effective Date"), is an amendment to the 2008 Stock Option and Restricted Stock Plan, as amended (the "Plan"), of OpGen, Inc., a Delaware corporation (the "Company"). All capitalized terms used in this Amendment without definition have the meanings set forth in the Plan.

WHEREAS, on March 5, 2012, each of the Board of Directors and the then-current stockholders of the Company holding more than a majority of the outstanding capital stock of the Company approved changes to the Plan to increase the number of shares of Stock available for Awards under the Plan to equal eight percent (8%) of the Common Stock of the Company on a fully diluted basis after completion of all stock issuances under that certain Series C Preferred Stock Purchase Agreement dated as of March 5, 2012.

WHEREAS, the Board of Directors and the then-current stockholders of the Company authorized the officers of the Company to document the approved increase in the number of shares of Stock available for Awards under the Plan in accordance with the foregoing approval

WHEREAS, in accordance with such authority, this Amendment documents the approved increase, by 6,316,193 shares of Stock so as to increase the number of shares of Stock available for issuance upon the exercise and/or vesting of outstanding and future Awards under the Plan as of the Effective Date of the Amendment to 20,898,372 shares, which represents 8% of the fully diluted shares of Common Stock of the Company as of the Effective Date.

NOW, THEREFORE, intending to be legally bound, and in accordance with the approvals set forth in the WHEREAS clauses, which are incorporated by reference into this Amendment, the Company amends the Plan as follows:

1. Section 4(a) of the Plan is deleted in it entirety and is replaced by the following:

   "4. **LIMITS ON AWARDS UNDER THE PLAN**

   (a) Number of Shares. A maximum of 22,389,189 shares of Stock may be delivered in satisfaction of Awards under the Plan, which, as of March 5, 2012, leaves a maximum of 20,898,372 shares of Stock that may be delivered in satisfaction of outstanding and future Awards under the Plan."

2. Except as amended by this Amendment, the Plan continues in full force and effect.

3. In the event of a conflict between this Amendment and the Plan, this Amendment shall govern.

In accordance with the authority granted to the officers of the Company by the Board of Directors and stockholders, this Amendment is executed as of this 22nd day of March, 2012 by the undersigned, duly authorized officer.

OPGEN, INC.

By: /s/ C. Douglas White
Name: C. Douglas White
Title: CEO

OPGEN, INC.

AMENDMENT NO. 2012-02 TO
2008 STOCK OPTION AND RESTRICTED STOCK PLAN, AS AMENDED

EFFECTIVE DECEMBER 18, 2012

This Amendment No. 2012-02 (the "Amendment"), effective December 18, 2012 (the "Effective Date"), is an amendment to the 2008 Stock Option and Restricted Stock Plan, as amended (the "Plan"), of OpGen, Inc., a Delaware corporation (the "Company"). All capitalized terms used in this Amendment without definition have the meanings set forth in the Plan.

WHEREAS, on March 5, 2012, each of the Board of Directors and the then-current stockholders of the Company holding more than a majority of the outstanding capital stock of the Company approved changes to the Plan to increase the number of shares of Stock available for Awards under the Plan to equal eight percent (8%) of the Common Stock of the Company on a fully diluted basis after completion of all stock issuances under that certain Series C Preferred Stock Purchase Agreement dated as of March 5, 2012.

WHEREAS, the Board of Directors and the then-current stockholders of the Company authorized the officers of the Company to document the approved increase in the number of shares of Stock available for Awards under the Plan in accordance with the foregoing approval

WHEREAS, in accordance with such authority, this Amendment documents the approved increase, by 6,598,651 shares of Stock so as to increase the number of shares of Stock available for issuance upon the exercise and/or vesting of outstanding and future Awards under the Plan as of the Effective Date of the Amendment to 27,493,898 shares, which represents 8% of the fully diluted shares of Common Stock of the Company as of the Effective Date.

NOW, THEREFORE, intending to be legally bound, and in accordance with the approvals set forth in the WHEREAS clauses, which are incorporated by reference into this Amendment, the Company amends the Plan as follows:

1. Section 4(a) of the Plan is deleted in it entirety and is replaced by the following:

   "4. **LIMITS ON AWARDS UNDER THE PLAN**

   (a) Number of Shares. A maximum of 28,987,840 shares of Stock may be delivered in satisfaction of Awards under the Plan, which, as of December 18, 2012, leaves a maximum of 27,493,898 shares of Stock that may be delivered in satisfaction of outstanding and future Awards under the Plan."

2. Except as amended by this Amendment, the Plan continues in full force and effect.

3. In the event of a conflict between this Amendment and the Plan, this Amendment shall govern.

In accordance with the authority granted to the officers of the Company by the Board of Directors and stockholders, this Amendment is executed as of this 18th day of January, 2013 by the undersigned, duly authorized officer.

OPGEN, INC.

By: /s/ C.E. Winzer
Name: C. Eric Winzer
Title: Chief Financial Officer

OPGEN, INC.

AMENDMENT NO. 2014-01 TO
2008 STOCK OPTION AND RESTRICTED STOCK PLAN, AS AMENDED

EFFECTIVE APRIL 24, 2014

This Amendment No. 2014-01 (the "Amendment"), effective April 24, 2014 (the "Effective Date"), is an amendment to the 2008 Stock Option and Restricted Stock Plan, as amended (the "Plan"), of OpGen, Inc., a Delaware corporation (the "Company"). All capitalized terms used in this Amendment without definition have the meanings set forth in the Plan.

WHEREAS, the Board of Directors and the then-current stockholders of the Company holding more than a majority of the outstanding capital stock of the Company approved additional increases in the number of shares of Stock available for Awards under the Plan to equal ten percent (10%) of the Common Stock of the Company on a fully diluted basis following the December 2013 recapitalization transaction, including the reverse stock split of one share for every 790.5407 shares outstanding, on an as-converted basis (the "Reverse Stock Split"), and the issuance of promissory notes convertible into shares of the Company's new Series A Convertible Preferred Stock, which was further convertible into Common Stock, plus any additional issuances of the new Series A Convertible Preferred Stock in financings in December 2013 through April 2014.

WHEREAS, on April 24, 2014, the Board of Directors and the then-current stockholders of the Company authorized the officers of the Company to document the approved increase in the number of shares of Stock available for Awards under the Plan in accordance with the foregoing approval.

WHEREAS, in accordance with such authority, this Amendment documents the approved increase, by 466,678 shares of Stock so as to increase the number of shares of Stock available for issuance upon the exercise and/or vesting of outstanding and future Awards under the Plan as of the Effective Date of the Amendment to 503,346 shares, which represents 10% of the fully diluted shares of Common Stock of the Company as of the Effective Date.

NOW, THEREFORE, intending to be legally bound, and in accordance with the approvals set forth in the WHEREAS clauses, which are incorporated by reference into this Amendment, the Company amends the Plan as follows:

1. Section 4(a) of the Plan is deleted in its entirety and is replaced by the following:

   "4. **LIMITS ON AWARDS UNDER THE PLAN**

   (a) Number of Shares. A maximum of 505,282 shares of Stock may be delivered in satisfaction of Awards under the Plan, which, as of April 24, 2014, leaves a maximum of 503,346 shares of Stock that may be delivered in satisfaction of outstanding and future Awards under the Plan."

2. All share numbers in this Amendment, and in the Plan are adjusted to reflect the Reverse Stock Split.

3. Except as amended by this Amendment, the Plan continues in full force and effect.

4. In the event of a conflict between this Amendment and the Plan, this Amendment shall govern.

In accordance with the authority granted to the officers of the Company by the Board of Directors and stockholders, this Amendment is executed as of this 24th day of April, 2014 by the undersigned, duly authorized officer.

OPGEN, INC.

By: /s/ C. Eric Winzer
Name: C. Eric Winzer
Title: Chief Financial Officer

OPGEN, INC.

AMENDMENT NO. 2014-02 TO
2008 STOCK OPTION AND RESTRICTED STOCK PLAN, AS AMENDED

EFFECTIVE OCTOBER 23, 2014

This Amendment No. 2014-02 (the "Amendment"), effective October 23, 2014 (the "Effective Date"), is an amendment to the 2008 Stock Option and Restricted Stock Plan, as amended (the "Plan"), of OpGen, Inc., a Delaware corporation (the "Company"). All capitalized terms used in this Amendment without definition have the meanings set forth in the Plan.

WHEREAS, on October 23, 2014, each of the Board of Directors and the then-current stockholders of the Company holding more than a majority of the outstanding capital stock of the Company approved changes to the Plan to increase the number of shares of Stock available for Awards under the Plan to be equivalent to ten percent (10%) of the Common Stock of the Company on a fully diluted basis after completion of proposed convertible preferred stock and common stock offerings, including convertible notes to acquire shares of the Company's Series A Convertible Preferred Stock or a newly designated series of convertible preferred stock in private placement transactions and a proposed public offering of the Company's Common Stock.

WHEREAS, the Board of Directors and the then-current stockholders of the Company authorized the officers of the Company to document the approved increase in the number of shares of Stock available for Awards under the Plan in accordance with the foregoing approval.

WHEREAS, in accordance with such authority, this Amendment documents the approved increase, by 944,445 shares of Stock so as to increase the number of shares of Stock available for issuance upon the exercise and/or vesting of outstanding and future Awards under the Plan as of the Effective Date of the Amendment to 1,447,791 shares, which represents approximately 19% of the fully diluted shares of Common Stock as of the Effective Date and will represent 10% of the fully diluted shares of Common Stock of the Company on an estimated basis, assuming successful consummations of the private and public financings as described above.

NOW, THEREFORE, intending to be legally bound, and in accordance with the approvals set forth in the WHEREAS clauses, which are incorporated by reference into this Amendment, the Company amends the Plan as follow

1. Section 4(a) of the Plan is deleted in its entirety and is replaced by the following:

   "4. **LIMITS ON AWARDS UNDER THE PLAN**

   (a) Number of Shares. A maximum of 1,449,727 shares of Stock may be delivered in satisfaction of Awards under the Plan, which, as of October 23, 2014, leaves a maximum of 1,447,791 shares of Stock that may be delivered in satisfaction of outstanding and future Awards under the Plan."

2. Except as amended by this Amendment, the Plan continues in full force and effect.

3. In the event of a conflict between this Amendment and the Plan, this Amendment shall govern.

In accordance with the authority granted to the officers of the Company by the Board of Directors and stockholders, this Amendment is executed as of this 21st day of November, 2014 by the undersigned, duly authorized officer.

OPGEN, INC.

By: /s/ C. Eric Winzer
Name: C. Eric Winzer
Title: Chief Financial Office

March 3, 2014

Mr. Evan Jones
11013 Cripplegate Road
Potomac, MD 20854

Re: Amended and Restated Chief Executive Officer Letter Agreement

Dear Evan:

This letter agreement amends and restates the employment letter between you and OpGen, Inc. ("OpGen" or the "Company"), dated January 30, 2014.

This letter agreement documents your position as the Chief Executive Officer (“CEO”) of the Company, effective as of October 25, 2013 (the “Effective Date”), in addition to your continued service as the Chairman of the Board of Directors (the “Board”). In your role as CEO, you will report to the Board, and will perform such duties as are normally associated with the position of chief executive officer and president of a Delaware corporation.

We expect that your time spent fulfilling the role of CEO will be the equivalent of 70% of the time commitment of a full-time executive officer. It is important for you to have a frequent presence at the Gaithersburg office during the standard work week. During times when you are not available to be in the office, you agree to make yourself via telephone or email to the executive team.

During your employment with the Company, you will devote your best efforts and a substantial portion of your business time and attention (adjusting for the “Outside Activities” described below) to the business of the Company. Your employment relationship with the Company shall also be governed by, and you will be required to comply with, the general employment policies and practices of the Company (except that if the terms of this letter agreement differ from or are in conflict with the Company’s general employment policies or practices, this letter agreement will control). The Company reserves the right to change the Company’s general employment policies and procedures, from time to time in its discretion, and will communicate such changes to you.

COMPENSATION

Commencing on the Effective Date, your annualized base salary will be $190,000 ($270,000 x 0.7). In lieu of payment of such base salary in cash, you have agreed to be compensated for your services as CEO through a grant of shares of the Company's Common Stock (the "Common Stock") until at least June 30, 2014. The attached Restricted Stock Unit Award grants you restricted stock units ("RSUs") to acquire 130,640 shares of Common Stock (the "Shares"). All such RSUs shall be subject to forfeiture restrictions tied to your continued service in the role of CEO until the first anniversary of the Effective Date, when such forfeiture restrictions shall lapse with respect to all RSUs, and the Shares of Common Stock shall be issued to you; provided, however, such lapse event shall be accelerated for all RSUs if a Deemed Liquidation Event (as defined in the Company's Restated Certificate of Incorporation (Restated Charter)) or a liquidation of the Company occurs prior to October 24, 2014. Once the forfeiture restrictions lapse on the RSUs you may "net settle" the Shares to the full extent permitted by law or provide the Company with funds necessary to meet its withholding obligations with respect to you. You will be entitled to all indicia of ownership of such Shares only upon the lapse of the restrictions on the RSUs, including the right to vote the Shares in accordance with the Restated Charter, as the same may be amended from time to time

The Board will review the payment provisions of this letter agreement from time to time as needed. The payment of any base salary will be subject to standard federal and state payroll withholding requirements in accordance with Company's standard payroll practices. .

The Board will establish an annual bonus opportunity for you, based on performance goals determined by the Board in its discretion, with a maximum target of 35% of annual base salary.

The Company will reimburse you for reasonable business expenses in accordance with the Company's standard expense reimbursement policy. Additionally, the Company will reimburse you for reasonable attorneys' fees incurred in the review of this letter agreement, up to a maximum amount of $2,500.

You will receive a Board-approved award of options to acquire shares of Common Stock equal to 4.0% of the fully diluted equity of the Company, at the conclusion of the current contemplated financing, with vesting over four (4) years in accordance with the Company's standard vesting practices; provided, however, the award will accelerate and vest in full upon a Deemed Liquidation Event or liquidation of the Company in accordance with the Restated Charter. The timing of such award will be determined by the Board. The vesting schedule shall start as of the Effective Date.

EMPLOYEE BENEFITS

You have agreed to waive any and all rights, if any, to participation in any fringe benefit plans or programs offered by the Company to its employees except for participation in the Company's 401(k) plan. The benefits waived include, but not limited to, health, sickness, accident or dental coverage, life insurance, disability benefits, severance, accidental death and dismemberment coverage, and pension benefit(s) provided by the Company to its employees. You will be eligible for certain minimum benefits required by law, such as workers' compensation, unemployment, and Social Security. You are eligible to participate in the Company's 401(k) plan to the same extent as other executives of the Company.

TERM

The term of your service as CEO began as of the Effective Date. Either you or the Company may terminate this letter agreement and your employment relationship for any reason, or no reason, upon to thirty days advance written notice. The Company may terminate this letter agreement and your employment relationship immediately for Cause. "Cause" means that the Company has determined in its sole discretion that you have engaged in any of the following: (i) a material breach of any covenant or condition under this letter agreement or any other agreement between the parties; (ii) any act constituting dishonesty, fraud, immoral or disreputable conduct; (iii) any conduct which constitutes a felony under applicable law; (iv) violation of any Company policy or any act of misconduct; (v) refusal to follow or implement a clear and reasonable directive of the Company; (vi) negligence or incompetence in the performance of your duties or failure to perform such duties in a manner satisfactory to the Company after the expiration of ten (10) days without cure after written notice of such failure; or (vii) breach of fiduciary duty.

Following termination of your employment for any reason, you shall fully cooperate with the Company in all matters relating to the winding up of your pending work including, but not limited to, any litigation in which the Company is involved, and the orderly transfer of any such pending work to such other employees as may be designated by the Company.

PRIOR AGREEMENTS

The Executive Chairman Agreement between you and the Company dated September 21, 2010 (the "Executive Chairman Agreement") shall terminate upon the execution and delivery of this letter agreement. You agree to waive the Company's obligation to pay you the unpaid balance of the $100,000 annual cash stipend for 2013 as set forth in Section 4 of the Executive Chairman Agreement.

PROPRIETARY INFORMATION AND INVENTIONS AGREEMENT

You will continue to be bound by, and hereby affirm, the terms of the Company's Proprietary Information and Inventions Agreement (the "Proprietary Information Agreement"), which you previously executed, a form of which is attached hereto as **Attachment A**. The Proprietary Information Agreement may be amended by the parties from time to time without regard to this Agreement. The Proprietary Information Agreement contains provisions that are intended by the parties to survive and do survive termination or expiration of this Agreement.

INDEMNIFICATION

The Company shall continue to indemnify you to the full extent permitted by law and by the Bylaws of the Company in your roles of Chairman of the Board and Chief Executive Officer. The Company shall use its best efforts to maintain appropriate directors' and officers' liability insurance coverage for its directors and officers, and shall provide you with written notice of any lapse of such coverage.

OUTSIDE ACTIVITIES

You agree not to undertake or engage in any other employment, occupation or business enterprise that would interfere with your responsibilities and the performance of your duties to OpGen, except for (i) reasonable time devoted to volunteer services for or on behalf of such religious, educational, non-profit and/or other charitable organization as you may wish to serve, (ii) reasonable time devoted to activities in the non-profit and business communities consistent with your duties; (iii) reasonable time devoted to your role as a member of the Board of Directors for the organizations and companies listed on **Attachment B**; and (iv) such other activities as may be specifically approved by the Board. This restriction shall not, however, preclude you (x) from owning less than one percent (1%) of the total outstanding shares of a publicly traded company, or (y) from employment or service in any capacity with Affiliates of the Company. As used herein, "*Affiliates*" means an entity under common management or control with the Company.

MISCELLANEOUS

This letter agreement, including the attached Proprietary Information Agreement, constitutes the complete, final and exclusive embodiment of the entire agreement between you and the Company with regard to the subject matter hereof. It supersedes any other agreements, promises, warranties or representations concerning its subject matter. No term or provision of this letter agreement may be amended waived, released, discharged or modified except in writing, signed by you and an authorized officer of the Company upon approval of the Board. This letter agreement will bind the heirs, personal representatives, successors and assigns of both you and the Company, and inure to the benefit of both you and the Company, and such heirs, personal representatives, successors and assigns. If any provision of this letter agreement is determined to be invalid or unenforceable, in whole or in part, this determination shall not affect any other provision of this letter agreement and the provision in question shall be modified so as to be rendered enforceable in a manner consistent with the intent of the parties insofar as possible under applicable law. This letter agreement shall be construed and enforced in accordance with the laws of the State of Maryland without regard to conflicts of law principles. Any waiver of a breach of this letter agreement, or rights hereunder, shall be in writing and shall not be deemed to be a waiver of any successive breach or rights hereunder. This letter agreement may be executed in counterparts which shall be deemed to be part of one original, and facsimile signatures shall be equivalent to original signatures.

Please indicate your acceptance of this letter agreement by signing below and returning to me.

Sincerely,

OPGEN, INC.

/s/ Misti Ushio
Misti Ushio
Board Member and Chair of the Compensation Committee

Accepted and Agreed:

/s/ Evan Jones
Evan Jones

_____
Date

ATTACHMENT A

PROPRIETARY INFORMATION AGREEMENT

ATTACHMENT B

OUTSIDE ACTIVITIES

Professional

1. jVen Capital, LLC: Managing Member
2. Fluidigm, Inc.: Board of Directors, member Compensation and Audit Committees
3. Foundation Medicine, Inc.: Board of Directors, Chair Audit Committee
4. Veracyte, Inc.: Board of Directors; Chair Compensation Committee

Not for profit

1. Children's National Medical Center: Board of Directors, member compensation committee
2. Research!America: Board of Directors
3. Campaign for Public Health Foundation: Chair Board of Directors
4. American College of Medical Genetics Foundation: Board of Directors

OPGEN, INC.

EXECUTIVE CHANGE IN CONTROL
AND SEVERANCE BENEFITS AGREEMENT

This **Executive Change in Control And Severance Benefits Agreement** ***("Agreement")*** is dated January 19, 2011 ***("Effective Date")***, and is between C. Eric Winzer ***("Executive")*** and Opgen, Inc., a Delaware corporation ***("Company")***.

WHEREAS, Executive is currently employed by the Company with a title of Chief Financial Officer; and

WHEREAS, the Company and Executive wish to enter into this Agreement to set forth the compensation and benefits that Executive will be eligible to receive in the event that Executive's employment with the Company terminates under the circumstances described herein,

Accordingly, in consideration of the mutual promises and covenants contained herein, the parties agree to the following:

1. **Severance Benefits.**

1.1 **Eligibility for Severance Benefits**. If the Company terminates Executive's employment without Cause (as defined below), and provided that any such termination constitutes a "separation from service" (as such term is defined in Treasury Regulation Section 1.409A-1(h), without regard to any alternative definitions thereunder, a "***Separation From Service***"), (such termination event is referred to as a "***Covered Termination***" and the effective date of termination is the "***Termination Date***"), Executive will be eligible for the compensation and benefits described in Section 1.2 below. If Executive's employment terminates for any reason other than a Covered Termination, Executive will not be eligible to receive any compensation or benefits under Section 1 of this Agreement.

1.2 **Amount of Severance Benefits.** Following a Covered Termination, and subject to the terms and conditions set forth in Section 3, Executive will receive severance pay at the rate of Executive's base salary in effect immediately prior to the effective date of the Covered Termination for six (6) months from the Termination Date, less applicable withholdings and deductions as required by law, paid on the regular payroll dates of the Company following such Termination Date; provided, however, that no payments will be made prior to the 60th day following the Termination Date, and on such 60th day, the Company will make a lump sum payment to Executive equal to the payments he would have received through such date had the timing of the payments not been delayed by this sentence, with the balance of the payments made thereafter as originally scheduled.

2. **Change in Control Benefits.** If a Change in Control (as defined below) closes and becomes effective, and Executive is an employee of the Company on the effective date of such Change in Control, Executive will be eligible for the following payments and benefits:

2.1 Accelerated Vesting of Equity Incentives.

(a) On the effective date of the Change in Control, any outstanding stock option or other equity award, held at such time by Executive under the terms of the Opgen, Inc. 2008 Stock Option and Restricted Stock Plan, or any other plan or program, provided that such stock option or other equity award was granted on or prior to December 31, 2011 (each a ***"2011 Award"*** and collectively the ***"2011 Awards"***), will become vested and immediately exercisable (if applicable) with respect to fifty percent (50%) of the then unvested portion of such 2011 Award at the time of the Change in Control transaction. Whether subject to timebased or performance-based vesting, the 2011 Awards will continue to vest and become exercisable (if applicable) in accordance with their existing vesting schedules after the date of Change in Control, provided, however, that the number of shares with respect to which each 2011 Award is scheduled to vest and become exercisable on each vesting installment thereafter will be adjusted to take into account the accelerated vesting hereunder, and, specifically, the number of shares will be reduced on a pro rata basis for each vesting installment remaining after the Change in Control.

Notwithstanding the above, if the 2011 Awards are not continued, assumed, or substituted for as part of the Change in Control transaction, and the 2011 Awards would otherwise terminate and expire upon the Change in Control, then any such 2011 Awards will become one hundred percent (100%) vested and exercisable in full immediately before such Change in Control transaction and contingent upon its effectiveness.

(b) If the 2011 Awards have been continued, assumed or substituted for in connection with a Change in Control, then, if during the six (6) month period after the effective date of the Change in Control, the Company terminates Executive's employment without Cause, the 2011 Awards will become one hundred percent (100%) vested, and exercisable in full, as of the date of Executive's termination from employment.

2.2 Additional Severance Benefits. If Executive voluntarily terminates employment with the Company for a Good Reason within twelve (12) months after the effective date of a Change in Control, and provided that such termination constitutes a Separation from Service, any such termination will be considered a Covered Termination and Executive will receive severance pay in accordance with Section 1.2 above (including any requirement to execute a Release as a condition to the receipt of severance pay or benefits). For purposes of clarity, Section 1 shall continue to remain in effect after a Change in Control and is not superseded by this Section 2.2.

3. Release. Before any compensation or benefits will be payable to Executive on account of a Covered Termination, Executive must (a) execute a release substantially in the form attached hereto as **Exhibit A** (the ***"Release"***) within the applicable Consideration Period specified in the Release, (b) not revoke the Release within any applicable revocation period specified in the Release such that the Release is effective not later than the 60th day following the date of termination of employment, and (c) comply with any post-termination obligations to the Company, including the confidentiality and non-disparagement provisions of the Release. In the event that Executive does not comply with any of the foregoing obligations, no compensation or benefits shall be payable under this Agreement to Executive, and the Company may cease any further payments or the provision of additional benefits hereunder.

4. **Basis of Payments.** All benefits under this Agreement shall be paid by the Company. This Agreement shall be unfunded, and benefits hereunder shall be paid only from the general assets of the Company.

5. **Other Severance Agreements and Policies**. The compensation and benefits provided to Executive pursuant to this Agreement are in lieu of, and not in, addition to, any benefits to which Executive may otherwise be entitled under any other agreement between Executive and the Company in respect of severance or termination pay or benefits, or any Company severance plan, policy or program, or other corporate documents of any type, including any individually negotiated severance provisions as part of any offer letter or employment agreement between the Company and Executive (collectively, ***"Other Agreements"***). The severance pay and benefits provided hereunder are intended to supersede and replace any severance pay and benefits to which Executive may otherwise be entitled as a result of any termination from employment, and by executing this Agreement Executive agrees to waive, forego and forever relinquish any right or entitlement to receive compensation or benefits under any Other Agreements. This waiver and relinquishment is in consideration for the right to severance pay and benefits under the terms of this Agreement which are in addition to the compensation and benefits that Executive would otherwise be eligible to receive, and applies whether or not Executive actually receives severance pay or benefits hereunder.

6. **Term.** This Agreement will become effective on the Effective Date and continue in effect for a period of successive one-year terms, unless at least ninety (90) days before the end of any such one-year term, the Company gives notice to Executive that the Agreement will not be renewed, in which case the Agreement will expire at the end of the then current term. Notwithstanding the foregoing, (1) if a Covered Termination occurs while the Agreement is effective, the Agreement will continue in effect until such time as Executive has received all of the payments and benefits to which he is entitled hereunder, and (2) upon a Change in Control, if this Agreement is still effective, the Agreement will automatically renew for a period of one year beginning on the effective date of the Change in Control, and will automatically renew for oneyear terms thereafter unless the Company or any Successor provides a notice of non-renewal within the time·periods described above.

7. **Definitions.** For purposes of this Agreement, the following terms shall have the following meanings:

(a) ***"Cause"*** will mean: (i) Executive's commission of a felony; (ii) any act or omission of Executive constituting dishonesty, fraud, immoral or disreputable conduct that causes material harm to the Company; (iii) Executive's violation of Company policy that causes material harm to the Company; (iv) Executive's material breach of any written agreement between Executive and the Company which, if curable, remains uncured after notice; or (v) Executive's breach of fiduciary duty. The termination of Executive's employment as a result of the death or Disability of Executive shall not, in any event, be deemed to be a termination without Cause. Transferring Executive's employment to a Successor (as defined below) shall not be considered a termination without Cause under this Agreement.

(b) ***"Change in Control"*** shall have the meaning ascribed to the term "Deemed Liquidation Event" in the Company's Fourth Amended and Restated Certificate of Incorporation filed with the Secretary of State of the State of Delaware on September 21, 2010, as may be amended from time to time, and provided that to the extent necessary for compliance with Section 409A of the Internal Revenue Code of l986, as amended (the ***"Code"***), no transaction will be a Change in Control for purposes of this Agreement unless such transaction is also a change in the ownership or effective control of the Company, or a change in the ownership of a substantial portion of the Company's assets as described in Treasury Regulation Section 1.409A-3(i)(5).

(c) ***"Exchange Act"*** will mean the Securities Exchange Act of 1934, as amended.

(d) ***"Good Reason"*** will mean any of the following, without Executive's consent: (i) a material diminution of Executive's responsibilities or duties (provided, however, that the acquisition of the Company and subsequent conversion of the Company to a division or unit of the acquiring company will not by itself be deemed to be a diminution of Executive's responsibilities or duties); (ii) material reduction in the level of Executive's base salary (and any such reduction will be ignored in determining Executive's base salary for purposes of calculating the amount of severance pay); (iii) relocation of the office at which Executive is principally based to a location that is more than fifty (50) miles from the location at which Executive performed his or her duties immediately prior to the effective date of a Change in Control; (iv) failure of a Successor in a Change in Control to assume this Agreement; or (v) the Company's material breach of any written agreement between Executive and the Company. Notwithstanding the foregoing any actions taken by the Company to accommodate a disability of Executive or pursuant to the·Family and Medical Leave Act shall not be a Good Reason for purposes of this Agreement. Additionally, before Executive may terminate employment for a Good Reason, Executive must notify the Company in writing within thirty (30) days after the initial occurrence of the event, condition or conduct giving rise to Good Reason, the Company must fail to remedy or cure the alleged Good Reason within the thirty (30) day period after receipt of such notice if capable of being cured within such thirty-day period, and, if the Company does not cure the Good Reason (or it is incapable of being cured within such thirty-day period), then Executive must terminate employment by no later than thirty (30) days after the expiration of the last day of the cure period (or, if the event condition or conduct is not capable of being cured within such thirty-day period, within thirty (30) days after initial notice to the Company of the violation). Transferring Executive's employment to a Successor is not itself Good Reason to terminate employment under this Agreement, provided, however, that subparagraphs (i) through (v) above shall continue to apply to Executive's employment by the Successor. This definition is intended to constitute a ***"substantial risk of forfeiture"*** as defined under Treasury Regulation 1.409A-1(d).

References to the Company in this Agreement shall be deemed to include any affiliate of the Company, or the acquiring, surviving or successor entity in a Change in Control (as defined below) or their affiliates (collectively, ***"Successor"***), as applicable.

8. General Provisions.

8.1 Employment Status. This Agreement does not constitute a contract of employment or impose on Executive any obligation to remain as an employee, or impose on the Company any obligation to (a) retain Executive as an employee, (b) change the status of Executive as an at-will employee or (c) change the Company's policies regarding termination of employment.

8.2 Nonexclusivity. Except as specifically provided herein, nothing in this Agreement shall prevent or limit Executive's continuing or future participation in any benefit, bonus, incentive or other plans, programs, policies or practices provided by the Company and for which Executive may otherwise qualify, nor shall anything herein limit or otherwise affect such rights as Executive may have under any stock option or other equity agreements with the Company. Except as otherwise expressly provided herein, amounts which are vested benefits of which Executive is otherwise entitled to receive under any plan, policy, practice or program of the Company at or subsequent to the date of a Covered Termination shall be payable in accordance with such plan, policy, practice or program.

8.3 Non-Alienation of Benefits. No benefit hereunder shall be subject to anticipation, alienation, sale, transfer, assignment, pledge, encumbrance or change, and any attempt to so subject a benefit hereunder shall be void.

8.4 Notices. Any notices provided hereunder must be in writing and shall be deemed effectively given: (a) upon personal delivery to the party to be notified, (b) when sent by electronic mail, telex or confirmed facsimile if sent during normal business hours of the recipient, and if not, then on the next business day, (c) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid, or (d) one (1) day after deposit with a nationally recognized overnight courier, specifying next day delivery, with written verification of receipt. All communications shall be sent to the Company at its primary office location and to Executive at Executive's address as listed on the Company payroll, or at such other address as the Company or Executive may designate by ten (10) days advance written notice to the other.

8.5 Severability. Whenever possible, each provision of this Agreement will be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Agreement is held to be invalid, illegal or unenforceable in any respect under any applicable law or rule in any jurisdiction, such invalidity, illegality or enforceability will not affect any other provision or any other jurisdiction, but this Agreement will be reformed, construed and enforced in such jurisdiction as if such invalid, illegal or unenforceable provisions had never been contained herein.

8.6 Waiver. If either party should waive any breach of any provisions of this Agreement, Executive or it shall not thereby be deemed to have waived any preceding or succeeding breach of the same or any other provision of this Agreement.

8.7 Complete Agreement. This Agreement, including **Exhibit A**, constitutes the entire agreement between Executive and the Company with regard to the subject matter hereof. This Agreement is the complete, final, and exclusive embodiment of their agreement with regard to this subject matter and supersedes any prior oral discussions or written communications and agreements. This Agreement is entered into without reliance on any promise or representation other than those expressly contained herein.

8.8 Amendments. This Agreement may be amended, modified or terminated only in writing signed by Executive and the Company. The Company may only consent to an amendment or modification of this Agreement after such amendment or modification has been approved by the Company's Board of Directors or compensation committee thereof.

8.9 Counterparts. This Agreement may be executed in separate counterparts, any one of which need not contain signatures of more than one party, but all of which taken together will constitute one and the same Agreement.

8.10 Headings. The headings of the sections hereof are inserted for convenience only and shall not be deemed to constitute a part hereof nor to affect the meaning thereof.

8.11 Successors and Assigns. This Agreement is intended to bind and inure to the benefit of and be enforceable by Executive and the Company, and their respective successors, assigns, heirs, executors and administrators, except that Executive may not assign any of Executive's duties hereunder and Executive may not assign any of Executive's rights hereunder without the written consent of the Company.

8.12 Choice of Law and Venue. All questions concerning the construction, validity and interpretation of this Agreement will be governed by the laws of the State of Maryland. The parties hereby submit to the jurisdiction of the state and federal courts for the location encompassing the Company's then principal offices for the resolution of any disputes arising under this Agreement.

8.13 Opportunity for Independent Counsel and Advisors. Executive acknowledges that Executive has had an opportunity to retain and consult with independent counsel and tax advisors to review this Agreement. The Company makes no representations as to the tax treatment of the payments and benefits provided for under this Agreement.

8.14 Application of Section 409A. Notwithstanding anything to the contrary set forth herein, any payments and benefits provided under this Agreement that constitute "deferred compensation" within the meaning of Section 409A of the Internal Revenue Code of 1986, as amended (***"Code"***) and the regulations and other guidance thereunder and any state law of similar effect (collectively, ***"Section 409A"***) shall not commence in connection with Executive's termination of employment unless and until Executive has also incurred a Separation From Service unless the Company reasonably determines that such amounts may be provided to Executive without causing Executive to incur the additional 20% tax under Section 409A.

It is intended that each installment of severance pay provided for in this Agreement is a separate "payment" for purposes of Treasury Regulation Section 1.409A-2(b)(2)(i). For the avoidance of doubt, it is intended that severance payments set forth in this Agreement satisfy, to the greatest extent possible, the exceptions from the application of Section 409A provided under Treasury Regulation Sections 1.409A-1(b)(4), 1.409A-1(b)(5), and 1.409A-1(b)(9). If the Company (or, if applicable, the successor entity thereto) determines that any payments or benefits constitute "deferred compensation" under Section 409A and Executive is, on the termination of service, a "specified employee" of the Company or any successor entity thereto, as such term is defined in Section 409A(a)(2)(B)(i) of the Code, then, solely to the extent necessary to avoid the incurrence of the adverse personal tax consequences under Section 409A, the timing of the payments and benefits shall be delayed until the earlier to occur of: (a) the date that is six months and one day after Executive's Separation From Service, or (b) the date of Executive's death (such applicable date, the ***"Specified Employee Initial Payment Date")***. On the Specified Employee Initial Payment Date, the Company (or the successor entity thereto, as applicable) shall (i) pay to Executive a lump sum amount equal to the sum of the payments and benefits that Executive would otherwise have received through the Specified Employee Initial Payment Date if the commencement of the payment of such amounts had not been so delayed pursuant to this Section and (ii) commence paying the balance of the payments and benefits in accordance with the applicable payment schedules set forth in this Agreement.

[SIGNATURE PAGE FOLLOWS]

In Witness Whereof, the parties have executed this Executive Change in Control and Severance Benefits Agreement on the day and year first written above.

OPGEN, INC.

By: /s/ C. Douglas White
Name: C. Douglas White
Title: CEO

/s/ C. Eric Winzer
C. Eric Winzer

Exhibit A: Form of Release Agreement

EXHIBIT A

FORM OF RELEASE AGREEMENT

1. **Release.** In exchange for the payments and other consideration provided under the Executive Change in Control and Severance Benefits Agreement ***("Severance Agreement")***, and other good and valuable consideration, to which Executive would not otherwise be entitled, and except as otherwise set forth in this Release Agreement, Executive hereby generally and completely releases, acquits and forever discharges the Company, its parents and subsidiaries, and its and their officers, directors, managers, partners, agents, servants, employees, attorneys, shareholders, successors, assigns and affiliates, of and from any and all claims, liabilities, demands, causes of action, costs, expenses, attorneys' fees, damages, indemnities and obligations of every kind and nature, in law, equity, or otherwise, both known and unknown, suspected and unsuspected, disclosed and undisclosed, arising out of or in any way related to agreements, events, acts, conduct, or omissions at any time prior to and including the execution date of this Release Agreement, including but not limited to: all such claims and demands directly or indirectly arising out of or in any way connected with Executive's employment with the Company or the termination of that employment; claims or demands related to salary, bonuses, commissions, stock, stock options, or any other ownership interests in the Company, vacation pay, fringe benefits, expense reimbursements, severance pay, or any other form of compensation; claims pursuant to any federal, state or local law, statute, or cause of action; tort law; or contract law. The claims and causes of action Executive is releasing and waiving in this Release Agreement include, but are not limited to, any and all claims and causes of action that the Company, its parents and subsidiaries, and its and their respective officers, directors, agents, servants employees, attorneys, shareholders, successors, assigns or affiliates:

(a) has violated its personnel policies, handbooks, contracts of employment, or covenants of good faith and fair dealing;

(b) has discriminated against Executive on the basis of age, race, color, sex (including sexual harassment), national origin, ancestry, disability, religion, sexual orientation, marital status, parental status, source of income, entitlement to benefits, any union activities or other protected category in violation of any local, state or federal law, constitution, ordinance, or regulation, including but not limited to: the Age Discrimination in Employment Act, as amended (the ***"ADEA"***); Title VII of the Civil Rights Act of 1964, as amended; the Maryland Fair Employment Practices Act; Maryland Law on Equal Pay; 42 U.S.C. § 1981, as amended; the Equal Pay Act; the Americans With Disabilities Act; the Employee Retirement Income Security Act, Section 510; and the National Labor Relations Act; and

(c) has violated any statute, public policy or common law (including but not limited to claims for retaliatory discharge; negligent hiring, retention or supervision; defamation; intentional or negligent infliction of emotional distress and/or mental anguish; intentional interference with contract; negligence; detrimental reliance; loss of consortium to Executive or any member of Executive's family and/or promissory estoppel).

Notwithstanding the foregoing, Executive is not releasing any of the following rights or claims: (i) claims for severance Payments or benefits in accordance with the Severance Agreement, (ii) claims for vested retirement benefits under any tax-qualified retirement plan of the Company, (iii) claims relating to the conversion or continuation of insured welfare benefits under any employee benefit plan sponsored or maintained by the Company in which Executive was a participant as of the date of termination or resignation, (iv) any rights of indemnification that Executive may have for any liabilities arising from Executive's actions within the course and scope of employment with the Company or within the course and scope of Executive's role as a member of the Board of Directors and/or officer of the Company, or (v) any rights or claims that may arise after the execution date of this Release Agreement. Also excluded from this Release Agreement are any claims which cannot be waived by law. Executive is waiving, however, Executive's right to any monetary recovery should any governmental agency or entity, such as the EEOC or the DOL, pursue any claims on Executive's behalf. Executive also acknowledges that the consideration given to Executive in exchange for the waiver and release in the Release Agreement is in addition to anything of value to which Executive was already entitled, and that Executive has been paid for all time worked, has received all the leave, leaves of absence and leave benefits and protections for which Executive is eligible, and bas not suffered any on-the-job injury for which Executive has not already filed a claim. Executive further acknowledges that Executive has been advised by this writing that: (a) Executive's waiver and release does not apply to any rights or claims that may arise after the execution date of this Release Agreement; and (b) Executive has been advised hereby that Executive has the right to consult with an attorney prior to executing this Release Agreement.

2. **ADEA Waiver and Release.** Executive acknowledges that Executive is knowingly and voluntarily waiving and releasing any rights Executive may have under the ADEA, as amended. Executive acknowledges that Executive has been advised by this writing that: (a) Executive has twenty-one (21) days (except in the event that Executive's employment was terminated as part of a group termination, as determined by the Company, in which case Executive has forty-five (45) days) to consider this Release Agreement (although Executive may choose to voluntarily execute this Release Agreement earlier, in which case, Executive will sign the Consideration Period waiver below); (b) Executive has seven (7) days following execution of this Release Agreement to revoke it; and (c) this Release Agreement shall not be effective until the date upon which the revocation period bas expired unexercised (the "Effective Date"), which shall be the eighth day after this Release Agreement is executed by Executive. Executive may revoke this Release Agreement during the seven (7) day revocation period by notifying the Company's Chief Executive Officer, Chief Financial Officer, or General Counsel in writing.

3. **Confidentiality**. The provisions of this Release Agreement will be held in strictest confidence by Executive and will not be publicized or disclosed in any manner whatsoever; *provided*, *however*, that: (a) Executive may disclose this Release Agreement to Executive's immediate family; (b) Executive may disclose this Release Agreement in confidence to Executive's attorney, accountant, auditor, tax preparer, and financial advisor; and (c) Executive may disclose this Release Agreement insofar as such disclosure may be required by law.

4. **Nondisparagement**. Executive agrees not to disparage the Company, and the Company's employees, directors, managers, partners, agents, attorneys and affiliates, in any manner likely to be harmful to them or their business, business reputation or personal reputation; *provided* the Executive may respond accurately and fully to any question, inquiry or request for information when required by legal process.

5. **No Admission**. This Release Agreement does not constitute an Admission by the Company of any wrongful action or violation of any federal, state, or local statute, or common law rights, including those relating to the provisjons of any law or statute concerning employment actions or of any other possible or claimed violation of law or right.

6. **Breach**. Executive agrees that upon any breach of this Release Agreement by Executive, Executive will forfeit all amounts paid or owing to Executive under this Release Agreement. Further, Executive acknowledges that it may be impossible to assess the damages caused by Executive's violation of the terms of Section 1 of this Release Agreement and further agree that any threatened or actual violation or breach of those paragraphs of this Release Agreement will constitute immediate and irreparable injury to the Company. Executive therefore agrees that any such breach of this Release Agreement is a material breach of this Release Agreement, and, in addition to any and all other damages and remedies available to the Company upon Executive's breach of this Release Agreement, the Company shall be entitled to an injunction to prevent Executive from violating or breaching this Release Agreement. Executive agrees that if the Company is successful in whole or part in any legal or equitable action against Executive under this Section 6, Executive agrees to pay all of the costs, including reasonable attorney's fees, incurred by the Company in enforcing the terms of this Release Agreement.

7. **Miscellaneous**. This Release Agreement constitutes the complete, final and exclusive embodiment of the entire agreement between Executive and the Company with regard to this subject matter. It is entered into without reliance on any promise or representation, written or oral, other than those expressly contained herein, and it supersedes any other such promises, warranties or representations. This Release Agreement may not be modified or amended except in a writing signed by both Executive and a duly authorized officer of the Company. This Release Agreement will bind the heirs, personal representatives, successors and assigns of both Executive and the Company, and inure to the benefit of both Executive and the Company, their heirs, successors and assigns. If any provision of this Release Agreement is determined to be invalid or unenforceable, in whole or in part, this determination will not affect any other provision of the Release Agreement and the provision in question will be modified by the court so as to be rendered enforceable. This Release Agreement will be deemed to have been entered into and will be construed and enforced in accordance with the laws of the State of Maryland as applied to contracts made and to be performed entirely within the State of Maryland.

OPGEN, INC.

By: _____
Name:
Title:

EXECUTIVE:

By: _____
[Name]

Date: _____

CONSIDERATION PERIOD

I, _____, understand that I have the right to take at least 45 days (the "***Consideration Period***") to consider whether to sign this Release Agreement, which I received on _____ __, 20__. If I elect to sign this Release Agreement before the Consideration Period has passed, I understand I am to sign and date below this paragraph to confirm that I knowingly and voluntarily agree to waive the Consideration Period.

AGREED:

_____
Executive Signature

_____
Date

AMENDMENT TO
EXECUTIVE CHANGE IN CONTROL AND
SEVERANCE BENEFITS AGREEMENT

This Amendment (the "***Amendment***"), dated as of November 1, 2013 (the "***Amendment Effective Date***") is an amendment to that certain Executive Change in Control and Severance Benefits Agreement, dated January 19, 2011 (the "***Agreement***"), by and between C. Eric Winzer ("***Executive***") and OpGen, Inc., a Delaware corporation (the "***Company***"). All defined terms used in this Amendment without definition have the meanings set forth in the Agreement.

WHEREAS, the Company has determined that it is in the best interests of the Company and its stockholders, and the Board of Directors has approved, an amendment to the Agreement to provide for the Company with the ability to terminate the Agreement at any time by providing sixty (60) days' notice.

WHEREAS, as consideration for the Executive entering into this Amendment, the Company is providing the Executive with due and adequate consideration in the form of equity awards to acquire shares of capital stock of the Company to be awarded as of the Amendment Effective Date (the "***Equity Awards***").

NOW, THEREFORE, in consideration of the mutual promises and covenants contained in the Agreement and herein, the parties hereto, agreeing to be legally bound, agree as follows:

1. **Adequate Consideration**. The Executive acknowledges and agrees that the Equity Awards constitute good and valuable new and additional consideration in exchange for the execution and delivery of this Amendment to the Company by the Executive.

2. **Term**. Section 6 of the Agreement is deleted in its entirety and replaced with the following:

> **"6. Term**. The term of this Agreement became effective on the Effective Date and shall continue in effect unless and until the Company terminates this Agreement by providing Executive with sixty (60) days prior written notice. Such notice shall specify the termination date for this Agreement. Notwithstanding the foregoing, (i) if a Covered Termination occurs while the Agreement is effective, the Agreement will continue in effect until such time as Executive has received all of the payment and benefits to which he is entitled hereunder, and (ii) upon a Change in Control, if this Agreement is still effective, the Agreement will automatically renew for a period of six months beginning on the effective date of the Change in Control, and will remain in effect thereafter, unless the Company or any Successor provides a termination notice within the time period described above."

3. **Impact on Agreement**. All other terms and provisions of the Agreement remain in full force and effect as supplemented by this Amendment. If there is a conflict between this Amendment and the Agreement, the terms and provisions of this Amendment will control.

IN WITNESS WHEREOF, this Amendment is executed as of the Amendment Effective Date.

OPGEN, INC.

By: /s/ Evan Jones
Name: Evan Jones
Title: Chief Executive Officer

/s/ C. Eric Winzer
C. Eric Winzer

OPGEN, INC.

EXECUTIVE CHANGE IN CONTROL
AND SEVERANCE BENEFITS AGREEMENT

This **EXECUTIVE CHANGE IN CONTROL AND SEVERANCE BENEFITS AGREEMENT** ("***Agreement***") is dated January 27, 2012 ("***Effective Date***"), and is between Vadim Sapiro ("***Executive***") and **OPGEN, INC.**, a Delaware corporation ("***Company***").

WHEREAS, Executive is currently employed by the Company with a title of Chief Information Officer; and

WHEREAS, the Company and Executive wish to enter into this Agreement to set forth the compensation and benefits that Executive will be eligible to receive in the event that Executive's employment with the Company terminates under the circumstances described herein.

Accordingly, in consideration of the mutual promises and covenants contained herein the parties agree to the following:

1. SEVERANCE BENEFITS.

1.1 Eligibility for Severance Benefits. If the Company terminates Executive's employment without Cause (as defined below), and provided that any such termination constitutes a "separation from service" (as such term is defined in Treasury Regulation Section 1.409A-1(h), without regard to any alternative definitions thereunder, a "***Separation From Service***"), (such termination event is referred to as a "***Covered Termination***" and the effective date of termination is the "***Termination Date***"), Executive will be eligible for the compensation and benefits described in Section 1.2 below. If Executive's employment terminates for any reason other than a Covered Termination, Executive will not be eligible to receive any compensation or benefits under Section 1 of this Agreement.

1.2 Amount of Severance Benefits. Following a Covered Termination, and subject to the terms and conditions set forth in Section 3, Executive will receive severance pay at the rate of Executive's base salary in effect immediately prior to the effective date of the Covered Termination for six (6) months from the Termination Date, less applicable withholdings and deductions as required by law, paid on the regular payroll dates of the Company following such Termination Date; provided, however, that no payments will be made prior to the 60th day following the Termination Date, and on such 60th day, the Company will make a lump sum payment to Executive equal to the payments he would have received through such date had the timing of the payments not been delayed by this sentence, with the balance of the payments made thereafter as originally scheduled.

2. Change in Control Benefits. If a Change in Control (as defined below) closes and becomes effective and Executive is an employee of the Company on the effective date of such Change m Control, Executive will be eligible for the following payments and benefits:

2.1 Accelerated Vesting of Equity Incentives.

(a) On the effective date of the Change in Control, any outstanding stock option, or other equity award, held at such time by Executive under the terms of the Opgen, Inc. 2008 Stock Option and Restricted Stock Plan, or any other plan or program, provided that such stock option or other equity award was granted on or prior to December 31, 2011 (each a "***2011 Award***" and collectively the "***2011 Awards***"), will become vested and immediately exercisable (if applicable) with respect to fifty percent (50%) of the then unvested portion of such 2011 Award at the time of the Change in Control transaction. Whether subject to time-based or performance-based vesting, the 2011 Awards will continue to vest and become exercisable (if applicable) in accordance with their existing vesting schedules after the date of Change in Control, provided, however, that the number of shares with respect to which each 2011 Award is scheduled to vest and become exercisable on each vesting installment thereafter will be adjusted to take into account the accelerated vesting hereunder, and, specifically, the number of shares will be reduced on a pro rata basis for each vesting installment remaining after the Change in Control.

Notwithstanding the above, if the 2011 Awards are not continued, assumed, or substituted for as part of the Change in Control transaction, and the 2011 Awards would otherwise terminate and expire upon the Change in Control, then any such 2011 Awards will become one hundred percent (100%) vested and exercisable in full immediately before such Change in Control transaction and contingent upon its effectiveness.

(b) If the 2011 Awards have been continued, assumed or substituted for in connection with a Change in Control, then, if during the six (6) month period after the effective date of the Change in Control, the Company terminates Executive's employment without Cause, the 2011 Awards will become one hundred percent (100%) vested, and exercisable in full, as of the date of Executive's termination from employment.

2.2 Additional Severance Benefits. If Executive voluntarily terminates employment with the Company for a Good Reason within twelve (12) months after the effective date of a Change in Control, and provided that such termination constitutes a Separation from Service, any such termination will be considered a Covered Termination and Executive will receive severance pay in accordance with Section 1.2 above (including any requirement to execute a Release as a condition to the receipt of severance pay or benefits). For purposes of clarity, Section 1 shall continue to remain in effect after a Change in Control and is not superseded by this Section 2.2.

3. **Release**. Before any compensation or benefits will be payable to Executive on account of a Covered Termination, Executive must (a) execute a release substantially in the form attached hereto as **Exhibit A** (the "***Release***") within the applicable Consideration Period specified in the Release, (b) not revoke the Release within any applicable revocation period specified in the Release such that the Release is effective not later than the 60th day following the date of termination of employment, and (c) comply with any post-termination obligations to the Company, including the confidentiality and non-disparagement provisions of the Release. In the event that Executive does not comply with any of the foregoing obligations, no compensation or benefits shall be payable under this Agreement to Executive, and the Company may cease any further payments or the provision of additional benefits hereunder.

4. **Basis of Payments**. All benefits under this Agreement shall be paid by the Company. This Agreement shall be unfunded, and benefits hereunder shall be paid only from the general assets of the Company.

5. **Other Severance Agreements and Policies**. The compensation and benefits provided to Executive pursuant to this Agreement are in lieu of, and not in addition to, any benefits to which Executive may otherwise be entitled under any other agreement between Executive and the Company in respect of severance or termination pay or benefits, or any Company severance plan, policy or program, or other corporate documents of any type, including any individually negotiated severance provisions as part of any offer letter or employment agreement between the Company and Executive (collectively, "***Other Agreements***"). The severance pay and benefits provided hereunder are intended to supersede and replace any severance pay and benefits to which Executive may otherwise be entitled as a result of any termination from employment, and by executing this Agreement Executive agrees to waive, forego and forever relinquish any right or entitlement to receive compensation or benefits under any Other Agreements. This waiver and relinquishment is in consideration for the right to severance pay and benefits under the terms of this Agreement, which are in addition to the compensation and benefits that Executive would otherwise be eligible to receive, and applies whether or not Executive actually receives severance pay or benefits hereunder.

6. **Term**. This Agreement will become effective on the Effective Date and continue in effect for a period of successive one-year terms, unless at least ninety (90) days before the end of any such one-year term, the Company gives notice to Executive that the Agreement will not be renewed, in which case the Agreement will expire at the end of the then current term. Notwithstanding the foregoing, (1) if a Covered Termination occurs while the Agreement is effective, the Agreement will continue in effect until such time as Executive has received all of the payments and benefits to which he is entitled hereunder, and (2) upon a Change in Control, if this Agreement is still effective, the Agreement will automatically renew for a period of one year beginning on the effective date of the Change in Control, and will automatically renew for one-year terms thereafter unless the Company or any Successor provides a notice of non-renewal within the time periods described above.

7. **Definitions**. For purposes of this Agreement, the following terms shall have the following meanings:

(a) "***Cause***" will mean: (i) Executive's commission of a felony; (ii) any act or omission of Executive constituting dishonesty, fraud, immoral or disreputable conduct that causes material harm to the Company; (iii) Executive's violation of Company policy that causes material harm to the Company; (iv) Executive's material breach of any written agreement between Executive and the Company which, if curable, remains uncured after notice; or (v) Executive's breach of fiduciary duty. The termination of Executive's employment as a result of the death or Disability of Executive shall not, in any event, be deemed to be a termination without Cause. Transferring Executive's employment to a Successor (as defined below) shall not be considered a termination without Cause under this Agreement.

(b) "***Change in Control***" shall have the meaning ascribed to the term "Deemed Liquidation Event" in the Company's Fourth Amended and Restated Certificate of Incorporation filed with the Secretary of State of the State of Delaware on September 21, 2010, as may be amended from time to time, and provided that to the extent necessary for compliance with Section 409A of the Internal Revenue Code of 1986, as amended (the "***Code***"), no transaction will be a Change in Control for purposes of this Agreement unless such transaction is also a change in the ownership or effective control of the Company, or a change in the ownership of a substantial portion of the Company's assets as described in Treasury Regulation Section 1.409A-3(i)(5).

(c) "***Exchange Act***" will mean the Securities Exchange Act of 1934, as amended.

(d) "***Good Reason***" will mean any of the following, without Executive's consent: (i) a material diminution of Executive's responsibilities or duties (*provided*, *however*, that the acquisition of the Company and subsequent conversion of the Company to a division or unit of the acquiring company will not by itself be deemed to be a diminution of Executive's responsibilities or duties); (ii) material reduction in the level of Executive's base salary (and any such reduction will be ignored in determining Executive's base salary for purposes of calculating the amount of severance pay); (iii) relocation of the office at which Executive is principally based to a location that is more than fifty (50) miles from the location at which Executive performed his or her duties immediately prior to the effective date of a Change in Control; (iv) failure of a Successor in a Change in Control to assume this Agreement; or (v) the Company's material breach of any written agreement between Executive and the Company. Notwithstanding the foregoing, any actions taken by the Company to accommodate a disability of Executive or pursuant to the Family and Medical Leave Act shall not be a Good Reason for purposes of this Agreement. Additionally, before Executive may terminate employment for a Good Reason, Executive must notify the Company in writing within thirty (30) days after the initial occurrence of the event, condition or conduct giving rise to Good Reason, the Company must fail to remedy or cure the alleged Good Reason within the thirty (30) day period after receipt of such notice if capable of being cured within such thirty-day period, and, if the Company does not cure the Good Reason (or it is incapable of being cured within such thirty-day period), then Executive must terminate employment by no later than thirty (30) days after the expiration of the last day of the cure period (or, if the event condition or conduct is not capable of being cured within such thirty-day period, within thirty (30) days after initial notice to the Company of the violation). Transferring Executive's employment to a Successor is not itself Good Reason to terminate employment under this Agreement, provided, however, that subparagraphs (i) through (v) above shall continue to apply to Executive's employment by the Successor. This definition is intended to constitute a "***substantial risk of forfeiture***" as defined under Treasury Regulation 1.409A-1(d).

References to the Company in this Agreement shall be deemed to include any affiliate of the Company, or the acquiring, surviving or successor entity in a Change in Control (as defined below) or their affiliates (collectively, "***Successor***"), as applicable.

8. GENERAL PROVISIONS.

8.1 Employment Status. This Agreement does not constitute a contract of employment or impose on Executive any obligation to remain as an employee, or impose on the Company any obligation to (a) retain Executive as an employee, (b) change the status of Executive as an at-will employee or (c) change the Company's policies regarding termination of employment.

8.2 Nonexclusivity. Except as specifically provided herein, nothing in this Agreement shall prevent or limit Executive's continuing or future participation in any benefit, bonus, incentive or other plans, programs, policies or practices provided by the Company and for which Executive may otherwise qualify, nor shall anything herein limit or otherwise affect such rights as Executive may have under any stock option or other equity agreements with the Company. Except as otherwise expressly provided herein, amounts which are vested benefits of which Executive is otherwise entitled to receive under any plan, policy, practice or program of the Company at or subsequent to the date of a Covered Termination shall be payable in accordance with such plan, policy, practice or program.

8.3 Non-Alienation of Benefits. No benefit hereunder shall be subject to anticipation, alienation, sale, transfer, assignment, pledge, encumbrance or change, and any attempt to so subject a benefit hereunder shall be void.

8.4 Notices. Any notices provided hereunder must be in writing and shall be deemed effectively given: (a) upon personal delivery to the party to be notified, (b) when sent by electronic mail, telex or confirmed facsimile if sent during normal business hours of the recipient, and if not, then on the next business day, (c) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid, or (d) one (1) day after deposit with a nationally recognized overnight courier, specifying next day delivery, with written verification of receipt. All communications shall be sent to the Company at its primary office location and to Executive at Executive's address as listed on the Company payroll, or at such other address as the Company or Executive may designate by ten (10) days advance written notice to the other.

8.5 Severability. Whenever possible, each provision of this Agreement will be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Agreement is held to be invalid, illegal or unenforceable in any respect under any applicable law or rule in any jurisdiction, such invalidity, illegality or unenforceability will not affect any other provision or any other jurisdiction, but this Agreement will be reformed, construed and enforced in such jurisdiction as if such invalid, illegal or unenforceable provisions had never been contained herein.

8.6 Waiver. If either party should waive any breach of any provisions of this Agreement, Executive or it shall not thereby be deemed to have waived any preceding or succeeding breach of the same or any other provision of this Agreement.

8.7 Complete Agreement. This Agreement, including **Exhibit A**, constitutes the entire agreement between Executive and the Company with regard to the subject matter hereof. This Agreement is the complete, final, and exclusive embodiment of their agreement with regard to this subject matter and supersedes any prior oral discussions or written communications and agreements. This Agreement is entered into without reliance on any promise or representation other than those expressly contained herein.

8.8 **Amendments**. This Agreement may be amended, modified or terminated only in writing signed by Executive and the Company. The Company may only consent to an amendment or modification of this Agreement after such amendment or modification has been approved by the Company's Board of Directors or compensation committee thereof.

8.9 **Counterparts**. This Agreement may be executed in separate counterparts, any one of which need not contain signatures of more than one party, but all of which taken together will constitute one and the same Agreement.

8.10 **Headings**. The headings of the sections hereof are inserted for convenience only and shall not be deemed to constitute a part hereof nor to affect the meaning thereof.

8.11 **Successors and Assigns**. This Agreement is intended to bind and inure to the benefit of and be enforceable by Executive and the Company, and their respective successors, assigns, heirs, executors and administrators, except that Executive may not assign any of Executive's duties hereunder and Executive may not assign any of Executive's rights hereunder without the written consent of the Company.

8.12 **Choice of Law and Venue**. All questions concerning the construction, validity and interpretation of this Agreement will be governed by the laws of the State of Maryland. The parties hereby submit to the jurisdiction of the state and federal courts for the location encompassing the Company's then principal offices for the resolution of any disputes arising under this Agreement.

8.13 **Opportunity for Independent Counsel and Advisors**. Executive acknowledges that Executive has had an opportunity to retain and consult with independent counsel and tax advisors to review this Agreement. The Company makes no representations as to the tax treatment of the payments and benefits provided for under this Agreement.

8.14 **Application of Section 409A**. Notwithstanding anything to the contrary set forth herein, any payments and benefits provided under this Agreement that constitute "deferred compensation" within the meaning of Section 409A of the Internal Revenue Code of 1986, as amended ("***Code***") and the regulations and other guidance thereunder and any state law of similar effect (collectively, "***Section 409A***") shall not commence in connection with Executive's termination of employment unless and until Executive has also incurred a Separation From Service, unless the Company reasonably determines that such amounts may be provided to Executive without causing Executive to incur the additional 20% tax under Section 409A.

It is intended that each installment of severance pay provided for in this Agreement is a separate "payment" for purposes of Treasury Regulation Section 1.409A-2(b)(2)(i). For the avoidance of doubt, it is intended that severance payments set forth in this Agreement satisfy, to the greatest extent possible, the exceptions from the application of Section 409A provided under Treasury Regulation Sections 1.409A-1(b)(4), 1.409A-1(b)(5), and 1.409A-1(b)(9). If the Company (or, if applicable, the successor entity thereto) determines that any payments or benefits constitute "deferred compensation" under Section 409A and Executive is, on the termination of service, a "specified employee" of the Company or any successor entity thereto, as such term is defined in Section 409A(a)(2)(B)(i) of the Code, then, solely to the extent necessary to avoid the incurrence of the adverse personal tax consequences under Section 409A, the timing of the payments and benefits shall be delayed until the earlier to occur of: (a) the date that is six months and one day after Executive's Separation From Service, or (b) the date of Executive's death (such applicable date, the "***Specified Employee Initial Payment Date***"). On the Specified Employee Initial Payment Date, the Company (or the successor entity thereto, as applicable) shall (i) pay to Executive a lump sum amount equal to the sum of the payments and benefits that Executive would otherwise have received through the Specified Employee Initial Payment Date if the commencement of the payment of such amounts had not been so delayed pursuant to this Section and (ii) commence paying the balance of the payments and benefits in accordance with the applicable payment schedules set forth in this Agreement.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the parties have executed this Executive Change in Control and Severance Benefits Agreement on the day and year first written above.

OPGEN, INC.

By: /s/ C. Douglas White
Name: C. Douglas White
Title: CEO

/s/ Vadim Sapiro
Vadim Sapiro

Exhibit A: Form of Release Agreement

EXHIBIT A

FORM OF RELEASE AGREEMENT

1. Release. In exchange for the payments and other consideration provided under the Executive Change in Control and Severance Benefits Agreement ("***Severance Agreement***"), and other good and valuable consideration, to which Executive would not otherwise be entitled, and except as otherwise set forth in this Release Agreement, Executive hereby generally and completely releases, acquits and forever discharges the Company, its parents and subsidiaries, and its and their officers, directors, managers, partners, agents, servants, employees, attorneys, shareholders, successors, assigns and affiliates, of and from any and all claims, liabilities, demands, causes of action, costs, expenses, attorneys' fees, damages, indemnities and obligations of every kind and nature, in law, equity, or otherwise, both known and unknown, suspected and unsuspected, disclosed and undisclosed, arising out of or in any way related to agreements, events, acts, conduct, or omissions at any time prior to and including the execution date of this Release Agreement, including but not limited to: all such claims and demands directly or indirectly arising out of or in any way connected with Executive's employment with the Company or the termination of that employment; claims or demands related to salary, bonuses, commissions, stock, stock options, or any other ownership interests in the Company, vacation pay, fringe benefits, expense reimbursements, severance pay, or any other form of compensation; claims pursuant to any federal, state or local law, statute, or cause of action; tort law; or contract law. The claims and causes of action Executive is releasing and waiving in this Release Agreement include, but are not limited to, any and all claims and causes of action that the Company, its parents and subsidiaries, and its and their respective officers, directors, agents, servants, employees, attorneys, shareholders, successors, assigns or affiliates:

(a) has violated its personnel policies, handbooks, contracts of employment, or covenants of good faith and fair dealing;

(b) has discriminated against Executive on the basis of age, race, color, sex (including sexual harassment), national origin, ancestry, disability, religion, sexual orientation, marital status, parental status, source of income, entitlement to benefits, any union activities or other protected category in violation of any local, state or federal law, constitution, ordinance, or regulation, including but not limited to: the Age Discrimination in Employment Act, as amended (the "***ADEA***"); Title VII of the Civil Rights Act of 1964, as amended; the Maryland Fair Employment Practices Act; Maryland Law on Equal Pay; 42 U.S.C. § 1981, as amended; the Equal Pay Act; the Americans With Disabilities Act; the Employee Retirement Income Security Act, Section 510; and the National Labor Relations Act; and

(c) has violated any statute, public policy or common law (including but not limited to claims for retaliatory discharge; negligent hiring, retention or supervision; defamation; intentional or negligent infliction of emotional distress and/or mental anguish; intentional interference with contract; negligence; detrimental reliance; loss of consortium to Executive or any member of Executive's family and/or promissory estoppel).

Notwithstanding the foregoing, Executive is not releasing any of the following rights or claims: (i) claims for severance payments or benefits in accordance with the Severance Agreement, (ii) claims for vested retirement benefits under any tax-qualified retirement plan of the Company, (iii) claims relating to the conversion or continuation of insured welfare benefits under any employee benefit plan sponsored or maintained by the Company in which Executive was a participant as of the date of termination or resignation, (iv) any rights of indemnification that Executive may have for any liabilities arising from Executive's actions within the course and scope of employment with the Company or within the course and scope of Executive's role as a member of the Board of Directors and/or officer of the Company, or (v) any rights or claims that may arise after the execution date of this Release Agreement. Also excluded from this Release Agreement are any claims which cannot be waived by law. Executive is waiving, however, Executive's right to any monetary recovery should any governmental agency or entity, such as the EEOC or the DOL, pursue any claims on Executive's behalf. Executive also acknowledges that the consideration given to Executive in exchange for the waiver and release in the Release Agreement is in addition to anything of value to which Executive was already entitled, and that Executive has been paid for all time worked, has received all the leave, leaves of absence and leave benefits and protections for which Executive is eligible, and has not suffered any on-the-job injury for which Executive has not already filed a claim. Executive further acknowledges that Executive has been advised by this writing that: (a) Executive's waiver and release does not apply to any rights or claims that may arise after the execution date of this Release Agreement; and (b) Executive has been advised hereby that Executive has the right to consult with an attorney prior to executing this Release Agreement.

2. ADEA Waiver and Release. Executive acknowledges that Executive is knowingly and voluntarily waiving and releasing any rights Executive may have under the ADEA, as amended. Executive acknowledges that Executive has been advised by this writing that: (a) Executive has twenty-one (21) days (except in the event that Executive's employment was terminated as part of a group termination, as determined by the Company, in which case Executive has forty-five (45) days) to consider this Release Agreement (although Executive may choose to voluntarily execute this Release Agreement earlier, in which case, Executive will sign the Consideration Period waiver below); (b) Executive has seven (7) days following execution of this Release Agreement to revoke it; and (c) this Release Agreement shall not be effective until the date upon which the revocation period has expired unexercised (the "***Effective Date***"), which shall be the eighth day after this Release Agreement is executed by Executive. Executive may revoke this Release Agreement during the seven (7) day revocation period by notifying the Company's Chief Executive Officer, Chief Financial Officer, or General Counsel in writing.

3. Confidentiality. The provisions of this Release Agreement will be held in strictest confidence by Executive and will not be publicized or disclosed in any manner whatsoever; *provided*, *however*, that: (a) Executive may disclose this Release Agreement to Executive's immediate family; (b) Executive may disclose this Release Agreement in confidence to Executive's attorney, accountant, auditor, tax preparer, and financial advisor; and (c) Executive may disclose this Release Agreement insofar as such disclosure may be required by law.

4. Nondisparagement. Executive agrees not to disparage the Company, and the Company's employees, directors, managers, partners, agents, attorneys and affiliates, in any manner likely to be harmful to them or their business, business reputation or personal reputation; *provided* that Executive may respond accurately and fully to any question, inquiry or request for information when required by legal process.

5. No Admission. This Release Agreement does not constitute an admission by the Company of any wrongful action or violation of any federal, state, or local statute, or common law rights, including those relating to the provisions of any law or statute concerning employment actions, or of any other possible or claimed violation of law or right.

6. Breach. Executive agrees that upon any breach of this Release Agreement by Executive, Executive will forfeit all amounts paid or owing to Executive under this Release Agreement. Further, Executive acknowledges that it may be impossible to assess the damages caused by Executive's violation of the terms of Section 1 of this Release Agreement and further agree that any threatened or actual violation or breach of those paragraphs of this Release Agreement will constitute immediate and irreparable injury to the Company. Executive therefore agrees that any such breach of this Release Agreement is a material breach of this Release Agreement, and, in addition to any and all other damages and remedies available to the Company upon Executive's breach of this Release Agreement, the Company shall be entitled to an injunction to prevent Executive from violating or breaching this Release Agreement. Executive agrees that if the Company is successful in whole or part in any legal or equitable action against Executive under this Section 6, Executive agrees to pay all of the costs, including reasonable attorney's fees, incurred by the Company in enforcing the terms of this Release Agreement

7. Miscellaneous. This Release Agreement constitutes the complete, final and exclusive embodiment of the entire agreement between Executive and the Company with regard to this subject matter. It is entered into without reliance on any promise or representation, written or oral, other than those expressly contained herein, and it supersedes any other such promises, warranties or representations. This Release Agreement may not be modified or amended except in a writing signed by both Executive and a duly authorized officer of the Company. This Release Agreement will bind the heirs, personal representatives, successors and assigns of both Executive and the Company, and inure to the benefit of both Executive and the Company, their heirs, successors and assigns. If any provision of this Release Agreement is determined to be invalid or unenforceable, in whole or in part, this determination will not affect any other provision of the Release Agreement and the provision in question will be modified by the court so as to be rendered enforceable. This Release Agreement will be deemed to have been entered into and will be construed and enforced in accordance with the laws of the State of Maryland as applied to contracts made and to be performed entirely within the State of Maryland.

OPGEN, INC.

By: _____
Name:
Title:

EXECUTIVE:

_____
[Name]

Date: _____

CONSIDERATION PERIOD

I, _____, understand that I have the right to take at least 45 days (the "***Consideration Period***") to consider whether to sign this Release Agreement, which I received on _____ ____, 20____. If I elect to sign this Release Agreement before the Consideration Period has passed, I understand I am to sign and date below this paragraph to confirm that I knowingly and voluntarily agree to waive the Consideration Period.

AGREED:

_____
Executive Signature

_____
Date

AMENDMENT TO
EXECUTIVE CHANGE IN CONTROL AND
SEVERANCE BENEFITS AGREEMENT

This Amendment (the "***Amendment***"), dated as of November 1, 2013 (the "***Amendment Effective Date***") is an amendment to that certain Executive Change in Control and Severance Benefits Agreement, dated January 27, 2012 (the "***Agreement***"), by and between Vadim Sapiro ("***Executive***") and OpGen, Inc., a Delaware corporation (the "***Company***"). All defined terms used in this Amendment without definition have the meanings set forth in the Agreement.

WHEREAS, the Company has determined that it is in the best interests of the Company and its stockholders, and the Board of Directors has approved, an amendment to the Agreement to provide for the Company with the ability to terminate the Agreement at any time by providing sixty (60) days' notice.

WHEREAS, as consideration for the Executive entering into this Amendment, the Company is providing the Executive with due and adequate consideration in the form of equity awards to acquire shares of capital stock of the Company to be awarded as of the Amendment Effective Date (the "***Equity Awards***").

NOW, THEREFORE, in consideration of the mutual promises and covenants contained in the Agreement and herein, the parties hereto, agreeing to be legally bound, agree as follows:

1. **Adequate Consideration**. The Executive acknowledges and agrees that the Equity Awards constitute good and valuable new and additional consideration in exchange for the execution and delivery of this Amendment to the Company by the Executive.

2. **Term**. Section 6 of the Agreement is deleted in its entirety and replaced with the following:

> **"6.** **Term**. The term of this Agreement became effective on the Effective Date and shall continue in effect unless and until the Company terminates this Agreement by providing Executive with sixty (60) days prior written notice. Such notice shall specify the termination date for this Agreement. Notwithstanding the foregoing, (i) if a Covered Termination occurs while the Agreement is effective, the Agreement will continue in effect until such time as Executive has received all of the payment and benefits to which he is entitled hereunder, and (ii) upon a Change in Control, if this Agreement is still effective, the Agreement will automatically renew for a period of six months beginning on the effective date of the Change in Control, and will remain in effect thereafter, unless the Company or any Successor provides a termination notice within the time period described above."

3. **Impact on Agreement**. All other terms and provisions of the Agreement remain in full force and effect as supplemented by this Amendment. If there is a conflict between this Amendment and the Agreement, the terms and provisions of this Amendment will control.

IN WITNESS WHEREOF, this Amendment is executed as of the Amendment Effective Date.

OPGEN, INC.

By: /s/ Evan
Name: Evan Jones
Title: Chief Executive Officer

/s/ Vadim Sapiro
Vadim Sapiro

EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [* * *] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

TECHNOLOGY DEVELOPMENT AGREEMENT

by and between

OPGEN, INC.,

and

HITACHI HIGH-TECHNOLOGIES CORPORATION

September 25, 2013

EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [* * *] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

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TECHNOLOGY DEVELOPMENT AGREEMENT

This TECHNOLOGY DEVELOPMENT AGREEMENT (this "Agreement") is entered into as of September 25, 2013 (the "Effective Date") by and between OpGen, Inc., a Delaware corporation having its principal place of business at 708 Quince Orchard Road, Gaithersburg, Maryland 20878 ("OpGen"), and Hitachi High-Technologies Corporation, a Japan corporation having its principal place of business at 24-14, Nishi-shimbashi 1-chome, Minato-ku, Tokyo 105-8717, Japan ("HHT"). OpGen and HHT are sometimes referred to herein individually as a "Party" and collectively as the "Parties" to this Agreement.

WHEREAS, OpGen is a provider of whole genome mapping services;

WHEREAS, HHT is a global supplier of solutions-oriented information technology services; and

WHEREAS, OpGen and HHT desire to enter into a definitive agreement providing for the collaborative use of the Parties' respective technologies in order to produce new product and service offerings in the field of human chromosome mapping.

NOW, THEREFORE, in consideration of the mutual covenants and premises contained herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties, intending to be legally bound, hereby agree as follows:

ARTICLE 1
DEFINITIONS

Section 1.1 *Certain Definitions*. As used in this Agreement, the following initially capitalized terms shall have the meanings set forth in this Article 1. Other terms may be defined elsewhere in the text of this Agreement and, unless otherwise indicated, shall have such meaning throughout this Agreement.

(a) "Affiliate" means, with respect to either OpGen or HHT, a person, corporation, partnership, subsidiary or other entity that controls, is controlled by or is under common control with such Party. For the purposes of this definition, the term "control" (including, with correlative meaning, the terms "controlled by" or "under the common control with") means the actual power, either directly or indirectly through one or more intermediaries, to direct or cause the direction of the management and policies of an entity, whether by the ownership of more than fifty percent (50%) of the voting stock of such entity, or by contract or otherwise.

(b) "Business Day" means any day other than Saturday, Sunday or a holiday in either the United States or Japan.

(c) "Commercially Reasonable Efforts" means the efforts and resources that the Party required to make such efforts generally uses (as applicable in the context of this Agreement) to continually advance and commercialize a product or service, whether owned by it or to which it has rights under license, through successive stages of research, development, registration, manufacture, marketing, and commercialization.

(d) "Confidential Information" means, with respect to a Party, all Information of such Party that is disclosed to the other Party under this Agreement. Notwithstanding the foregoing, all Information generated or resulting from the arrangement or activities under this Agreement, whether generated by one or both of OpGen and HHT, shall be deemed the Confidential Information of the Parties. The term "Confidential Information" shall not include information that: (i) was known to the Receiving Party prior to the disclosure by the Disclosing Party as evidenced by then-current documentation; (ii) is or becomes publicly known through no fault or omission attributable to the Receiving Party; (iii) is rightfully given to the Receiving Party from sources independent of the Disclosing Party; or (iv) is independently developed by the Receiving Party without the use of the Disclosing Party's Confidential Information.

(e) "Control" means, with respect to any material, Information, or intellectual property right, that a Party owns or has a license to such material, Information, or intellectual property right and has the ability to grant to the other Party access, a license, or a sublicense (as applicable) to such material, Information, or intellectual property right on the terms and conditions set forth herein without violating the terms of any agreement or other arrangement with any third party existing at the time such Party would be first required hereunder to grant to the other Party such access, license, or sublicense.

(f) "Developed Technology" means all Information and intellectual property of any kind, whether or not copyrightable or patentable, that were or are conceived and reduced to practice or developed by any Party during the course of, and as a result of, the Parties' conduct of the Product development activities under this Agreement, together with any Patents that claim the foregoing.

(g) "Development Plan" has the meaning given to it in Section 2.3.

(h) "Field" means human chromosome mapping for research use only.

(i) "HHT Intellectual Property" means (i) the HHT Technology and (ii) the HHT Patents.

(j) "HHT Patents" means all Patents that are Controlled by HHT as of the Effective Date and all Patents Controlled by HHT thereafter during the Term that are reasonably necessary or useful for the research, development, manufacture, importation, offer for sale or sale of Products in the Field.

(k) "HHT Technology" means: (i) all Information and intellectual property of any kind, whether or not copyrightable or patentable, that is Controlled by HHT as of the Effective Date, or all Information Controlled by HHT thereafter during the Term, related to informatics, computational technology and cloud-based storage solutions; (ii) any improvements or modifications to any of the foregoing that are conceived and reduced to practice by or developed by HHT during the Term of this Agreement, except for any improvements or modifications that constitute Jointly-Owned Developed Technology, together with any Patents that claim the foregoing; and (iii) any other such items that are identified by HHT during the Term of this Agreement that are useful in the development, manufacturing and marketing of Products.

(l) "Information" means any data, results, and information of any type whatsoever, in any tangible or intangible form, including know-how, trade secrets, practices, techniques, methods, processes, inventions, developments, specifications, formulations, formulae, materials or compositions of matter of any type or kind (patentable or otherwise), software, algorithms, marketing reports, customer information, business or financial information, expertise, stability, technology, test data including pharmacological, biological, chemical, biochemical, toxicological, and clinical test data, analytical and quality control data, stability data, studies and procedures.

(m) "Intellectual Property" means the HHT Intellectual Property and the OpGen Intellectual Property.

(n) "Inventions" means any and all Developed Technology of any kind which constitutes a patentable invention.

(o) "OpGen Intellectual Property" means (i) the OpGen Technology and (ii) the OpGen Patents.

(p) "OpGen Patents" means all Patents that are Controlled by OpGen as of the Effective Date and all Patents Controlled by OpGen thereafter during the Term that are reasonably necessary or useful for the research, development, manufacture, importation, offer for sale or sale of Products in the Field.

(q) "OpGen Technology" means (i) all Information and intellectual property of any kind, whether or not copyrightable or patentable, that is Controlled by OpGen as of the Effective Date, or all Information Controlled thereafter during the Term by OpGen that are reasonably necessary or useful for the research, development, manufacture, importation, offer for sale or sale of products or services in the Field; (ii) any improvements or modifications to any of the foregoing that are conceived and reduced to practice by or developed by OpGen during the Term of this Agreement, except for any improvements or modifications that constitute Jointly Developed Technology, together with any Patents that claim the foregoing; and (iii) any other such items that are identified by OpGen during the Term of this Agreement that are useful in the development, manufacturing and marketing of Products.

(r) "Patents" means United States and foreign patents and patent applications and their respective substitutions, extensions (including patent term extensions), reissues, renewals, divisions, provisionals, continuations, continuations-in-part (and requests for continued examination of any of the foregoing), registrations, confirmations, re-examinations, extensions, and supplementary protection certificates of any of the foregoing, in each case, now existing and hereafter filed.

(s) "Products" means products and service offerings developed pursuant to this Agreement and the Development Plan that combine all or some of the OpGen Intellectual Property with the HHT Intellectual Property or are otherwise developed, as a joint product or service offering, of OpGen and HHT under this Agreement.

(t) "Project Milestones" means the milestones for the development of the Products as set forth on Exhibit A attached hereto.

(u) "Software Deliverable" means any software developed by OpGen under this Agreement for use in Products in the Field.

Section 1.2 *Interpretations*. The terms "includes," "including," "include" and derivative forms of them shall be deemed followed by the phrase "without limitation" (regardless of whether it is actually written there (and drawing no implication from the actual inclusion of such phrase in some instances after such terms but not others)). The words "hereof," herein," and "hereunder" and words of similar import, when used in this Agreement, shall refer to this Agreement as a whole and not to any other particular provision of this Agreement. References to specific Articles and Sections are to Articles and Sections of this Agreement, unless otherwise specifically stated otherwise. The terms defined in the singular herein shall have a comparable meaning when used in the plural, and vice versa.

ARTICLE 2
COLLABORATION

Section 2.1 *Collaboration Overview*. The Parties agree to collaborate (such collective activities, the "Collaboration") to jointly research, develop, manufacture, market and commercialize Products in the Field as set forth in this Agreement. Each Party shall work exclusively with the other Party in the development and commercialization of Products in the Field during the Term of this Agreement.

Section 2.2 *Steering Committee*.

(a) *Formation*. Within twenty (20) days after the Effective Date, the Parties will establish a steering committee (the "Steering Committee") that will monitor and oversee the Collaboration and the Parties' activities under this Agreement and facilitate communications between the Parties with respect to the development of the Products. The Steering Committee shall oversee and manage the flow of Information, promoting collaboration within and between the Parties, and any other committees that the Parties may establish under this Agreement.

(b) *Composition*. The Steering Committee will be composed of at least three (3) individuals from each of OpGen and HHT. The Steering Committee may change its size from time to time by mutual consent of its members, *provided*, that the Steering Committee shall at all times consist of an equal number of representatives of each of OpGen and HHT. Each Party may replace its Steering Committee members at any time upon delivery of written notice to the other Party. The Steering Committee may invite non-members to participate in the discussions and meetings of the Steering Committee, *provided*, that such participants shall have no voting authority with respect to the Steering Committee and, *provided*, *further*, that such participants undertake in writing to be bound by obligations of confidentiality and non-use regarding Confidential Information that are substantially the same as those undertaken by the Parties pursuant to this Agreement.

(c) *Specific Responsibilities*. In addition to its overall responsibility for monitoring and providing a forum to discuss and coordinate the Parties' activities under this Agreement, the Steering Committee shall in particular:

(i) oversee the activities of the Parties under this Agreement;

(ii) make all necessary strategic decisions relating to the development of the Products;

(iii) review and approve the Development Plan and any material amendments thereto;

(iv) approve an annual Development Plan budget;

(v) oversee and attempt to resolve issues presented to it by, and disputes within, the research and development personnel of the Parties;

(vi) establish such additional joint subcommittees as it deems necessary to achieve the objectives and intent of the Agreement; and

(vii) perform such other functions as appropriate to further the purposes of the Agreement as allocated to it in writing by the Parties.

(d) *Meetings*. The Steering Committee shall meet at least once per calendar quarter during the Term unless the Parties mutually agree in writing to a different frequency for such meetings. The Steering Committee may meet in person or by videoconference or, if the Parties mutually agree in writing, the Steering Committee may meet by teleconference. Either OpGen or HHT may also call a special meeting of the Steering Committee (that may be held by videoconference or teleconference) by giving reasonable prior written notice to the other Party in the event such Party reasonably believes that a significant matter must be addressed prior to the next scheduled meeting. Notwithstanding the foregoing, at least two (2) meetings per calendar year shall be in person unless the Parties mutually agree in writing to waive such requirement in exchange for a videoconference or teleconference. In-person Steering Committee meetings will be held at locations alternately selected by OpGen and HHT. The Party selecting a location shall be responsible for all expenses associated with utilizing that location. Each Party will bear the expense of its respective Steering Committee members' travel, lodging and participation in Steering Committee meetings. Meetings of the Steering Committee shall be effective only if at least one (1) representative of each Party is present or participating in such meeting. The chairperson of the Steering Committee, in cooperation with the senior member on the Steering Committee of OpGen and HHT, as applicable, shall be responsible for preparing an agenda and reasonably detailed written minutes of all Steering Committee meetings that reflect, without limitation, material decisions made at such meetings. The Steering Committee chairperson or senior member, as applicable, shall send draft meeting minutes to each member of the Steering Committee for review and approval within five (5) Business Days after each Steering Committee meeting. Such minutes will be deemed approved unless one or more members of the Steering Committee objects to the accuracy of such minutes within ten (10) Business Days after receipt.

(e) *Decision-Making*. The Steering Committee shall act by consensus. Each member of the Steering Committee will have one (1) vote on all matters to come before the Steering Committee. If the Steering Committee cannot reach consensus within ten (10) Business Days with respect to any matter that comes before it, then it shall submit the positions of the Parties to OpGen's and HHT's respective senior executive or their designees. Such senior executives or designees shall use good faith efforts to resolve promptly such matter within twenty (20) Business Days after the Steering Committee's submission of such matter to them. If such senior executives or designees fail to resolve such matter within such twenty (20) Business Day period, the matter shall be resolved pursuant to the dispute resolution procedures set forth in Section 10.1 hereof.

Section 2.3 *Development Committee*.

(a) *Formation*. Within thirty (30) days after the Effective Date, the Parties shall establish a development committee (the "Development Committee") that will monitor, manage and oversee the day-to-day activities of the Collaboration and the Parties under this Agreement, including coordinating the development activities of each Party and making recommendations to the Steering Committee.

(b) *Composition*. The Development Committee will be composed of at least three (3) individuals from each of OpGen and HHT. The Development Committee may change its size from time to time by mutual consent of its members, *provided*, that the Development Committee shall at all times consist of an equal number of members from each of OpGen and HHT. Each Party may replace any of its Development Committee members at any time upon delivery of written notice to the other Party.

(c) *Specific Responsibilities*. In addition to its responsibility for the day-to-day management of the activities of the Parties, including coordinating the development activities of each of the Parties, the Development Committee shall in particular:

(i) Prepare a development plan for the development of the Products (the "Development Plan");

(ii) Oversee and manage the implementation of the Development Plan;

(iii) Propose to the Steering Committee any amendments to the Development Plan;

(iv) Refer strategic issues to the Steering Committee for decision;

(v) Prepare annual Development Plan budgets and their submission to the Steering Committee for approval;

(vi) Facilitate the exchange of Information between Parties;

(vii) Coordinate the regulatory strategy and intellectual property strategy with respect to any Products; and

(viii) Review and report on the efforts of the Parties in performing their respective duties and development activities to the Steering Committee.

(d) *Development Plan*. The Development Plan will be prepared by the Development Committee with approval and revision by the Steering Committee as necessary. The Development Plan will be prepared by the Development Committee and submitted for approval to the Steering Committee within sixty (60) days after the Effective Date. Upon approval by the Steering Committee, the Development Plan will be incorporated into this Agreement and appended hereto as Exhibit B. The Development Plan will include:

(i) Identification of development activities to be conducted by, and the corresponding responsibilities of, each Party pursuant to this Agreement and the anticipated timelines for such activities;

(ii) The standards applicable to any development activities;

(iii) Specific goals and requirements for each Project Milestone, including approval of third party support for Phase II;

(iv) Identification of any testing and acceptance criteria for each of the Project Milestones; and

(v) Any specifications and performance standards applicable to the Products.

ARTICLE 3
PRODUCT DEVELOPMENT

Section 3.1 *Overview*. Each Party agrees to use its respective Commercially Reasonable Efforts to research and develop the Products pursuant to this Agreement and to perform such Party's respective obligations identified in the Development Plan. In addition, each Party agrees to use its respective Commercially Reasonable Efforts to perform its obligations set forth in the Development Plan in order to achieve the Project Milestones in accordance with the timelines set forth in the Development Plan.

Section 3.2 *Project Milestones*. The Party responsible for completing a Project Milestone as set forth in the Development Plan shall notify the other Party in writing of achieving a Project Milestone. Upon achieving a Project Milestone, the Products shall be subjected to the testing and acceptance procedures set forth in the Development Plan. Thereafter, the Parties shall work together to promptly test the progress of the Products to confirm whether the Products meet the acceptance criteria set forth in the Development Plan. No Party shall be liable or responsible for failing to achieve a Project Milestone as a result of a failure of the other Party to perform its responsibilities relating to such Project Milestone.

Section 3.3 *Performance Standards*. Each Party shall perform, or cause to be performed, its respective activities hereunder in good scientific manner, and in compliance, in all material respects, with all applicable laws. The Parties hereby agree and covenant that the goal of the Collaboration is to: (i) maximize the marginal profits from sales of the Products to be shared by the Parties in the commercialization agreement as set forth in Section 5.3 below; and (ii) perform each Party's activities hereunder to accomplish such goal. To comply with this covenant, each Party agrees that it shall use Commercially Reasonable Efforts to achieve the objectives of the Development Plan in accordance with the timelines and budgets set forth therein, in each case, efficiently and expeditiously by allocating sufficient and appropriate time, effort, equipment and skilled personnel in an effort to complete such activities successfully and promptly. It is not intended that the Parties will share costs and expenses incurred by the other Party for re-doing work or other additional expenses arising from errors or omissions of a Party in carrying out its responsibilities hereunder that arise from any unilateral deviation from the Development Plan by such Party.

Section 3.4 *Development Records and Reports*. Each Party shall maintain complete and accurate records (in the form of technical notebooks and/or electronic files where appropriate) of all work conducted by it under the Development Plan and all Information resulting from such work. Such records, including any electronic files where such Information may also be contained, shall fully and properly reflect all work done and results achieved in the performance of the Development Plan in sufficient detail and in good scientific manner appropriate for patent and regulatory purposes. Each Party shall have the right to review and copy such records maintained by the other Party at reasonable times and upon reasonable notice, and to obtain access to originals to the extent needed for patent or regulatory purposes or for other legal proceedings. Each Party shall provide the Development Committee with regular reports detailing its respective research and development activities under the Development Plan and the results of such activities.

Section 3.5 *Escrow for Software Deliverables*. OpGen must deliver a complete copy of the object code, together with the source code, and programming documentation related to any Software Deliverable developed under this Agreement to Iron Mountain (the "Escrow Agent") to be held in escrow for the benefit of HHT, as beneficiary, in the event of certain termination events as set forth in the Escrow Agreement between OpGen and the Escrow Agent (the "Escrow Agreement"), or inArticle 8 of this Agreement. HHT will have the right to review, negotiate, and approve the draft of the Escrow Agreement with OpGen prior to its execution. The Escrow Agreement will, among other things, provide HHT with all rights necessary to use the Software Deliverable as contemplated under this Agreement, including, if necessary, the right to modify the Software Deliverable. OpGen shall be responsible for the annual escrow costs to be paid to the Escrow Agent and shall update the source code, object code and documentation stored in the escrow within a reasonable time after the Software Deliverable has been modified or updated.

Section 3.6 *Commercialization and Right of First Offer*.

(a) Prior to the marketing and distribution of the Products, the Parties shall agree in writing to the methods and process applicable to the marketing and distribution of the Products (the "Marketing Plan"). Any customer arrangements of any Party in such commercialization stage shall be subject to a separate agreement between the Parties and shall reflect the financial terms set forth on Exhibit C attached hereto, and contain such other terms and conditions, as are agreed upon by the Parties prior to the initial commercialization activities and thereafter from time to time during the Term of this Agreement.

(b) Right of First Offer. OpGen hereby grants HHT a right of first offer to partner and/or collaborate with OpGen in the development of products and services and/or the commercialization of Products developed under this Agreement in [* * *] (each of (i) and (ii) an "Additional Field" and collectively, the "Additional Fields"). The first offer process, including the rights and obligations of OpGen and of HHT under this right of first offer are:

(i) If OpGen desires to develop and/or commercialize any Developed Technology in any Additional Field, it shall develop a summary development and/or commercialization plan for such activities.

(ii) OpGen shall offer to HHT the first right to collaborate or partner with OpGen for such use of the Developed Technology in such Additional Field before offering such plan to any third party.

(iii) OpGen shall present HHT with the plan developed under clause (i) of this subsection, and any other materials developed by OpGen to describe the potential product offering (the "Additional Field Offer").

(iv) HHT shall have thirty (30) Business Days to review the Additional Field Offer (the "Offer Period"). HHT must provide OpGen with a binding term sheet (the "Term Sheet") prior to or on the last Business Day of the Offer Period if HHT elects to partner or collaborate with OpGen on the Additional Field Offer. If HHT does not provide such Term Sheet to OpGen by the expiration of the Offer Period, OpGen shall be free to offer the Additional Field Offer plan to any third party or to develop such plan independently.

(v) If HHT provides the Term Sheet contemplated by clause (iv) to OpGen within the Offer Period, the parties shall, within ninety (90) days after the date of delivery of the Term Sheet, negotiate a definitive agreement with respect to such Additional Field Offer. Unless the definitive agreement is executed by the Parties within such ninety-day period, the obligations of OpGen under this right of first offer shall cease, and be of no further force and effect; provided, however, that if the failure to finalize such definitive agreement is based solely on OpGen's failure to negotiate the definitive agreement in good faith; such negotiation period shall be extended to one hundred eighty (180) days. Any dispute between the Parties as to whether OpGen fails to negotiate in good faith shall be submitted to the dispute resolution process set forth in Section 10.1 of this Agreement. The time limits in this Section 3.6(b)(v) may also be extended upon written agreement of the Parties.

(vi) The right of first offer set forth in this Section 3.6(b) shall apply to any proposed product or service development or commercialization plan using the Developed Technology identified or considered by OpGen in an Additional Field. OpGen shall provide HHT with notice, non-confidential information, and an opportunity to negotiate with OpGen, with respect to any independent offer or proposal made to OpGen by any third party; provided, however, that as set forth in Section 2.1 of this Agreement, during the Term OpGen shall not work with or discuss the development and commercialization of Products in the Field with any entity, organization or person other than HHT.

ARTICLE 4
INTELLECTUAL PROPERTY PROVISIONS

Section 4.1 *License of OpGen Intellectual Property*. OpGen hereby grants to HHT, for use during the Term, a limited, non-transferable, non-exclusive, non-sublicenseable and worldwide license to the OpGen Intellectual Property solely for use in the research and development of Products in the Field and solely pursuant to this Agreement. HHT acknowledges and agrees that nothing contained in this Agreement (i) grants to HHT any right, express or implied, except as set forth in this Agreement or (ii) shall limit or prohibit OpGen from using or licensing to others the right to use the OpGen Intellectual Property outside of this Agreement, subject to the restrictions set forth in Section 2.1 regarding the sale of Products in the Field.

Section 4.2 *License of HHT Intellectual Property*. HHT hereby grants to OpGen, for use during the Term, a limited, non-transferable, non-exclusive, non-sublicenseable and worldwide license to the HHT Intellectual Property solely for use in the research and development of Products in the Field and solely pursuant to this Agreement. OpGen acknowledges and agrees that nothing contained in this Agreement (i) grants to OpGen any right, express or implied, except as set forth in this Agreement or (ii) shall limit or prohibit HHT from using or licensing to others the right to use the HHT Intellectual Property outside of this Agreement, subject to the restrictions set forth in Section 2.1 regarding the sale of Products in the Field.

Section 4.3 *Ownership*. The Parties recognize that in the performance of work under this Agreement, each Party may independently and separately, or the Parties may jointly, create or make Developed Technology with respect to the Products or processes or methods relating to any of the foregoing. This Section 4.3 establishes the agreement of the Parties with respect to ownership of such Developed Technology. Any and all Developed Technology shall be owned by the Parties as follows, but shall be subject, in each case, to the provisions of Section 4.4 hereof:

(a) *OpGen Developed Technology*. OpGen shall be the sole and exclusive owner of all Inventions where the inventorship arose from the independent and separate efforts of any employee(s) or consultant(s) of OpGen and which is not based on Confidential Information of HHT or HHT Intellectual Property. OpGen shall also be the sole and exclusive owner of any Developed Technology (other than Inventions) independently and separately made, created, conceived and reduced to practice or developed by OpGen during the course, or as a result of, OpGen's performance of the activities contemplated by this Agreement, and which is not based on Confidential Information of HHT or HHT Intellectual Property (together with the Inventions owned by OpGen, the "OpGen Developed Technology").

(b) *HHT Developed Technology*. HHT shall be the sole and exclusive owner of all Inventions where the inventorship arose from the independent and separate efforts of any employee(s) or consultant(s) of HHT and which is not based on Confidential Information of OpGen or OpGen Intellectual Property. HHT shall also be the sole and exclusive owner of any Developed Technology (other than Inventions) independently and separately made, created, conceived and reduced to practice or developed by HHT during the course, or as a result of, HHT's performance of the activities contemplated by this Agreement, and which is not based on Confidential Information of OpGen or OpGen Intellectual Property (together with the Inventions owned by HHT, the "HHT Developed Technology").

(c) *Jointly-Owned Developed Technology*. OpGen and HHT shall jointly own all Inventions where the inventorship arose from the joint efforts of employee(s), consultant(s) or subcontractors of the Parties or which was developed by one Party but based on the Confidential Information or Intellectual Property of the other Party. The Parties shall also jointly own any Developed Technology (other than Inventions) made, created, conceived and reduced to practice or developed by subcontractors of any Party or otherwise pursuant to the activities performed pursuant to this Agreement and not exclusively owned by any Party pursuant to subsection (a) or (b) above (together with the Inventions owned jointly by the Parties, the "Jointly-Owned Developed Technology"). The Steering Committee shall approve the designation of Jointly-Owned Technology for any Developed Technology under this Agreement and shall maintain a record of such Jointly-Owned Developed Technology. Subject to clause (d) below, the determination of the Steering Committee with respect to the designation of any Developed Technology as Jointly-Owned Developed Technology shall be binding on the Parties and their successors and assigns.

(d) *Determination of Inventorship*. If the Parties are unable to agree as to the inventorship of any Invention included in the Developed Technology, the Parties shall jointly retain independent patent counsel, reasonably acceptable to the Parties, to determine inventorship of such Invention. The Parties agree to be bound by the determination of such independent patent counsel with respect to inventorship of such Invention, and to share equally (50/50) in the fees and expenses of such independent patent counsel.

Section 4.4 *Developed Technology License Grants*. The Parties anticipate that Developed Technology will arise pursuant to the activities performed pursuant to this Agreement and shall be owned by the Parties as set forth herein. The Parties hereby agree that the use and exploitation of any such Developed Technology by the Parties shall be as follows:

(a) *Cross Licenses of Developed Technology for Products in the Field*. OpGen hereby grants to HHT a limited, non-transferable, non-sublicenseable and worldwide license, co-exclusive with OpGen, to use any and all OpGen Developed Technology to practice, exploit, reproduce, distribute, perform, display, develop, make, have made, sell, offer for sale, and import Products solely in the Field. HHT hereby grants to OpGen a limited, non-transferable, non-sublicenseable and worldwide license, co-exclusive with HHT, to use any and all HHT Developed Technology to practice, exploit, reproduce, distribute, perform, display, develop, make, have made, use, sell, offer for sale, and import Products solely in the Field.

(b) *Rights to Use Developed Technology Other Than for Products in the Field*. Except as set forth in Section 4.4(a), OpGen shall have the sole right to use, practice and exploit all OpGen Developed Technology. Except as set forth in Section 4.4(a), HHT shall have the sole right to use, practice and exploit all HHT Developed Technology. Notwithstanding anything else in this Agreement to the contrary, each Party shall have the right to use, practice, exploit, reproduce, prepare derivative works, distribute, perform, display, develop, make, have made, sell, offer for sale, and import the Jointly-Owned Developed Technology without obligation to the other Party; *provided*, *however*, that, without the prior written consent of the other Party, no Party shall use the Jointly-Owned Developed Technology for any purpose other than in connection with the Products developed pursuant to this Agreement or such Party's Intellectual Property, and *provided*, *further*, that any use of the Jointly-Owned Developed Technology in a cloud-based solution shall be on an HHT cloud solution.

(c) *Software Deliverable*. OpGen grants to HHT a limited, non-transferable, non-sublicenseable (except as set forth in Section 4.4(d)), and worldwide license, co-exclusive with OpGen, to use, practice, exploit, reproduce, distribute, perform, display, develop, make, have made, sell, offer for sale, and import the Software Deliverable in connection with Products in the Field. OpGen shall provide HHT with the object code and documentation of the Software Deliverable as may be amended from time to time, for use in the Product development and commercialization activities contemplated under this Agreement, and OpGen shall provide all assistance necessary to customize the Software Deliverable for use on the HHT cloud solution, including, if necessary, the source code required for such customization. OpGen shall not transfer or assign the copyright of the Software Deliverable and/or the copyright of a derivative work based on the Software Deliverable without HHT's prior written consent, except as permitted in Section 10.7.

(d) *Sublicense Right*. Except for non-exclusive end user licenses required to be granted in connection with commercialization of the Products, neither Party shall grant a license under any Product, the Software Deliverable or the Jointly-Owned Developed Technology without the other Party's prior written consent. The Parties shall present all sublicense opportunities to the Steering Committee for approval.

Section 4.5 *Patent Disclosure*. Each Party shall promptly disclose to the other Party in writing all Inventions or potential Developed Technology, whether patentable or not, which are: (a) attributable to one or more employees, agents or consultants of such Party and arise during the course of performance of any activities hereunder; or (b) jointly attributable to one or more employees, agents or consultants of OpGen and one or more employees, agents or consultants of HHT and which arise during the course of performance of any activities hereunder. All disclosures under this Section 4.5 shall be made at least sixty (60) days prior to any public disclosure of such Invention or potential Developed Technology or any required submission to government agencies in compliance with the requirements of government supported research, if applicable.

Section 4.6 *Patent Prosecution.*

(a) OpGen shall be responsible for filing, prosecuting and maintaining any applications for Patents claiming OpGen Developed Technology, and maintaining any Patents issued thereon, all at its cost and expense. OpGen shall inform HHT of any Patent application being prepared on any of the OpGen Developed Technology, and provide a detailed description thereof. Further, OpGen shall endeavor to provide draft applications for Patents on OpGen Developed Technology to HHT sufficiently in advance of filing for HHT to have the opportunity to comment thereon, and at least thirty (30) days prior to the contemplated filing date whenever possible. OpGen shall provide copies of all amendments and responses to all substantive communications received from applicable patent offices relating to OpGen Developed Technology sufficiently in advance of the proposed submission date of such amendments or responses to allow HHT to comment thereon, and at least fourteen (14) days prior to the contemplated submission date thereof whenever possible. Any reasonable requests made by HHT pertaining to such filings, amendments or responses shall be reflected in such filings, amendments and responses; *provided* that HHT provides such input to OpGen sufficiently in advance of such proposed submission date to permit inclusion therein.

(b) If OpGen elects not to seek or maintain Patent protection for any OpGen Developed Technology at all or in any particular country, HHT may file and control the prosecution and maintenance of applications for Patents as the patent applicant with respect to such OpGen Developed Technology to the extent necessary to protect its rights under the licenses granted pursuant to Section 4.4(a). In the event HHT elects to file or maintain such a Patent application, OpGen will grant any necessary authority to HHT to do so everywhere or in such particular country, as appropriate, and will cooperate as is reasonable, at HHT's expense, with HHT's prosecution and maintenance efforts. HHT shall grant a license to OpGen of the Patent application pursuant to Section 4.4(a).

(c) HHT shall be responsible for filing, prosecuting and maintaining any applications for Patents claiming HHT Developed Technology, and maintaining any Patents issued thereon, all at its cost and expense. HHT shall inform OpGen of any applications for Patents being prepared on any of the HHT Developed Technology, and provide a detailed description thereof. Further, HHT shall endeavor to provide draft applications for Patent on HHT Developed Technology to OpGen sufficiently in advance of filing for OpGen to have the opportunity to comment thereon, and at least thirty (30) days prior to the contemplated filing date whenever possible. HHT shall provide copies of all amendments and responses to all substantive communications received from applicable patent offices relating to HHT Developed Technology sufficiently in advance of the proposed submission date of such amendments or responses to allow OpGen to comment thereon, and at least fourteen (14) days prior to the contemplated submission date thereof whenever possible. Any reasonable requests made by OpGen pertaining to such filings, amendments or responses shall be reflected in such filings, amendments and responses, *provided* that OpGen provides such input to HHT sufficiently in advance of such proposed submission date to permit inclusion therein.

(d) If HHT elects not to seek or maintain Patent protection for any HHT Developed Technology at all or in any particular country, OpGen may file and control the prosecution and maintenance of applications for Patent as the patent applicant with respect to such HHT Developed Technology to the extent necessary to protect its rights under the license granted pursuant to Section 4.4(a) hereof. In the event OpGen elects to file or maintain such a Patent application, HHT will grant any necessary authority to OpGen to do so everywhere or in such particular country, as appropriate, and will cooperate as is reasonable, at OpGen's expense, with OpGen's prosecution and maintenance efforts. OpGen shall grant a license to HHT of the Patent application pursuant toSection 4.4(a).

(e) To the extent that OpGen or HHT has elected to file for, prosecute and maintain Patent protection for any Developed Technology and later elects to abandon such activities, such Party shall promptly notify the other Party. The other Party shall thereafter have the right, but not the obligation, to continue to pursue such Patent protection for such Developed Technology at its own expense as the patent applicant or patentee. The Party that abandons such Patent prosecution or maintenance will grant any necessary authority to the other Party to continue such Patent prosecution and maintenance activities in the applicable countries and will cooperate as is reasonable, at the other Party's expense, with such other Party's Patent protection activities. The Party that pursues such Patent application shall grant a license to the other Party of such Patent application pursuant to Section 4.4(a).

(f) The Parties shall be jointly responsible for filing, prosecuting and maintaining any applications for Patents claiming Jointly-Owned Developed Technology, and maintaining any Patents issued thereon, all at their shared (50/50) cost and expense. The Steering Committee shall discuss and evaluate the Jointly-Owned Developed Technology and determine the advisability of filing applications for Patent in the United States and in other countries to cover such Jointly-Owned Developed Technology. Each Party shall have the opportunity to comment on any such Patent application and amendments thereto at least thirty (30) days prior to the contemplated filing date, whenever possible. Any reasonable requests made by any Party pertaining to such filings, amendments or responses shall be reflected in such filings, amendments and responses; *provided* that such commenting Party provides such input to the other Party sufficiently in advance of such proposed submission date to permit inclusion therein.

(g) If the Parties do not agree with respect to seeking or maintaining Patent protection for any Jointly-Owned Developed Technology, at all or in any particular country, either of OpGen or HHT, as the case may be, may file and control the prosecution and maintenance of applications for Patents as the patent applicant or patentee with respect to such Jointly-Owned Developed Technology to the extent necessary to protect its rights under the licenses granted pursuant to Section 4.4(a) hereof. In the event one Party elects to file or maintain such a Patent application, the other Party will grant any necessary authority to such electing Party to do so everywhere or in such particular country, as appropriate, and will cooperate as is reasonable, at such electing Party's expense, with such electing Party's prosecution and maintenance efforts. The Party that pursues such Patent application shall grant a license to the other Party of such Patent application pursuant to Section 4.4(a).

Section 4.7 *Cooperation*. Upon request, each Party shall execute and deliver to the other Party all information, descriptions, applications, assignments and other documents and instruments necessary or proper to carry out the provisions of this Agreement without further compensation; and the Parties shall cooperate with and assist each other or their nominees in all reasonable ways and at all reasonable times, including, but not limited to, testifying in all legal proceedings, signing all lawful papers and in general performing all lawful acts reasonable, necessary or proper, to aid the other Party in obtaining, maintaining, defending and enforcing all lawful patent, copyright, trade secret, know-how and like rights in the United States and elsewhere.

Section 4.8 *No License*. Except as specifically set forth in this Article 4, nothing contained herein shall be construed by implication or otherwise to grant to a Party any rights to the other Party's Developed Technology or Intellectual Property or any license under any Patent, copyright or trademark now or hereinafter in existence, except as specifically provided herein and for the limited purposes set forth herein.

Section 4.9 *Infringement by Third Parties*.

(a) *Notification*. If either Party becomes aware of any infringement, threatened infringement, or alleged infringement of any Intellectual Property, OpGen Developed Technology, HHT Developed Technology or Jointly-Owned Developed Technology on account of a third party's manufacture, use or sale of a product or service, then such Party shall promptly notify the other Party in writing of any such infringement of which it becomes aware, and shall provide evidence in such Party's possession demonstrating such infringement.

(b) *Product Infringement*. OpGen shall have the first right, but not the obligation, to bring, prosecute and control any appropriate suit or other action against any person or entity engaged in such infringement by its own counsel if it relates to the OpGen Intellectual Property or OpGen Developed Technology. HHT shall have the first right, but not the obligation, to bring, prosecute and control any appropriate suit or other action against any person or entity engaged in such infringement by its own counsel if it relates to the Jointly-Owned Developed Technology, HHT Intellectual Property or HHT Developed Technology. The primary Party responsible shall have a period of one hundred twenty (120) days after its discovery of such infringement, to elect to so enforce any applicable intellectual property rights. In the event the primary Party does not so elect, it shall so notify the other Party in writing, and such Party shall have the right to commence a suit or take action to enforce the applicable intellectual property rights with respect to such infringement by its own counsel, and the other Party shall have the right to be represented in any such action by counsel of its own choice. OpGen shall have the right to join any suit or other action related to the Jointly-Owned Developed Technology with counsel of its choice and at its own expense. Each Party shall provide to the Party enforcing any such rights under this Section 4.9(b) reasonable assistance in such enforcement, at such enforcing Party's request and expense, including joining such action as a party plaintiff if required by applicable law to pursue such action. The enforcing Party shall keep the other Party regularly informed of the status and progress of such enforcement efforts, and shall reasonably consider the other Party's comments on any such efforts.

(c) *Settlement*. Without the prior written consent of the applicable Party, no Party shall settle any claim, suit or action related to Jointly-Owned Developed Technology that such Party brought under this Section 4.9 in any manner.

(d) *Expenses and Recoveries*. The Party bringing a claim, suit or action under Section 4.9(b) against any person or entity engaged in infringement of the applicable intellectual property rights shall be solely responsible for any expenses incurred by such Party as a result of such claim, suit or action. If such Party recovers monetary damages from such third party in such suit or action, such recovery shall be allocated first to the reimbursement of any expenses incurred by the Parties in such litigation and any remaining amount shall belong to the Parties that maintained the suit or action to judgment or conclusion.

Section 4.10 *Infringement of Third Party Intellectual Property.*

(a) *Notification of Potential Infringement*. Each Party shall notify the others in writing of any allegations it receives from a third party that the manufacture, production, use, development, sale or distribution of any Product or any technology or intellectual property licensed by a Party under this Agreement infringes the intellectual property rights of a third party. Such notice shall be provided promptly, but in no event after more than ten (10) Business Days, following receipt of such allegations.

(b) *Notification of Suit*. In the event that a Party receives notice that it or any of its Affiliates have been individually named as a defendant in a legal proceeding by a third party alleging infringement of a third party's patents or other intellectual property rights as a result of the manufacture, production, use, development, sale, offer for sale, importation, reproduction, performance, display or distribution of Products or any technology or intellectual property licensed by a Party under this Agreement, such Party shall immediately notify the other Party in writing and in no event later than ten (10) Business Days after the receipt of such notice. Such written notice shall include a copy of any summons or complaint (or the equivalent thereof) received regarding the foregoing. Each Party shall assert and not waive the joint defense privilege with respect to all communications between the Parties reasonably the subject thereof. In such event, the Parties shall agree how best to mitigate or control the defense of any such legal proceeding; *provided*, *however*, that if any Party or any of its Affiliates has been individually named as a defendant in a legal proceeding relating to the alleged infringement of a third party's patents or other intellectual property right as a result of the manufacture, production, use, development, sale offer for sale, importation, reproduction, performance, display or distribution of the Products, the other Parties shall be allowed to join in such action, at their its expense.

Section 4.11 Trademarks. The Steering Committee shall be responsible for selecting the trademarks to be used in connection with the sale or marketing of the Products in the Field (the "Marks") and which Party will be responsible for the registration, maintenance and defense of such Marks. In the event that the Steering Committee is not able to agree on the foregoing, if the Mark relates to the whole genome mapping aspects of the Product, then OpGen shall be responsible for selecting, registering, maintaining and defending such Mark, and, if the Mark relates to the cloud computational aspects of the Product, then HHT shall be responsible for selecting, registering, maintaining and defending such Mark. No Party shall, without the prior written consent of the other Party, use any trademarks or service marks of the other Party (including such Party's corporate names), or marks confusingly similar thereto, in connection with such Party's commercialization of the Products under this Agreement.

ARTICLE 5
FINANCIAL PROVISIONS

Section 5.1 *Initial Development Payment*. HHT shall pay OpGen an amount equal to $[* * *] upon execution of this Agreement.

Section 5.2 *Milestone Payments*. HHT hereby agrees to pay OpGen the amounts set forth on Exhibit A after confirmation of completion and acceptance of a Project Milestone in compliance with the Development Plan (each, a "Milestone Payment") and the procedure set forth below. The Development Committee shall meet within twenty (20) Business Days of the delivery of a Project Milestone to determine if such Project Milestone was completed and accepted in accordance with the Development Plan. If the Development Committee is unable to determine whether such Project Milestone has been completed within twenty (20) Business Days, the determination will be referred to the Steering Committee. If the Steering Committee is unable to determine whether such Project Milestone has been completed within twenty (20) Business Days of referral, the Parties will follow the dispute resolution process in Section 10.1. HHT shall pay OpGen the Milestone Payment for a Project Milestone at the end of the month following the month in which the Project Milestone is completed and accepted.

Section 5.3 *Financial Terms*. The Parties agree to commence good faith negotiations of the financial terms between the Parties related to the commercialization and sale of the Products no later than the completion of Project Milestone II.B. The Parties further agree to negotiate in good faith and take all reasonable action in order to enter into a definitive agreement governing the commercialization and sale of the Products prior to the achievement of the Project Milestones and acceptance of the Products pursuant to the Development Plan. Such negotiations and the terms of any such definitive agreement will include, at a minimum, the items set forth on Exhibit C.

Section 5.4 *Payments*. All payments made by one Party to another Party under this Agreement shall be made in United States Dollars by wire transfer (or such other reasonable means as the receiving Party may direct) to such bank account as the receiving Party may designate in writing from time to time.

Section 5.5 *Records Retention; Audit.*

(a) *Record Retention*. Each Party shall maintain (and shall ensure that its Affiliates shall maintain) complete and accurate books, records and accounts that fairly reflect their respective (i) costs and expenses in researching, developing, marketing and selling the Products, and (ii) Net Sales of Products, in each case in sufficient detail to confirm the accuracy of any payments required hereunder and in accordance with generally accepted accounting principles in the United States, which books, records and accounts shall be retained by each Party until the later of (1) three (3) years after the end of the period to which such books, records and accounts pertain, and (2) the expiration of the applicable tax statute of limitations (or any extensions thereof), or for such longer period as may be required by applicable law.

(b) *Audit*. HHT and OpGen shall each have the right to have an independent certified public accounting firm of nationally recognized standing, reasonably acceptable to the audited Party, have access during normal business hours, and upon reasonable prior written notice, to such of the records of the other Party (and its Affiliates) as may be reasonably necessary to verify the accuracy of such Party's expenses and Net Sales, as applicable, for any fiscal quarter ending not more than thirty-six (36) months prior to the date of such request; *provided*, *however*, that neither HHT nor OpGen shall have the right to conduct more than one (1) such audit in any twelve (12)-month period; *provided*, *further*, *however*, that a Party can repeat a confirmatory audit if the first audit reveals underpayments as set forth below. The accounting firm shall disclose to each Party whether the reports of such expenses and Net Sales, as applicable, supplied by the other Party are correct or incorrect and the specific details concerning any discrepancies. No other information shall be provided to the requesting Party. The requesting Party shall bear the cost of such audit unless the audit reveals an underpayment by (or over-billing by) the audited Party of more than five percent (5%) from the reported results, in which case the audited Party shall bear the cost of the audit.

ARTICLE 6
CONFIDENTIALITY

Section 6.1 *Protection of Confidential Information*. Each Party agrees that it will exercise reasonable care to protect and maintain the confidentiality of any Confidential Information of another Party (the "Disclosing Party"), but in no event shall the Party receiving the Confidential Information of another Party (the "Receiving Party") use less than the same steps it takes to protect its own proprietary and confidential information. The Receiving Party shall only use the Confidential Information of the Disclosing Party for the purpose of performing its obligations under this Agreement. The Receiving Party shall only disclose the Confidential Information of the Disclosing Party to its employees, officers and consultants, if necessary for any purpose contemplated by or related directly to this Agreement, *provided*, that any consultants that have access to any Confidential Information shall first execute a confidentiality undertaking containing provisions at least as protective as those set forth in this Agreement. Except with respect to any Confidential Information that is considered a trade secret of the Disclosing Party, the Receiving Party shall protect and keep confidential and shall not use, publish or otherwise disclose to any third party, except as contemplated by this Agreement or with the Disclosing Party's prior written consent, the Disclosing Party's Confidential Information for a period of five (5) years from the date of termination or expiration of this Agreement. Accordingly, each Party hereby agrees that, in the event or use or disclosure by the Receiving Party other than as specifically provided for in this Agreement, the Disclosing Party may be entitled to equitable relief as granted by any appropriate judicial body. The Receiving Party shall protect and keep confidential all trade secrets of the Disclosing Party until such Confidential Information is no longer considered Confidential Information as defined herein.

Section 6.2 *Required Disclosure*. In the event that a Receiving Party is required by applicable law or by judicial or administrative process to disclose any of the Disclosing Party's Confidential Information, the Receiving Party shall (a) promptly notify the Disclosing Party of each such requirement and identify the documents so required thereby, so that the Disclosing Party may seek an appropriate protective order or other remedy and/or waive compliance by the Receiving Party with the provisions of this Agreement, and (b) consult with the Disclosing Party on the advisability of taking legally available steps to resist or narrow the scope of such requirement. If, in the absence of such a protective order or such a waiver by the Disclosing Party of the provisions of this Agreement, the Receiving Party is nonetheless required by mandatory applicable law to disclose any part of such Confidential Information, the Receiving Party may disclose such Confidential Information without liability under this Agreement, except that the Receiving Party shall (i) furnish only that portion of such Confidential Information which is legally required and (ii) use its reasonable efforts to obtain an order or other reliable assurance that confidential treatment shall be accorded to the portion of such Confidential Information so required to be disclosed.

Section 6.3 *Return of Confidential Information*. At any time upon the request of the Disclosing Party, the Receiving Party shall promptly return to the Disclosing Party any of the Disclosing Party's Confidential Information (other than Jointly-Owned Developed Technology) responsive to such request, including all copies thereof, except to the extent that retention of one copy of such Confidential Information is reasonably necessary for the Receiving Party to fulfill its obligations contemplated hereby or exercising its rights under this Agreement. At the Disclosing Party's written request, the Confidential Information that is otherwise required to be returned to the Disclosing Party shall be destroyed and such destruction shall be certified in writing to the Disclosing Party by an authorized officer of the Receiving Party. The return and/or destruction of such Confidential Information as provided above shall not relieve the Receiving Party of its other obligations under this Agreement.

Section 6.4 *Publicity; Press Releases*. The Parties agree that the terms and existence of this Agreement are the Confidential Information of all of the Parties and shall not be disclosed to any third party without the prior written consent of the other Party. No Party shall issue any press releases or similar public communication relating to this Agreement, the Products or any Information developed hereunder without the prior written consent of the other Party, which consent shall not be unreasonably withheld or delayed.

ARTICLE 7
REPRESENTATIONS, WARRANTIES AND COVENANTS

Section 7.1 *Representations and Warranties of OpGen*. OpGen hereby represents, warrants, and covenants to HHT as follows:

(a) *Existence and Power*. OpGen is a corporation duly organized, validly existing, and in good standing under the laws of the State of Delaware, and has full corporate power and authority and legal right to own and operate its property and assets and to carry on its business as it is now being conducted and as contemplated in this Agreement, including the right to grant the licenses granted by it hereunder.

(b) *Authority and Binding Agreement*. As of the Effective Date, (i) OpGen has taken all necessary action on its part required to authorize the execution and delivery of this Agreement and the performance of its obligations hereunder, and (ii) this Agreement has been duly executed and delivered on behalf of OpGen, and constitutes a legal, valid and binding obligation of OpGen that is enforceable against it in accordance with its terms.

(c) *No Conflict*. OpGen is not a party to and will not enter into any agreement that would materially prevent it from granting the rights granted to HHT under this Agreement or performing its obligations under this Agreement.

(d) *Title*. As of the Effective Date, OpGen has sufficient legal and/or beneficial title, ownership or license, free and clear from any mortgages, pledges, liens, security interests, conditional and installment sale agreements, encumbrances, charges or claims of any kind, of the OpGen Intellectual Property to grant the licenses to HHT pursuant to this Agreement.

(e) *Actions*. To the best of OpGen's knowledge after due inquiry, there are no actions, proceedings or litigation pending, threatened or anticipated in any court of law or governmental agency which would affect the validity, enforceability or ownership of any of the OpGen Intellectual Property.

(f) *Notice of Infringement or Misappropriation; Non-Infringement of Third Party Rights*. As of the Effective Date, OpGen has not received any written notice from any third party asserting or alleging that any research or development of any OpGen Intellectual Property prior to the Effective Date infringed or misappropriated the intellectual property rights of such third party. As of the Effective Date, to the best of OpGen's knowledge, the research, development, use and sale of the Products can be reasonably carried out without infringing any patents reasonably expected to be enforceable, or published patent applications reasonably expected to issue and be enforceable, in each case owned or controlled by a third party.

(g) *Employee Invention Agreements*. OpGen's employees, consultants and subcontractors who are employed to do research, development or other inventive work in connection with OpGen Intellectual Property are subject to agreements providing for the assignment of all interest in such work and intellectual property to OpGen. During the Term of this Agreement, OpGen shall cause its employees, consultants and subcontractors who are employed to do research, development or other inventive work in connection with the Collaboration to be bound by an agreement providing for the assignment of all interest in such work and resulting intellectual property to OpGen.

(h) *No Reverse Engineering*. OpGen shall not, during the Term or after its expiration reverse engineer, disassemble, decompile, or otherwise manipulate any HHT Technology in an attempt to derive the source code thereof.

Section 7.2 *Representations and Warranties of HHT*. Each of HHT hereby represents, warrants, and covenants to OpGen as follows:

(a) *Existence and Power*. HHT is a corporation duly organized, validly existing, and in good standing under the laws of Japan, and has full corporate power and authority and legal right to own and operate its property and assets and to carry on its business as it is now being conducted and as contemplated in this Agreement, including the right to grant the licenses granted by it hereunder.

(b) *Authority and Binding Agreement.* As of the Effective Date, (i) HHT has taken all necessary action on its part required to authorize the execution and delivery of this Agreement and the performance of its obligations hereunder, and (ii) this Agreement has been duly executed and delivered on behalf of HHT, and constitutes a legal, valid and binding obligation of HHT that is enforceable against it in accordance with its terms.

(c) *No Conflict*. HHT is not a party to and will not enter into any agreement that would materially prevent it from granting the rights granted to OpGen under this Agreement or performing its obligations under this Agreement.

(d) *Title*. As of the Effective Date, HHT has sufficient legal and/or beneficial title, ownership or license, free and clear from any mortgages, pledges, liens, security interests, conditional and installment sale agreements, encumbrances, charges or claims of any kind, of the HHT Intellectual Property to grant the licenses to OpGen pursuant to this Agreement.

(e) *Actions*. To the best of HHT's knowledge after due inquiry, there are no actions, proceedings or litigation pending, threatened or anticipated in any court of law or governmental agency which would affect the validity, enforceability or ownership of any of the HHT Intellectual Property.

(f) *Notice of Infringement or Misappropriation; Non-Infringement of Third Party Rights*. As of the Effective Date, HHT has not received any written notice from any third party asserting or alleging that any research or development of any HHT Intellectual Property prior to the Effective Date infringed or misappropriated the intellectual property rights of such third party. As of the Effective Date, to the best of HHT's knowledge, the research, development, use and sale of the Products can be reasonably carried out without infringing any patents reasonably expected to be enforceable, or published patent applications reasonably expected to issue and be enforceable, in each case owned or controlled by a third party.

(g) *Employee Invention Agreements*. HHT's employees, consultants and subcontractors who are employed to do research, development or other inventive work in connection with HHT Intellectual Property are subject to agreements providing for the assignment of all interest in such work and intellectual property to HHT, as applicable. During the Term of this Agreement, HHT shall cause its employees, consultants and subcontractors who are employed to do research, development or other inventive work in connection with the Collaboration to be bound by an agreement providing for the assignment of all interest in such work and resulting intellectual property to HHT, as applicable.

(h) *No Reverse Engineering*. HHT shall not, during the Term or after its expiration reverse engineer, disassemble, decompile, or otherwise manipulate any OpGen Technology or any Software Deliverable in an attempt to derive the source code thereof (except as expressly permitted in Section 4.4(c).

Section 7.3 *Disclaimer*. EXCEPT AS SET FORTH IN THIS ARTICLE 7 OF THIS AGREEMENT OR IN ANY EXHIBIT HERETO, NO PARTY MAKES ANY REPRESENTATIONS AND WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nothing contained in this Agreement shall be construed as a warranty on the part of any Party that any results will be achieved while performing the product development activities hereunder or that the Products are or will be commercially exploitable.

Section 7.4 *Non-Solicitation of Employees*. Each Party agrees that during the Term of this Agreement, and for a period of twelve (12) months after the termination hereof, each Party shall not, directly or indirectly, without the prior written consent of the other Party, hire or attempt to hire any employee of or applicable consultant to such other Party or solicit, induce or attempt to induce any person that is an employee of or applicable consultant to such other Party at the time of such termination, or during the ninety (90) days immediately preceding such termination, to terminate his or her employment or consulting arrangement with such other Party. The term "applicable consultant" means an independent contractor specifically retained by a Party to assist such Party in the activities associated with this Agreement. General advertising performed by one Party and not specifically directed at employees of or consultants to another Party shall not be deemed a violation of this Section 7.4.

Section 7.5 *Publications*. OpGen shall have the sole right to publish any findings related to the Product development efforts with HHT's prior written consent, which such consent shall not be unreasonably withheld or delayed. For purposes of this Agreement, "publish" means scientific and scholarly publications, journal articles, abstracts, conference presentations and similar written materials. HHT shall have the right to review any such publication prior to submission for publication or other first public use. At least sixty (60) days prior to presenting or submitting for publication any such materials, OpGen shall provide HHT with a complete copy of the proposed publication. HHT shall review any such publication and provide its comments to OpGen promptly, but in any event within thirty (30) days after receiving such publication for review. OpGen shall comply with HHT's request to delete HHT's Confidential Information from any such publication. OpGen shall not name HHT in any such publication without HHT's prior written consent.

Section 7.6 *Insurance*. Each Party will keep in full force and effect during the Term: (a) comprehensive general liability insurance in an amount not less than $1 million per occurrence for bodily injury and property damage, (b) workers' compensation insurance in an amount not less than that required by applicable law, and (c) professional liability and errors and omission liability insurance covering acts, errors, omissions arising out of insured's negligence in an amount not less than $2 million per occurrence.

ARTICLE 8
TERM AND TERMINATION

Section 8.1 *Term*. This Agreement shall commence as of the Effective Date and shall continue, unless earlier terminated in accordance with the provisions hereof, until December 31, 2015 (the "Term"). The Term can be extended by mutual agreement of the Parties.

Section 8.2 *Material Breach*. If either Party commits a material breach with respect to its performance or obligations under this Agreement, the non-breaching Party shall give the breaching Party written notice of such breach. The breaching Party shall have thirty (30) days to cure such breach. If such breach is not cured within such thirty (30) days, the non-breaching Party shall have the right, upon notice to the breaching Party and without prejudice to any other rights the non-breaching Party may have, to terminate this Agreement unless the breaching Party is in the process of attempting in good faith to remedy such default, in which case the non-breaching Party may extend the thirty (30) days cure period by an additional thirty (30) days by providing the breaching party with written notice thereof.

Section 8.3 *Termination Upon Completion of a Project Milestone*. Beginning with Project Milestone I.E., following completion of each Project Milestone and payment of the corresponding Milestone Payment, each of OpGen and HHT shall have the option, in its sole discretion, to terminate this Agreement by delivering written notice thereof to the other Party within ten (10) Business Days after the receipt of such Milestone Payment if such Party determines, in its sole discretion, that the continued Collaboration is not likely to result in Products that are or will be commercially exploitable.

Section 8.4 *Insolvency or Bankruptcy*. OpGen or HHT may, in addition to any other remedies available to it by law or in equity, terminate this Agreement by written notice to such other Party in the event the other Party shall have become insolvent (i.e., that Party is unable to pay its debts incurred in the ordinary course of business as they become due) or shall have made an assignment for the benefit of its creditors, or there shall have been appointed a trustee or receiver for such other Party or for all or a substantial part of its property, or any case or proceeding shall have been voluntarily initiated by, or commenced against, or other action taken by or against, such other Party in bankruptcy or seeking reorganization, liquidation, dissolution, winding up, arrangement, composition or readjustment of its debts or any other relief under any bankruptcy, insolvency, reorganization or other similar act or law of any jurisdiction now or hereafter in effect.

Section 8.5 *Termination by HHT Upon Change in Control of OpGen*. In the event: (i) that OpGen transfers and assigns this Agreement to a third party in a merger, consolidation, reorganization, or sale of assets; (ii) there is a transfer in the beneficial ownership of OpGen's outstanding voting securities representing fifty percent (50%) or more of the combined voting power of OpGen (in a single transaction or series of transactions) to a third party not previously a shareholder of OpGen prior to such transaction(s); or (iii) of any other change in control transaction (a "Change in Control Transaction"), HHT shall have the right, in its discretion, for no more than thirty (30) days following the consummation of such Change in Control Transaction, to terminate this Agreement with immediate effect upon written notice to OpGen. OpGen shall provide written notice to HHT promptly upon the closing of any Change in Control Transaction.

Section 8.6 *Effect of Termination*. Termination or expiration of this Agreement for any reason shall not release any Party from any liability or obligation that already has accrued prior to such expiration or termination, nor affect the survival of any provision hereof to the extent it is expressly stated to survive such termination. Except as otherwise set forth in this Agreement, upon termination of this Agreement, all obligations of the Parties under this Agreement shall immediately cease and be of no further force and effect.

Section 8.7 *Rights to HHT Upon Certain Termination Events*. In case of termination of this Agreement by OpGen pursuant to Section 8.3 or by HHT pursuant to Section 8.2, Section 8.4 or Section 8.5, HHT shall automatically, without the need for any further action by OpGen, acquire: [* * *]. Any royalty required under clause (d) shall be commercially reasonable for the Intellectual Property licensed, and OpGen shall use its commercially reasonable efforts to assist HHT in the finalization of any such license.

Section 8.8 *Survival*. Notwithstanding anything else to the contrary in this Agreement, Article 4 (Intellectual Property Provisions), Article 6 (Confidentiality), Article 7 (Representations, Warranties and Covenants), Article 9 (Indemnification) and Article 10 (Miscellaneous), and Section 2.2 (Steering Committee), Section 5.5 (Records Retention; Audit), Section 8.6 (Effect of Termination), Section 8.7 (Rights to HHT Upon Certain Termination Events), and this Section 8.8 shall survive the termination or expiration of this Agreement for any period set forth therein, or if none, perpetually.

ARTICLE 9
INDEMNIFICATION

Section 9.1 *Limitation of Liability*. No Party shall be liable to the other for indirect, incidental, punitive, special, exemplary or consequential damages arising out of any of the terms and conditions of this Agreement or with respect to their performance or lack thereof.

Section 9.2 *Indemnification by OpGen*. OpGen shall defend, indemnify, and hold HHT, its Affiliates, and their respective officers, directors, employees, and agents (the "HHT Indemnitees") harmless from and against any and all damages or other amounts payable to a third party claimant (including reasonable attorneys' fees and costs of litigation) all to the extent resulting from claims, suits, proceedings or causes of action brought by such third party against such HHT Indemnitee based on or alleging: (a) a material breach of any of OpGen's representations, warranties, or obligations under this Agreement; and (b) the willful misconduct or grossly negligent acts of OpGen or its employees in connection with the conduct of the activities under this Agreement. The foregoing indemnity obligation shall not apply if the HHT Indemnitees materially fail to comply with the indemnification procedures set forth in Section 9.4, or to the extent that such claim is based on or alleges: (i) a material breach of any of HHT's representations, warranties, or obligations under the Agreement; or (ii) the willful misconduct or grossly negligent acts of HHT or its employees.

Section 9.3 *Indemnification by HHT*. HHT shall defend, indemnify, and hold OpGen, its Affiliates, and their respective officers, directors, employees, and agents (the "OpGen Indemnitees") harmless from and against any and all damages or other amounts payable to a third party claimant (including reasonable attorneys' fees and costs of litigation) all to the extent resulting from claims, suits, proceedings or causes of action brought by such third party against such OpGen Indemnitee based on or alleging: (a) a material breach of any of HHT's representations, warranties, or obligations under this Agreement; and (b) the willful misconduct or grossly negligent acts of HHT or its employees in connection with the conduct of the activities under this Agreement. The foregoing indemnity obligation shall not apply if the OpGen Indemnitees materially fail to comply with the indemnification procedures set forth in Section 9.4, or to the extent that such Claim is based on or alleges: (i) a material breach of any of OpGen's representations, warranties, or obligations under the Agreement; or (ii) the willful misconduct or grossly negligent acts of OpGen or its employees.

Section 9.4 *Indemnification Procedures*. The Party claiming indemnity under this Article 9 (the "Indemnified Party") shall give written notice to the Party from whom indemnity is being sought (the "Indemnifying Party") promptly after learning of the claim, suit, proceeding or cause of action for which indemnity is being sought (a "Claim"). The Indemnified Party shall provide the Indemnifying Party with reasonable assistance, at the Indemnifying Party's expense, in connection with the defense of the Claim for which indemnity is being sought. The Indemnified Party may participate in and monitor such defense with counsel of its own choosing at its sole expense which shall not be subject to indemnification; *provided*, *however*, that the Indemnifying Party shall have the right to assume and conduct the defense of the Claim with counsel of its choice. The Indemnifying Party shall not settle any Claim without the prior written consent of the Indemnified Party, not to be unreasonably withheld. So long as the Indemnifying Party is actively defending the Claim in good faith, the Indemnified Party shall not settle any such Claim without the prior written consent of the Indemnifying Party. If the Indemnifying Party does not assume and conduct the defense of the Claim as provided above, (a) the Indemnified Party may defend against, and consent to the entry of any judgment or enter into any settlement with respect to the Claim in any manner the Indemnified Party may deem reasonably appropriate (and the Indemnified Party need not consult with, or obtain any consent from, the Indemnifying Party in connection therewith), and (b) the Indemnifying Party will remain responsible to indemnify the Indemnified Party as provided in this Article 9.

ARTICLE 10
MISCELLANEOUS

Section 10.1 *Dispute Resolution*. The Parties agree that the following dispute resolution process shall be the only authorized forum for the resolution of disputes between the Parties arising under this Agreement. Except with respect to Section 4.3(d), any dispute, controversy or claim arising out of or related to this Agreement, including the interpretation, execution, breach or termination hereof, or related to the activities of the Parties hereunder shall be brought to the attention of the Steering Committee, which shall attempt in good faith to achieve a resolution. OpGen or HHT may convene a special meeting of the Steering Committee for the purpose of resolving disputes. If the Steering Committee is unable to resolve any dispute within twenty (20) Business Days after the first presentation of such dispute to the Steering Committee, or if the dispute originated in the Steering Committee, such dispute shall be referred to the Chief Executive Officers of each of the Parties (or their respective designees) who shall use their good faith efforts to mutually agree upon the proper course of action to resolve the dispute. If any dispute is not resolved by the Chief Executive Officers of the Parties (or their designees) within twenty (20) Business Days after such dispute is referred to them, the exclusive forum for the resolution of the dispute shall be arbitration as follows: at the request of one of the Parties, the dispute will be submitted to binding arbitration administered by the International Chamber of Commerce by one or more arbitrators appointed in accordance with the ICC Rules of Arbitration then in effect. If the request for arbitration is made by OpGen, then the arbitration will occur in Tokyo, Japan. If the request for arbitration is made by HHT, then the arbitration will occur in Washington, D.C., USA. The arbitrator's award will be final and binding on the Parties. While the dispute resolution process is in effect with respect to any issue(s), the Parties shall continue to perform all activities of the Collaboration unrelated to the issue(s) in dispute, unless otherwise determined by the Steering Committee. In any such proceeding between the Parties, the prevailing party shall be entitled to reimbursement of its attorneys' fees and arbitration costs.

Section 10.2 *Governing Law; Binding Effect.* This Agreement shall be governed by, and construed in accordance with, the laws of the State of New York without regards to its conflicts of law principles. This Agreement shall be binding upon, and inure to the benefit of, the Parties and their successors and permitted transferees and assigns.

Section 10.3 *Entire Agreement.* This Agreement sets forth the complete, final and exclusive agreement between the Parties with respect to the subject matter hereof and supersedes all prior agreements and understandings between the Parties with respect thereto. There are no covenants, promises, agreements, warranties, representations, conditions or understandings, either oral or written, between the Parties other than as are set forth herein.

Section 10.4 *Amendment.* No subsequent amendment, modification or change to this Agreement shall be binding upon the Parties unless set forth in a written agreement executed by each of the Parties.

Section 10.5 *Force Majeure*. Each of the Parties shall be excused from the performance of its obligations under this Agreement to the extent that such performance is prevented by an act of force majeure and the nonperforming Party promptly provides notice of the prevention to the other Party. Such excuse shall be continued so long as the condition constituting force majeure continues and the nonperforming Party takes reasonable efforts to remove the condition. For purposes of this Agreement, "force majeure" shall mean conditions beyond the control of the Parties, including an act of God, war, civil commotion, terrorist act, labor strike or lock-out, epidemic, failure or default of public utilities or common carriers, destruction of production facilities or materials by fire, earthquake, storm or like catastrophe, and failure of plant or machinery (provided that such failure could not have been prevented by the exercise of skill, diligence, and prudence that would be reasonably and ordinarily expected from a skilled and experienced person engaged in the same type of undertaking under the same or similar circumstances). Notwithstanding the foregoing, a Party shall not be excused from making payments owed hereunder because of a force majeure affecting such Party.

Section 10.6 *Notice*. Any notice required or permitted to be given under this Agreement shall be in writing, shall specifically refer to this Agreement, and shall be addressed to the appropriate Party at the address specified below or such other address as may be specified by such Party in writing in accordance with this Section 10.6, and shall be deemed to have been given for all purposes (a) when received, if hand-delivered or sent by a reputable overnight or express mail delivery service or (b) on the date sent by facsimile or e-mail (with confirmation of transmission) if sent during normal business hours of the recipient.

If to OpGen:

OpGen, Inc.
708 Quince Orchard Road
Gaithersburg, Maryland 20878
Attention:
Facsimile:
E-mail:

with a copy to:

Ballard Spahr LLP
1735 Market Street, 51st Floor
Philadelphia, PA 19103
Attention: Mary J. Mullany
Facsimile: (215) 864-8999
E-mail: mullany@ballardspahr.com

If to HHT:

c/o Hitachi High Technologies America, Inc.
1065 East Hillsdale Boulevard, Suite 225
Foster City, California 94404
Attention: Director, Life Science Division
E-mail:

with a copy to

Andrew S. Gelb
Senior Vice President & General Counsel
Hitachi High Technologies America, Inc.
5960 Inglewood Drive, Suite 200
Pleasanton, California 94588

Section 10.7 *Assignment*. Neither Party may assign or transfer this Agreement or any rights or obligations hereunder without the prior written consent of the other Party, except that a Party may make such an assignment without the other Party's consent to Affiliates, and either Party may, without the other Party's consent, assign and/or transfer this Agreement to a third party that is successor in interest to its business pursuant to a merger, consolidation, sale of substantially all of its assets or other change in control transaction, provided, that, such Party provides prior written notice to the other Party. Any permitted successor or assignee of rights and/or obligations hereunder shall, in a writing to the other Party, expressly assume performance of such rights and/or obligations (and in any event, any Party assigning this Agreement to an Affiliate shall remain bound by the terms and conditions hereof). Any assignment or attempted assignment by any Party in violation of the terms of this Section 10.7 shall be of no legal effect.

Section 10.8 *Construction; Headings*. This Agreement has been prepared jointly and shall not be strictly construed against any Party. Ambiguities, if any, in this Agreement shall not be construed against any Party, irrespective of which Party may be deemed to have authored the ambiguous provision. The heading of each Article and Section in this Agreement have been inserted for convenience of reference only and are not intended to limit or expand on the meaning of the language contained in the particular Article.

Section 10.9 *Severability*. If any one or more of the provisions of this Agreement is held to be invalid or unenforceable by a court of competent jurisdiction from which no appeal can be or is taken, the provision shall be considered severed from this Agreement and shall not serve to invalidate any remaining provisions hereof. The Parties shall make a good faith effort to replace any invalid or unenforceable provision with a valid and enforceable one such that the objectives contemplated by the Parties when entering this Agreement may be realized.

Section 10.10 *Waiver*. Any delay in enforcing a Party's rights under this Agreement or any waiver as to a particular default or other matter shall not constitute a waiver of such Party's rights to the future enforcement of its rights under this Agreement, except with respect to an express written and signed waiver relating to a particular matter for a particular period of time.

Section 10.11 *Independent Contractors*. Each Party shall act solely as an independent contractor, and nothing in this Agreement shall be construed to give any Party the power or authority to act for, bind, or commit any other Party in any way. Nothing herein shall be construed to create the relationship of partners, principal and agent, or joint-venture partners between the Parties.

Section 10.12 *Further Actions*. Each Party agrees to execute, acknowledge and deliver such further instruments, and to do all such other acts, as may be necessary or appropriate in order to carry out the purposes and intent of this Agreement.

Section 10.13 *Counterparts; Electronic Signature*. This Agreement may be executed in one (1) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. A signed copy of this Agreement delivered by facsimile, e-mail or other means of electronic transmission shall be deemed to have the same legal effect as delivery of an original signed copy of this Agreement.

Section 10.14 *Section 365(n)*. The Intellectual Property licensed under this Agreement is covered by Section 365(n) of the U.S. Bankruptcy Code. Upon a Party's filing for bankruptcy under the U.S. Bankruptcy Code, the non-filing Party may elect to retain its rights to the licensed Intellectual Property.

[Signature page follows]

IN WITNESS WHEREOF, each Party has caused this Agreement to be executed by its duly authorized representative as of the Effective Date.

OPGEN, INC.

By: /s/ C. Douglas White
Name: C. Douglas White
Title: President

HITACHI HIGH-TECHNOLOGIES CORPORATION

By: /s/ Takashi Matsuzaka
Name: Takashi Matsuzaka
Title: Senior Vice President and Executive Officer, CTO

EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [* * *] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

EXHIBIT A
Project Milestones

Technology Development Milestones	**Milestone Payment**
Phase I: Analytical Pipeline Development	
Milestone I. A: [* * *]	$[* * *]
Milestone I. B: [* * *]	$[* * *]
Milestone I. C: [* * *]	$[* * *]
Milestone I. D: [* * *]	$[* * *]
Milestone I. E: [* * *]	$[* * *]
Milestone I. F: [* * *]	$[* * *]
Milestone I. G: [* * *]	$[* * *]
Milestone I. H: [* * *]	$[* * *]
Phase II: Graphing/Computational Frameworks*	
Milestone II. A: [* * *]	$[* * *]
Milestone II. B: [* * *]	$[* * *]
Phase III: Human Chromosome Mapping Applications Development	
Milestone III. A: [* * *]	$[* * *]
Milestone III. B: [* * *]	$[* * *]
Milestone III. C: [* * *]	$[* * *]
Milestone III. D: [* * *]	$[* * *]
Milestone III. E: [* * *]	$[* * *]

***** Phase II milestones may require in-kind algorithm development support from HHT or a third party service provider. If a third party service provider is required to provide such algorithm development support, additional costs of up to $[* * *] are estimated for OpGen's completion of the Phase II Project Milestones. Accordingly, in such event, the corresponding Milestone Payments shall be increased by the additional costs incurred by OpGen after approval by the Development Committee.

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EXHIBIT B

Development Plan

To be attached hereto and incorporated herein pursuant to Section 2.3(d).

EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [* * *] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

EXHIBIT C

Terms Applicable to Commercialization

[* * *]

EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [* * *] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

FIRST ADDENDUM TO TECHNOLOGY DEVELOPMENT AGREEMENT

This First Addendum to Technology Development Agreement ("Addendum"), dated March 27, 2014 (the "Addendum Effective Date"), is by and between OpGen, Inc., a Delaware corporation having its principal office at 708 Quince Orchard Rd., Gaithersburg, Maryland 20878 ("OpGen") and Hitachi High-Technologies Corporation, a Japan corporation having its principal place of business at 24-14, Nishi-Shimbashi, 1-chome, Minato-ku, Tokyo 105-8717, Japan ("HHT"), and amends the development work scope and terms of the Technology Development Agreement dated September 25, 2013, by and between OpGen and HHT (the "Development Agreement"). OpGen and HHT are individually referred to as a "Party" and collectively as the "Parties" to this Addendum. All capitalized terms used in this Addendum without definition have the meanings set forth in the Development Agreement.

1. Background

The Parties have determined that it would be advantageous to the human chromosome mapping ("HCM") Products being developed under the Development Agreement to incorporate OpGen's web-enabled MapSolver™ ("Web MapSolver") software application as one of the potential interfaces for the HCM data for eventual deployment in the Hitachi cloud. This Addendum defines the additional scope of work required to deliver a modified Web MapSolver to HHT for use in connection with the developed HCM Products (hereinafter "HCM-MapSolver"), and sets forth the associated license grant to HCM-MapSolver.

2. HCM-MapSolver Development.

(a) Scope of Work. Following the Addendum Effective Date, OpGen shall perform the "scope of work" activities related to HCM-MapSolver as set forth on Appendix 1 to this Addendum.

(b) Milestones. Milestone 1 of the HCM-MapSolver project is set forth on Appendix 1. OpGen estimates that Milestone 1 will be completed within **[* * *]** following the Addendum Effective Date. The Development Committee will promptly establish any future milestones required for the development work, and the timeline and financial requirements for such additional milestone deliverables. Such additional milestones, including timetable and payments shall be added to Appendix 1 upon completion. OpGen shall be under no obligation to provide the license to HCM-MapSolver until all development activities, milestones, timeline and financial provisions are completed as set forth in Appendix 1.

(c) Development Scope of Work Exclusions and Limitations. The estimated development budget to complete the HCM-MapSolver Milestone 1 development is US**[* * *]**. Such scope of work and cost budget excludes customized features which may be defined or specified by HHT as development proceeds, or following initial deployment of HCM-MapSolver. Additional HHT features beyond the scope of work can be defined by the Parties for potential development by OpGen at additional cost to HHT.

3. HCM-MapSolver License Provisions

Upon completion of the HCM-MapSolver development work in accordance with Appendix 1 (as may be amended from time to time by the Parties), OpGen shall add the HCM-MapSolver as "OpGen Developed Technology" licensed to HHT under Article 4 of the Development Agreement., subject to the financial provisions in Section 4 below.

4. Financial Provisions

(a) The payment terms set forth in Section 5.2 and 5.4 of the Development Agreement shall apply to the following payments under this Addendum:

(1) the payment of **[* * *]** sum as partial payment, of the HCM-MapSolver development fee and for the initial HCM-MapSolver Development Plan, upon execution of this Addendum.

(2) the payment of **[* * *]** sum as the Milestone 1 payment including the licensing fee upon delivery and HHT's acceptance of the Milestone 1 deliverables as set forth on Appendix 1.

(b) The Parties shall negotiate payment terms for a separate licensing fee of **[* * *]** for the further use or license of HCM-MapSolver as part of the commercialization agreements contemplated by Section 3.6(a) of Development Agreement. The separate licensing fee may be structured as an up-front royalty payment and/or running royalties.

5. Status of Development Agreement

Except as otherwise provided in this Addendum, all terms and conditions of the Development Agreement remain in full force and effect as set forth therein. In the event of a conflict between the Development Agreement and this Addendum, this Addendum shall control. Each Party hereto represents to the other that it has the full authority to execute, deliver and perform this Addendum in accordance with its terms.

[Signatures on the following page.]

IN WITNESS WHEREOF, the Parties hereto have duly executed this Addendum on the dates indicated below.

HITACHI HIGH-TECHNOLOGIES CORPORATION

By:	/s/ Takashi Matsuzaka	Date:	March 31, 2014
Name:	Takashi Matsuzaka		
Title:	Senior Vice President and Executive Officer, CTO		

OPGEN, INC.

By:	/s/ C. Eric Winzer	Date:	March 27, 2014
Name:	C. Eric Winzer		
Title:	CFO		

Appendix 1
HCM-MapSolver Scope of Work Specifications

HCM-MapSolver Scope

This provides a high-level description of the basic features from Design Specification of HCM-MapSolver Version 1.0

[* * *]

HCM-MapSolver for the Hitachi Cloud Deliverables

OpGen will deliver the HCM-MapSolver Development Plan. OpGen will deliver a set of executables and requisite binaries in support of the combined baseline functionality described above. OpGen will provide documentation to support installation and operation of HCM-MapSolver. Together, these deliverables comprise Milestone 1 of the HCM-MapSolver for the Hitachi Cloud project.

HCM-MapSolver Development Cost and Timeline

OpGen will invoice HHT for **[* * *]** upon execution of this Addendum as described in Section 4 of this Addendum. OpGen will deliver the HCM-MapSolver Development Plan upon its execution of this Addendum. OpGen will invoice HHT for **[* * *]** upon completion and HHT's acceptance of Milestone 1, which will include the limited license for HCM-MapSolver for the Hitachi Cloud in the Field. OpGen estimates the completion of Milestone 1 to be **[* * *]** from the beginning of the development effort. A more accurate timeline will be established and presented to the Development Committee once the project is implemented.

EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [* * *] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

FLUIDIGM CORPORATION

SUPPLY AGREEMENT
(Consumables)

This Supply Agreement (the "**Agreement**") is effective as of the 17th day of March, 2014 (the "**Effective Date**") by and between Fluidigm Corporation, a Delaware corporation with its principal place of business at 7000 Shoreline Court, Suite 100, South San Francisco, California 94080 ("**Fluidigm**") and OpGen, Inc., a Maryland corporation with its principal place of business at 708 Quince Orchard Rd, Gaithersburg, MD ("**Buyer**"). Buyer and Fluidigm are sometimes referred to herein individually as a "**Party**" and collectively as the "**Parties**."

Background

A. Fluidigm manufactures, markets and sells certain chip, reagent, and other consumable products listed in Exhibit A; and

B. Buyer wishes to purchase from Fluidigm, and Fluidigm wishes to sell to Buyer, such products for Buyer's internal use, all pursuant to the terms and conditions of this Agreement.

Now, Therefore, for good and valuable consideration, the Parties hereby agree as follows:

Agreement

1. **Definitions**

1.1. "**Affiliate**" means, for an entity ("Entity"), any other entity that is Controlled by, Controls, or is under common Control of, that Entity, but only so long as such Control exists, where "Control" (including "Controlled" and other forms) of an entity means (i) beneficial ownership (whether direct, or indirect through Controlled entities or other means) of more than fifty percent (50%) of the outstanding voting securities of that entity; or (ii) having the contractual power (directly or indirectly) presently to designate more than fifty percent (50%) of the directors of a corporation, or in the case of unincorporated entities, of individuals exercising similar functions. (By way of example only, an entity has indirect Control of a Controlled subsidiary of its Controlled subsidiary.)

1.2. "**Products**" means the consumables products listed in Exhibit A.

2. Product Ordering and Purchases.

2.1. Forecast and Orders. All orders for Products submitted by Buyer shall be initiated by written purchase orders sent to Fluidigm requesting a delivery date during the term of this Agreement. To facilitate Fluidigm's production scheduling, Buyer shall submit purchase orders for Products to Fluidigm in accordance with Fluidigm's then current lead time for that Product. No order shall be binding upon Fluidigm until accepted by Fluidigm in writing, and Fluidigm shall have no liability to Buyer with respect to purchase orders that are not accepted. Fluidigm shall notify Buyer of the acceptance or rejection of an order and of the assigned ship date for accepted orders within ten (10) days of receipt of the purchase order. No partial shipment of an order shall constitute the acceptance of the entire order, absent the written acceptance of such entire order.

2.2. Prices and Payment. Product prices are set forth in Exhibit A (Quotation #Q-04985 rev1. Fluidigm will invoice Buyer at the time of shipment of each Product. Buyer shall make payment in full within thirty (30) days of the date of the invoice.

2.3. Terms of Sale. The "Fluidigm Sales Terms and Conditions" (OpGen Ts&CsDec2013) attached hereto as Exhibit B shall apply to the purchase and sale of Products under this Agreement. In the event of any conflict between the body of this Agreement and Exhibit B, the body of this Agreement shall govern. All sales are for Buyer's internal use and not for resale to any other person or entity.

2.4. Safety Stock. To help ensure that Buyer has an adequate supply of Products, both Buyer and Seller shall, at their own expense, establish and maintain at respective facilities a safety stock of Products, as follows. Subject only to the time required to replenish its safety stock after a withdrawal or due to a change in the required quantity, both Parties shall maintain a safety stock equal to at least **[* * *]** of the aggregate total of Products purchased by Buyer from Fluidigm during the preceding three (3) full calendar months. Both will rotate stock using FIFO (first in, first out) method to ensure proper inventory shelf-life. Buyer will use its own safety stock when encountering significant delay in order fulfillment by Seller.

3. CONFIDENTIAL INFORMATION

3.1. General. Any and all information disclosed or submitted in writing or in other tangible form to one Party by the other Party in connection with this Agreement and identified in writing as confidential at the time of disclosure shall hereinafter be referred to as the "**Confidential Information**" of the disclosing Party. Confidential Information may also include oral information disclosed by one Party to the other, and information disclosed visually (e.g., as a result of access to the other Party's premises or property), provided that such information is designated as confidential at the time of disclosure or access and reduced to a written summary by the disclosing Party, within thirty (30) days after its disclosure, which is marked in a manner to indicate its confidential nature and delivered to the receiving Party. Neither Party shall disclose any Confidential Information of the other Party or to any third party. Neither Party shall use the Confidential Information of the other Party for any purpose other than as required to perform obligations or exercise its rights hereunder. Each Party may disclose the other Party's Confidential Information to the receiving Party's Affiliates requiring access thereto for the purposes of this Agreement, *provided, however*, that prior to making any such disclosures, each such Affiliate shall be informed of the obligation and agree to maintain Confidential Information in confidence and not to use such information for any purpose other than in accordance with the terms and conditions of this Agreement. Each Party agrees that this Agreement shall be binding upon its Affiliates and each Party shall take steps reasonably necessary to ensure that its Affiliates shall comply with the terms and conditions of this Agreement. The foregoing obligations of confidentiality and non-use shall survive until three (3) years after the termination or expiration of this Agreement.

3.2. Exclusions from Nondisclosure Obligation. The nondisclosure and nonuse obligations in Section 3.1 shall not apply to any Confidential Information to the extent that the receiving Party can establish that the Confidential Information:

3.2.1. at the time of disclosure is in the public domain;

3.2.2. alter disclosure, becomes part of the public domain by publication or otherwise, except by breach of this Agreement by the receiving Party;

3.2.3. was in the receiving Party's possession or was known by the receiving Party, in each case without confidentiality restriction, at the time of disclosure;

3.2.4. is received by the receiving Party, without confidentiality restriction, from a third party who has the lawful right to disclose the Confidential Information;

3.2.5. is independently developed or discovered by or on behalf of the receiving Party without any aid, application or use of or access to the Confidential Information of the other Party; or

3.2.6. was or is disclosed generally to third parties by the disclosing Party without restrictions similar to those contained in this Agreement.

3.3. Required Disclosures. Nothing herein shall prevent a Party from disclosing any Confidential Information of the other Party that is required to be disclosed pursuant to an applicable law or regulation or the valid order of a court of competent jurisdiction, provided that the Party obligated to make such disclosure (a) shall give advance written notice to the other Party, (b) at the other Party's expense, shall reasonably cooperate in the other Party's effort to restrict or prevent such disclosure, and (c) shall disclose the Confidential Information solely to the extent required by the law, regulation, or order.

3.4. Return of Confidential Information. Promptly after the termination or expiration of this Agreement for any reason, each Party shall return to the other Party all tangible manifestations of such other Party's Confidential Information at that time in the possession of the receiving Party, except (i) as reasonably required to exercise any post-termination rights and (ii) one copy may be retained for archival purposes only. Nothing in this Section 3.4 shall require a Party to remove from electronic files existing manifestations of the other Party's Confidential Information that cannot be practicably recovered; however obligations of non-disclosure and non-use shall be and remain in effect, surviving termination of this Agreement.

4. Term and Termination

4.1. Term. This Agreement shall continue in full force and effect until twelve (12) months after the Effective Date unless and until terminated as set forth in this Agreement.

4.2. Material Breach. Each Party may terminate this Agreement upon written notice if the other Party (or any of its Affiliates) commits a material breach of this Agreement and does not correct such breach within forty-five (45) days after receiving written notice thereof, provided that the correction period for non-payment shall be ten (10) days instead of forty-five (45) days.

4.3. Bankruptcy. Either Party may terminate this Agreement effective upon written notice to the other Party (i) in the event that the other Party becomes the subject of a voluntary petition in bankruptcy or any voluntary proceeding relating to insolvency, or composition for the benefit of creditors, or (ii) in the event of an involuntary such petition or proceeding if that petition or proceeding is not dismissed within sixty (60) days after filing.

4.4. Survival. Any payment obligations accruing prior to any termination or expiration of this Agreement for any reason shall survive any such termination or expiration. In addition, the following sections shall survive and remain in full force and effect after any termination or expiration of this Agreement: Sections 3, 4.4, 5 and 6. Accepted orders outstanding as of the effective date of termination shall remain in effect and subject to the terms and conditions of this Agreement, provided that the terminating Party under Section 4.2 or 4.3 may, on notice to the other Party on or before ten (10) days after the effective date of termination, terminate any or all of such orders.

5. Limitation of Liability

IN NO EVENT SHALL FLUIDIGM'S AGGREGATE LIABILITY ARISING OUT OF OR IN CONNECTION WITH THIS AGREEMENT EXCEED THE AMOUNTS RECEIVED BY FLUIDIGM UNDER THIS AGREEMENT. IN NO EVENT SHALL FLUIDIGM BE LIABLE FOR ANY COSTS OF SUBSTITUTE PRODUCTS OR SERVICES OR FOR ANY LOST PROFITS OR SPECIAL, CONSEQUENTIAL, INDIRECT, OR INCIDENTAL DAMAGES (INCLUDING LOSS OF PROFITS, LOSS OF SALES, LOSS OF REVENUE, LOSS OR WASTE OF MANAGEMENT OR STAFF TIME), HOWEVER CAUSED, ON ANY THEORY OF LIABILITY AND WHETHER OR NOT FLUIDIGM HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, ARISING IN ANY WAY OUT OF OR IN CONNECTION WITH THIS AGREEMENT. THESE LIMITATIONS SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

6. Miscellaneous

6.1. Waiver; Amendment. The failure of either Party to enforce its rights under this Agreement at any time for any period shall not be construed as a waiver of such rights. Further, no changes or modifications or waivers can be made to this Agreement unless evidenced in writing and signed by both Parties.

6.2. Severability. If any provision of this Agreement shall be determined to be unenforceable, all other provisions shall remain in full force and effect, the affected provision shall be construed so as to be enforceable to the maximum extent possible, and the Parties shall negotiate and substitute a suitable and equitable provision in order to carry out, so far as may be valid and enforceable, the intent and purpose of such unenforceable provision.

6.3. Assignment. Neither Party shall assign, transfer, subdivide or otherwise deal with any obligations or benefit under this Agreement without the prior written consent of the other Party, provided that either Party may freely assign this Agreement to a successor to all or substantially all of its relevant assets, whether by sale, merger, or otherwise. Any attempted assignment in violation of this section shall be null and void.

6.4. Governing Law; Arbitration. This Agreement shall be governed by and construed in accordance with the laws of the State of California without regard to any conflicts of laws provisions. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Agreement. All disputes arising out of this Agreement shall be finally resolved by arbitration in accordance with the arbitration procedure set forth in Exhibit B.

6.5. Force Majeure. Neither Party shall be liable for any failure to perform any term or condition of this Agreement to the extent performance has been delayed, hindered or prevented by fire, earthquake, flood, compliance with requirements of any governmental authority, or by any other circumstances beyond its reasonable control.

6.6. Notices. Except as otherwise set forth in this Agreement, any notice required or permitted under this Agreement or required by law must be in writing and must be (i) delivered in person, (ii) sent by registered or certified mail, (iii) sent by overnight air courier, (iv) sent by email, or (v) sent by facsimile, in each case properly posted and fully prepaid to the appropriate address set forth in the table below.

If to Buyer:	If to Fluidigm:
OpGen, Inc. 708 Quince Orchard Road Gaithersburg, MD 20878	Fluidigm Corporation 7000 Shoreline Court, Suite 100 South San Francisco, California 94080
Attention: Telephone: email: Facsimile:	Attention: General Counsel Telephone: email: Facsimile:

Notices under this section will be considered to have been given at the time of actual personal delivery in person, three (3) calendar days (excluding Saturdays, Sundays and public holidays in the United States) after deposit in the mail as set forth above, one day after delivery to an overnight air courier service, upon transmission if by email, or upon confirmed transmission if by facsimile. Either Party may change its address or facsimile number for notification purposes by giving the other Party written notice of the new address or facsimile number in accordance with this section.

6.7. Relationship of Parties. The relationship between the Parties will be that of independent contractors. Each Party shall not represent itself as the agent or legal representative of the other Party for any purpose whatsoever, and shall have no right to create or assume any obligation of any kind, express or implied, for or on behalf of the other Party in any way whatsoever. This Agreement will not create or be deemed to create any agency, partnership or joint venture between the Parties.

6.8. Entire Agreement. This Agreement, and all exhibits attached hereto, constitutes the entire understanding and contract between the Parties and supersedes any and all prior and contemporaneous, oral or written representations, communications, understandings, term sheets, and agreements between the Parties with respect to the subject matter hereof. The Parties acknowledge and agree that neither of the Parties is entering into this Agreement on the basis of any representations or promises not expressly contained herein. This Agreement shall exclusively govern the ordering, purchase, and supply of the Products, and shall nullify any conflicting, amending, and/or additional terms contained in any purchase orders, invoices, or similar documents, which are hereby rejected and shall be null and void.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the dates set forth below effective as of the Effective Date.

BUYER

By: /s/ C. E. Winzer
Name: C. Eric Winzer
Title: Chief Financial Officer
Date: March 31, 2014

FLUIDIGM CORPORATION

By: /s/ Gajus V. Worthington
Name: Gajus V. Worthington
Title: CEO
Date: 31st Mar. 2014

EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [* * *] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

Exhibit A

Products and Prices

Quotation #Q-04985—rev 1

See attached

EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [* * *] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

Sales Quotation **Tax ID #**

SHIP TO: Materials Manager
OpGen
708 Quince Orchard Rd
Gaithersburg, MD 20878

PLEASE REFERENCE QUOTE NUMBER ON PURCHASE ORDER

PHONE:
FAX:
EMAIL:

QUOTE NO: **Q-04985**
QUOTE DATE: 3/20/2014
VALID THROUGH: 3/31/2015
PAYMENT TERMS: N30

FREIGHT TERMS: FOB Origin, PPD&ADD
CURRENCY: USD

FLUIDIGM CONTACT:
CONTACT EMAIL:
CONTACT PHONE:

This quotation corresponds to the Supply Agreement between OpGen, Inc. & Fluidigm Corp.
Quantities below will be scheduled for quarterly shipments of 60 chips.

Note: Line items 2 & 3 represent alternatives based upon assay chemistry
[* * *]

Item #	Product Name	Product Description	QTY	Unit List Price	Offer Price	Extended Price
[* * *]	[* * *]	[* * *]	[* * *]	[* * *]	[* * *]	[* * *]
[* * *]	[* * *]	[* * *]	[* * *]	[* * *]	[* * *]	[* * *]
[* * *]	[* * *]	[* * *]	[* * *]	[* * *]	[* * *]	[* * *]
[* * *]	[* * *]	[* * *]	[* * *]	[* * *]	[* * *]	[* * *]
					Items TOTAL:	[* * *]

CUSTOM ASSAY JOB IDs (if applicable):

Please Note:
Supply agreement requires that both OpGen & Fluidigm (Buyer & Seller) each maintain an additional Safety inventory equal to [* * *] of quarterly projection [* * *] to assure continuous supply.

- Prices do not include any applicable sales tax, consumption tax, import duties or VAT.
- Pricing only valid upon receipt of total order.
- Purchase order may not differ materially from the items listed in this quotation.
- Optional Items are available at an additional cost.
- This quotation subject to acceptance of attached Sales Terms and Conditions.
- Fluidigm, the “F” logo, BioMark, TOPAZ, Dynamic Array, and Digital Array are trademarks or registered trademarks of Fluidigm Corporation in the U.S. and/or other countries.
- Installation service performed by a Fluidigm representative is recommended.

Please email your order, indicating the quotation number, to **salesadmin@fluidigm.com** or fax it to **Order Administration**: 1.650.589.2548. Contact your sales representative with any questions regarding this quotation.

Exhibit B

Fluidigm Sales Terms and Conditions

FLUIDIGM CORPORATION SALES TERMS AND CONDITIONS for OPGEN, INC.
Effective December 26, 2013

1. General. These Fluidigm Corporation ("Fluidigm") Sales Terms and Conditions, all Addenda attached hereto, if any, and the accompanying Sales Quote, if any (collectively, the "Agreement") shall exclusively govern Fluidigm's sale and license of certain integrated fluidic circuits (with or without carriers, collectively known as "CHIPs"), instruments, software and reagents and other products, if any ("Products") and provision of certain services relating thereto, if any ("Services"), to the purchaser ("Buyer") - all as described on Fluidigm's or its representative's Sales Quote. If Buyer's order of Products is deemed an offer, Fluidigm's acceptance is expressly conditional on Buyer's acceptance of these terms (except non-preprinted quantity, price and payment terms in the Sales Quote); if these terms are deemed an offer by Fluidigm, Buyer's acceptance is expressly limited to these terms. Any additional or different terms or conditions (preprinted or otherwise) proposed by Buyer shall not become part of this Agreement. If a purchase order or other form containing terms and conditions is used by Buyer, Fluidigm objects to any proposed changes hereto. Fluidigm may substitute or modify Products provided they comply with applicable Fluidigm specifications. All listed prices and specifications are subject to change without notice, except as set forth in Section 2 below. All reorders of Products hereunder are subject to acceptance by Fluidigm.

2. Price. The price(s) for the Products will be those listed on the accompanying Sales Quote and expire on the date specified on the Sales Quote. If the Sales Quote does not include price(s) for the Products or if such price(s) have expired, the price(s) for the Products shall be their total cost increased by the gross margin percentage of the applicable product class for the previous fiscal year. Except as otherwise stated on the accompanying Sales Quote or agreed in writing between Fluidigm and Buyer: (i) prices for shipments within the continental U.S. and Canada exclude all insurance, freight, taxes, fees, duties and levies, which shall be payable by Buyer; and (ii) prices for shipments outside the continental U.S. and Canada exclude all overseas (*e.g.*, non-U.S.) insurance, freight, taxes, fees, duties and levies, which shall be payable by Buyer. Without limiting the foregoing, Products shipped within the U.S. and Canada shall otherwise be FOB (California Commercial Code) origin and to all other destinations shall otherwise be CIP (Incoterms 2010) destination chosen solely by Fluidigm, with Buyer being the importer for the Products and responsible for paying the import VAT or similar tax(es) levied outside the U.S., including within Buyer's country.

3. Delivery. Products will be packed in Fluidigm's standard packaging or as Fluidigm otherwise deems suitable. Stated shipping dates are approximate. Fluidigm or its representative may make partial deliveries or delivery in installments, and each installment shall be deemed to be a separate sale. For each installment, Fluidigm may render a separate invoice, which shall be paid without regard to prior or subsequent installments. Fluidigm or its representative will ship via the carrier selected by Fluidigm or its representative to any Buyer address shown on the front of the Sales Quote. If shipment is delayed at Buyer's request, Buyer will reimburse Fluidigm for all costs of storage, if any.

4. Acceptance. All Products shall be conclusively and irrevocably deemed accepted without qualification by Buyer upon delivery. Buyer, however, will notify Fluidigm or its representative in writing of any nonconformity to Fluidigm's extant specifications promptly after delivery, describing the nonconformity in detail. By accepting Products, Buyer acknowledges that Products are provided as follows: For Research Use Only. Not for use in diagnostic procedures.

5. Payment. Buyer will be invoiced at the time of shipment of each Product. Except as otherwise agreed by Fluidigm in writing, payment shall be made in full within thirty (30) days of the date of the invoice. Payments for Products are not subject to Buyer's inspection or acceptance of the Products. Late payments shall incur a charge at the rate of [* * *] per month, or the maximum allowed by law, whichever is less. Further shipment of Products may be declined if Buyer fails to make any payment when due, or if the financial condition of Buyer becomes unsatisfactory to Fluidigm. Payments on sales by Fluidigm shipped outside the U.S. must be made on a clean, irrevocable letter of credit issued by a bank acceptable to Fluidigm, which must be issued within ten (10) days of placement of any order and provide for draws upon presentation of Fluidigm's invoice and without any other condition upon Fluidigm or the bank upon which such letter is drawn.

6. Unforeseen Events. Fluidigm shall not be liable for delay or failure in performance of any obligations hereunder if performance is rendered impracticable by the occurrence of any condition beyond Fluidigm's reasonable control. In the event of any such delay or failure in performance, Fluidigm shall have such additional time within which to perform its obligations hereunder as may reasonably be necessary under the circumstances and Fluidigm shall have the right, to the extent necessary in Fluidigm's sole judgment, to apportion the Products then available for delivery among its various customers in such manner as Fluidigm may consider appropriate.

7. Restrictions. Buyer agrees that it will use the Products provided hereunder only in the ordinary course of Buyer's normal internal research and development activities and will ensure that no other person or entity uses such Products for any other purpose. Except to the extent such restrictions are prohibited by applicable law, Buyer agrees not to: (i) transfer (including but not limited to resell, donate, or loan) a CHIP or other Products to any third party; or (ii) reverse engineer, adapt or modify any Product. Buyer agrees that it will not export or transfer for re-export in violation of any United States laws or the laws of any other jurisdiction, or to any denied or prohibited person, entity or embargoed country in violation of such laws. In the event of any ambiguity in applying this Section 7, the burden shall be on Buyer to reasonably demonstrate compliance with the terms herein. Except as may be set forth, with respect to standard laboratory tools and equipment ancillary to use of such Product, in the extant applicable Fluidigm protocol for use of a Product, each Product may be used only with other Fluidigm Products. For example and without limitation, Fluidigm CHIPs may not be used with any non-Fluidigm reader, and Fluidigm readers may not be used with any chip other than Fluidigm CHIPs. Fluidigm CHIPs are SINGLE USE ONLY and MAY NOT BE REUSED unless otherwise specifically authorized in writing by Fluidigm. Further restrictions may apply; for details, please see any label license accompanying Products.

8. LIMITED LICENSE. EXCEPT AS EXPRESSLY SET FORTH HEREIN, NO RIGHT TO COPY, MODIFY, DISTRIBUTE, MAKE DERIVATIVE WORKS OF, PUBLICLY DISPLAY, MAKE, HAVE MADE, OFFER TO SELL, SELL, USE OR IMPORT CHIPS OR ANY OTHER PRODUCT IS CONVEYED OR IMPLIED WITH THE CHIPS, INSTRUMENTS, SOFTWARE, REAGENTS OR ANY OTHER ITEMS PROVIDED HEREUNDER. ALL PRODUCTS (INCLUDING THE CHIPS, INSTRUMENTS, SOFTWARE, AND REAGENTS) DELIVERED HEREUNDER ARE LICENSED TO BUYER FOR RESEARCH USE ONLY IN BUYER'S NORMAL COURSE OF BUSINESS. THIS LIMITED LICENSE PERMITS ONLY THE USE BY BUYER OF THE PARTICULAR PRODUCT(S), IN COMPLIANCE WITH APPLICABLE LAWS AND IN A MANNER NOT VIOLATIVE OF ANY THIRD PARTY RIGHTS, IN ACCORDANCE WITH THE WRITTEN INSTRUCTIONS PROVIDED THEREWITH, THAT BUYER PURCHASES FROM FLUIDIGM OR ITS AUTHORIZED REPRESENTATIVE. EXCEPT AS SPECIFIED IN FLUIDIGM PROTOCOLS, THE PURCHASE OF ANY PRODUCT(S) DOES NOT BY ITSELF CONVEY OR IMPLY THE RIGHT TO USE SUCH PRODUCT(S) IN COMBINATION WITH ANY OTHER PRODUCT(S). IN PARTICULAR, (i) NO RIGHT TO MAKE, HAVE MADE OR DISTRIBUTE OTHER INSTRUMENTS AND SOFTWARE IS CONVEYED OR IMPLIED BY THE PURCHASE OR USE OF THE CHIPS, (ii) NO RIGHT TO MAKE, HAVE MADE, IMPORT, DISTRIBUTE, OR USE CHIPS IS CONVEYED OR IMPLIED BY THE PURCHASE OR USE OF INSTRUMENTS OR SOFTWARE, AND (iii) EXCEPT IN ACCORDANCE WITH FLUIDIGM PROTOCOLS, NO RIGHT TO USE CHIPS IN COMBINATION WITH INSTRUMENTS OR SOFTWARE IS CONVEYED UNLESS ALL COMPONENT PARTS HAVE BEEN PURCHASED FROM FLUIDIGM OR ITS AUTHORIZED REPRESENTATIVE. FURTHERMORE, CHIPS DELIVERED HEREUNDER ARE LICENSED FOR ONE (1) TIME USE ONLY AND MAY NOT BE REUSED UNLESS OTHERWISE SPECIFICALLY AUTHORIZED IN WRITING BY FLUIDIGM. The Products are marketed for research use only and do not have clearance or approval from the U.S. Food and Drug Administration ("FDA") or other regulatory approval for in vitro diagnostic ("IVD") use. No license is conveyed or implied for the Buyer to use such Products for IVD use.

9. Limited Warranty. Fluidigm warrants to and only to Buyer for thirteen (13) months from the date of shipping that the software and instruments are free from defects in material and workmanship, and conform to Fluidigm's published specifications at the time of purchase in all material respects. Service will be provided pursuant to Fluidigm's standard service terms. Fluidigm's sole and exclusive liability (and Buyer's sole and exclusive remedy) under the foregoing warranty shall be for Fluidigm to repair or replace software and instruments or provide Buyer a refund, as solely determined by Fluidigm. Nonconforming instruments will be serviced at Buyer's facility or, at Fluidigm's option, Fluidigm's facility. If service is performed at Fluidigm's facility, Fluidigm will bear shipping costs. This warranty does not apply to any Product to which any of the following apply, i.e., the warranty for any such Product unit shall be void: a) failure to provide a suitable storage, use, or operating environment; b) use of non-recommended reagents; c) use of the Products for a purpose or in a manner other than that for which they were designed; d) modifications or repairs done by Buyer; or e) any other abuse, misuse, or neglect of the Products, including without limitation the use of the Product with any item other than Fluidigm chips and Products (except as may be set forth in the extant applicable Fluidigm protocol for use of a Product, with associated standard laboratory tools and equipment ancillary to use of such Product). For example, use of a Fluidigm reader with non-Fluidigm CHIPs voids the warranty for that reader, unless specifically authorized in writing by Fluidigm. This warranty applies only to Buyer and not third parties. Buyer acknowledges that failure to comply with any restriction of use set forth herein will (i) constitute a breach of these Terms and Conditions, (ii) invalidate any warranty provided herein and any applicable service agreement, and (iii) may constitute a violation or infringement of Fluidigm's and/or a third party's intellectual property rights. TO THE EXTENT PERMITTED BY APPLICABLE LAW, FLUIDIGM, ITS SUPPLIERS AND ITS REPRESENTATIVES DISCLAIM ALL OTHER REPRESENTATIONS AND WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO PRODUCTS AND SERVICES, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, SATISFACTORY QUALITY, NON-INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE.

10. Liability Limitation. EXCEPT TO THE EXTENT (i) CAUSED BY FLUIDIGM'S GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, OR (ii) REQUIRED BY APPLICABLE LAW, FLUIDIGM AND ITS REPRESENTATIVES SHALL HAVE NO LIABILITY FOR (A) ANY LOSS OF USE, PROFITS, REVENUE, GOODWILL, BUSINESS, OR OTHER FINANCIAL LOSS, (B) COSTS OF SUBSTITUTE GOODS OR SERVICES, OR (C) ANY LOST PROFITS, INDIRECT, CONSEQUENTIAL, INCIDENTAL, OR SPECIAL DAMAGES OF ANY KIND, HOWEVER CAUSED AND REGARDLESS OF FORM OF ACTION WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT PRODUCT LIABILITY OR OTHERWISE, EVEN IF FLUIDIGM OR ITS REPRESENTATIVE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN ADDITION, FLUIDIGM'S LIABILITY SHALL NOT EXCEED THE AMOUNT PAID BY BUYER TO FLUIDIGM IN THE PRIOR TWELVE (12) MONTHS. BUYER UNDERSTANDS THAT THE RISKS OF LOSS HEREUNDER ARE REFLECTED IN THE PRICE OF THE PRODUCTS AND THAT THESE TERMS WOULD HAVE BEEN DIFFERENT IF THERE HAD BEEN A DIFFERENT ALLOCATION OF RISK.

11. Intellectual Property. Except to the extent prohibited by applicable law, Fluidigm shall retain all ownership of its intellectual property rights with respect to the Products. Except to the extent prohibited by applicable law, Buyer grants Fluidigm, with the right to sublicense, a non-exclusive, fully paid-up, royalty-free, worldwide, irrevocable, perpetual license to make, have made, use, import, offer to sell or sell any Product Improvement Inventions when used in conjunction with any products sold by or on behalf of Fluidigm. "Product Improvement Inventions" shall mean all inventions conceived or reduced to practice using Products that relate to the (a) use (*e.g*., protocols; cell culture and analysis methods; and nucleic acid amplification, barcoding, and assays), design, manufacturing, layout and packaging of any Products; (b) interfaces between any Products and other devices, such as optical/detection systems, fluidic systems, material extraction systems, and robotics for use in connection with any Products; or (c) automated analysis techniques (*e.g.*, computers, software, etc.) relating to the extraction of data from any Products and storing/analyzing such data, for example, in a computer file or other storage media. Product Improvement Inventions shall not include data resulting from using Products (i.e., results of assays using Products, provided that "Product Improvement Inventions" shall include all data pertaining to the Products or their development, design, use, or manufacture) or discoveries derived from such data (provided that "Product Improvement Inventions" shall include all discoveries pertaining to the Products or their development, design, use, or manufacture). Training provided by Fluidigm representatives on Products is subject to copyright and other protections under 17 U.S.C. § 101 *et seq*. and their international equivalents. Buyer agrees not to reproduce training sessions in whole or in part.

12. Indemnification. Buyer shall indemnify, defend, and hold Fluidigm harmless from and against any and all losses, damages and expenses (including reasonable attorneys' fees and other costs of defending any action) that Fluidigm may incur as a result of Buyer's use or resale or other transfer (authorized or unauthorized) of Products or by reason of Buyer's breach of or failure to perform any of its obligations hereunder. Buyer shall fully cooperate with Fluidigm in any investigation relating to any such claims and, at no charge to Fluidigm, make available to Fluidigm all related statements, reports and tests available to Buyer.

13. Arbitration. Fluidigm and Buyer agree that any dispute or controversy arising out of or in connection with this Agreement shall be finally settled by binding arbitration under the extant rules of the International Centre for Dispute Resolution, by one (1) arbitrator appointed in accordance with such rules. For sales originating in Asia, the venue of any such arbitration shall be Singapore; for sales originating in Europe, the venue of any such arbitration shall be Amsterdam, Netherlands; and for sales originating in all other regions, the venue of arbitration shall be San Francisco, California. The arbitration shall be conducted in English, and any written evidence originally in a language other than English shall be submitted in English translation accompanied by the original or a true copy thereof. The decision and/or award rendered by the arbitrator shall be written, final and non-appealable, and the parties agree that the decision and/or award of the arbitrator shall be the sole, exclusive and binding remedy between them regarding any and all disputes, controversies, claims and counterclaims properly before the arbitrator. The parties agree that, any provision of applicable law notwithstanding, they will not request, and the arbitrator shall have no authority to award, punitive or exemplary damages against any party. The costs of any arbitration, including administrative fees and fees of the arbitrator, shall be shared equally by the parties, and each party shall bear the cost of its own attorneys' and expert fees, provided that the arbitrator may at his or her discretion award to the prevailing party the costs and expenses incurred by the prevailing party in connection with the arbitration proceeding. The decision and/or award of the arbitrator may be entered in any court of competent jurisdiction for a judicial recognition of the decision and applicable orders of enforcement (which may include, without limitation, permanent injunctive relief or orders for specific performance or for equitable relief), and either party may apply to any court of competent jurisdiction for appropriate restraining orders or temporary injunctive relief pending resolution of any arbitration proceeding. For avoidance of doubt, any such equitable remedies shall be cumulative and not exclusive and are in addition to any other remedies which either party may have under this Agreement or applicable law.

14. Miscellaneous. This Agreement (including any accompanying Sales Quote) constitutes the entire agreement between Buyer and Fluidigm with respect to the subject matter hereof and is the final, complete, and exclusive statement of the terms of the Agreement, superseding all prior written and oral agreements, understandings and undertakings. This Agreement shall exclusively govern the ordering, purchase, and supply of the Products, and shall override any conflicting, amending, and/or additional terms contained in any purchase orders, invoices, or similar documents, which are hereby rejected and shall be null and void. Fluidigm's failure to object to any such terms shall not constitute a waiver by Fluidigm, nor constitute acceptance by Fluidigm of such terms and conditions. Modifications may be made only in writing and signed by an authorized corporate officer of Fluidigm. The waiver of any term or condition or any breach thereof shall not affect any other term or condition of this Agreement. This Agreement shall be governed by and construed according to the laws of California, without regard to conflict-of-law provisions. Buyer may not assign this Agreement, and any change of control of Buyer shall be deemed to be an assignment. In any legal action commenced to enforce or interpret this Agreement, the prevailing party shall be entitled to reasonable attorneys' fees and expenses. Subject to filling any orders that have been accepted by Fluidigm, Fluidigm may terminate this Agreement without cause upon thirty (30) days written notice. Sections 6 through 14 (inclusive) and all attached Addenda, if any, shall survive termination. Time is not of the essence for Fluidigm's obligations herein. In the event that any provision of this Agreement or portion thereof is found to be illegal or unenforceable, the Agreement shall be construed without the unenforceable provision or portion thereof. Products may be covered by and/or sold under one or more U.S. or other patents licensed from third parties, including without limitation the California Institute of Technology, The Regents of the University of California, and/or The President and Fellows of Harvard College. FLUIDIGM, the "F" logo, and related logos are trademarks or registered trademarks of Fluidigm in the U.S. and/or other countries.

[Revised 26DEC2013AF]

NOTES PURCHASE AGREEMENT

THIS NOTES PURCHASE AGREEMENT, is made as of February 11, 2015 (the "**Agreement**"), by and among OpGen, Inc., a Delaware corporation (the "**Company**"), and the Investors listed on Exhibit A attached to this Agreement (each an "**Investor**" and together the "**Investors**"). Certain capitalized terms used in this Agreement are set forth in Section 1.5.

W I T N E S S E T H

WHEREAS, the Company desires to sell to the Investors, and the Investors desire to purchase from the Company, on the terms and conditions set forth in this Agreement, Secured Convertible Promissory Notes in the aggregate principal amount of $1,500,000 (the "**Financing**"), having the rights, preferences, privileges and restrictions set forth in the form(s) of Secured Convertible Promissory Notes attached to this Agreement as Exhibit B (the "**Notes**").

WHEREAS, the Notes are convertible (i) at the option of the holder, into shares of the Company's common stock, par value $0.01 per share (the "**Common Stock**"), at any time after the closing of a QPO (as defined below); (ii) at the option of the holder, into either (a) shares of the Common Stock, or (b) shares of the Company's Series A Convertible Preferred Stock, par value $0.01 per share (the "**Series A Preferred Stock**"), at a conversion rate of 1 share for each $1.00 of principal amount remaining, at any time after the closing of an initial public offering that is not a QPO; or (iii) at the option of the holder, into shares of the Series A Preferred Stock at a conversion rate of 1.25 shares for each $1.00 of principal amount remaining, if no initial public offering has been consummated; provided, however, and notwithstanding the foregoing, if an initial public offering is not consummated on or before June 30, 2015, then the Notes shall only be convertible pursuant to clause (iii) for so long as the Notes remain outstanding.

WHEREAS, if an initial public offering is not consummated on or before June 30, 2015, each Note will thereafter only be convertible, as long as the Notes remain outstanding, at the option of the holder, into shares of the Series A Preferred Stock at a conversion rate of 1.25 shares for each $1.00 of principal amount remaining.

WHEREAS, the Series A Preferred Stock has the rights, preferences, privileges and restrictions set forth in the Ninth Amended and Restated Certificate of Incorporation (the "**Restated Certificate**").

NOW, THEREFORE, in consideration of the foregoing recitals and the mutual promises hereinafter set forth, the parties, intending to be legally bound, hereby agree as follows:

1. Purchase and Sale of Notes.

1.1 Purchase and Issuance of Notes. Subject to the terms and conditions of this Agreement, each Investor agrees to purchase at the Closing and the Company agrees to sell and issue to each Investor at the Closing, a Note in the principal amount set forth opposite each Investor's name on Exhibit A attached hereto (each such amount, the "**Purchase Price**").

1.2 Issuance of Warrants. As additional consideration for the Investors to participate in the Financing, each Investor also will receive from the Company a Warrant to purchase Common Stock substantially in the form attached hereto as Exhibit D (each, a "**Warrant**," and, collectively, the "**Warrants**"), which Warrant will permit such Investor to acquire a number of shares of the Common Stock equal to fifteen percent (15%) of the principal amount of such Investor's Note divided by $1.00 if an initial public offering is consummated.

1.3 Closing; Delivery.

(a) The purchase and sale of the Notes and Warrants shall take place either remotely via the exchange of documents and signatures or at the offices of Ballard Spahr LLP, 1735 Market Street, 51st Floor, Philadelphia, PA 19103, at 10:00 a.m. on the date above first written or at such other date and time or such other place as the Company and Investors who have agreed to purchase a majority of the aggregate principal Notes listed on Exhibit A mutually agree, orally or in writing (which time and place are designated as the "**Initial Closing**"). The date on which the Initial Closing occurs is the "**Initial Closing Date**."

(b) At any time or from time to time on or before the 30th day following the Initial Closing (each such date, an "**Additional Closing Date**"), the Company may sell Notes and Warrants to certain existing stockholders of the Company in accordance with the purchase rights granted to such stockholders in the Investors' Rights Agreement among the Company and the investor signatories thereto. The Company will provide notice of the sale of the Notes and Warrants to all Investors under the Investors' Rights Agreement in accordance with Section 4.1(e) thereof as promptly as possible, but no later than three days after the Initial Closing Date. All such sales made to any Investor who complies with the notice requirement of Section 4.1(e) of the Investors' Rights Agreement at any additional closings (each an "**Additional Closing**") shall be made on the same terms and conditions set forth in this Agreement, except that the representations and warranties of the Company set forth in Section 2 hereof (and the Disclosure Schedule) shall speak as of the Initial Closing Date, and the representations and warranties of the additional purchasers in Section 3 hereof shall speak as of such Additional Closing Date on which they purchase Notes.

(c) Any Notes and Warrants sold pursuant to Section 1.3(b) shall be deemed to be "Notes" and "Warrants," as applicable, for all purposes under this Agreement, any purchasers thereof shall be deemed to be "Investors" for all purposes under this Agreement, in each case without any further action by the parties hereto. Each of the Initial Closing and any Additional Closings may hereinafter be separately referred to as a "**Closing**," and each of the Initial Closing Date and any Additional Closing Date may hereinafter be separately referred to as a "**Closing Date**."

(d) At each Additional Closing, each purchaser who agrees to purchase Notes and Warrants will execute a Joinder Agreement, pursuant to which such purchaser agrees to become a party hereto as an Investor hereunder and to be subject to the terms and conditions hereof.

(e) At each Closing, the Company shall issue to each Investor the Note and Warrant being purchased by such Investor at such Closing against payment of the Purchase Price therefor by check payable to the Company or by wire transfer to a bank account designated by the Company. jVen Capital, LLC ("**jVen**"), in its sole discretion, may tender to the Company principal and interest due to jVen under that certain Secured Demand Note in the principal amount of $300,000 from the Company to jVen, dated as of January 22, 2015, as partial satisfaction of payment of the Purchase Price of any Notes and Warrants that jVen purchases hereunder.

1.4 Use of Proceeds. In accordance with the directions of the Board of Directors, the Company will use the proceeds from the sale of the Notes and Warrants for working capital and other general corporate purposes.

1.5 Defined Terms Used in this Agreement. In addition to the terms defined above, the following terms used in this Agreement shall have the meanings set forth or referenced below.

(a) "**Affiliate**" means, with respect to any specified Person, any other Person who, directly or indirectly, controls, is controlled by, or is under common control with such Person, including, without limitation, any general partner, managing member, officer or director of such Person or any venture capital fund now or hereafter existing that is controlled by one or more general partners or managing members of, or shares the same management company with, such Person.

(b) "**Amended and Restated Intercreditor Agreement**" means the Amended and Restated Intercreditor Agreement, dated as of the date hereof, by and among Harris & Harris Group, Inc. ("**H&H**"), both as the collateral agent under the Convertible Notes Security Agreement (as defined in the Intercreditor Agreement) and as the collateral agent under the Demand Notes Security Agreement (as defined in the Intercreditor Agreement), each of the Secured Parties (as defined in the Intercreditor Agreement) and the Company, substantially in the form attached hereto as Exhibit I.

(c) "**Certificate of Amendment**" means the Certificate of Amendment to the Restated Certificate, attached hereto as Exhibit C.

(d) "**Code**" means the Internal Revenue Code of 1986, as amended.

(e) "**Common Stock**" means the common stock, par value $0.01 per share, of the Company.

(f) "**Company Intellectual Property**" means all patents, patent applications, trademarks, trademark applications, service marks, service mark applications, trade names, copyrights, trade secrets, domain names, mask works, information and proprietary rights and processes, similar or other intellectual property rights, subject matter of any of the foregoing, tangible embodiments of any of the foregoing, licenses in to and under any of the foregoing, and any and all such cases as are necessary to the Company in the conduct of the Company's business as now conducted and as presently proposed to be conducted.

(g) "**Indemnification Agreements**" means the agreements between the Company and (i) the director previously designated by any Investor entitled to designate a member of the Board of Directors pursuant to the Voting Agreement and (ii) the director designated by H&H pursuant to the Voting Agreement.

(h) "**Intercreditor Agreement**" means that certain Intercreditor Agreement, dated as of October 30, 2014, by and among H&H, both as the collateral agent under the Convertible Notes Security Agreement (as defined in the Intercreditor Agreement) and as the collateral agent under the Demand Notes Security Agreement (as defined in the Intercreditor Agreement), each of the Secured Parties (as defined in the Intercreditor Agreement) and the Company, as amended by the Amended and Restated Intercreditor Agreement.

(i) "**Investor**" means each of the Investors who is initially a party to this Agreement and any additional investor who becomes a party to this Agreement.

(j) "**Investors' Rights Agreement**" means the Third Amended and Restated Investors' Rights Agreement, dated December 18, 2013, among the Company and the investors signatory thereto, as amended by the Stockholders' Agreements Amendment and the Second Stockholders' Agreements Amendment.

(k) "**Key Employee**" means any executive-level employee (including division directors and vice president-level positions) as well as any employee or consultant who either alone or in concert with others develops, invents, programs or designs any Company Intellectual Property.

(l) "**Knowledge**," including the phrase "**to the Company's knowledge**," shall mean the actual knowledge of Evan Jones, C. Eric Winzer, Vadim Sapiro, David Hoekzema and Terrance Walker.

(m) "**Material Adverse Effect**" means a material adverse effect on the business, assets (including intangible assets), liabilities, financial condition, property, or results of operations of the Company.

(n) "**Person**" means any individual, corporation, partnership, trust, limited liability company, association or other entity.

(o) "**QPO**" means the closing of the sale of shares of Common Stock to the public at a price per share of at least $4.00 (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock), in a firm-commitment underwritten public offering pursuant to an effective registration statement under the Securities Act resulting in at least $30,000,000 of proceeds, net of the underwriting discount and commissions, to the Company, as this definition may be amended from time to time in an amendment or amendment and restatement of the Restated Certificate.

(p) "**Right of First Refusal Agreement**" means the Third Amended and Restated Right of First Refusal and Co-Sale Agreement, dated December 18, 2013, among the Company and the investors signatory thereto, as amended by the Stockholders' Agreements Amendment and the Second Stockholders' Agreements Amendment.

(q) "**Securities**" means the Notes and the Warrants and any and all securities issuable upon conversion or exercise of the Notes or the Warrants and the conversion of any such securities.

(r) "**Securities Act**" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

(s) "**Security Agreement**" means the Security Agreement by and among the Company and the holders of the Notes dated as of the date hereof and attached hereto as Exhibit E.

(t) "**Stockholders' Agreements Amendment**" means that certain Stockholders' Agreements Amendment, dated July 11, 2014, by and among the Company and the investors signatory thereto.

(u) **"Second Stockholders' Agreements Amendment"** means the Second Stockholders' Agreements Amendment among the Company and the investors signatory thereto, dated February 7, 2015 and attached hereto as Exhibit F.

(v) "**Series A Convertible Notes**" means the existing notes, convertible into Series A Preferred Stock, issued in July through September 2014.

(w) "**Voting Agreement**" means the Third Amended and Restated Voting Agreement, dated December 18, 2013, among the Company and the investors signatory thereto, as amended by Amendment No. 1 dated February 19, 2014 and as further amended by the Stockholders' Agreements Amendment and the Second Stockholders' Agreements Amendment.

2. Representations and Warranties of the Company. The Company hereby represents and warrants to each Investor that, except as set forth on the Disclosure Schedule attached as Exhibit G to this Agreement, which exceptions shall be deemed to be part of the representations and warranties made hereunder, the following representations are true and complete as of the Initial Closing Date, except as otherwise indicated. The Disclosure Schedule shall be arranged in sections corresponding to the numbered and lettered sections and subsections contained in this Section 2, and the disclosures in any section or subsection of the Disclosure Schedule shall qualify other sections and subsections in this Section 2 only to the extent it is readily apparent from a reading of the disclosure that such disclosure is applicable to such other sections and subsections.

2.1 Organization, Good Standing, Corporate Power and Qualification. The Company is a corporation duly organized, validly existing and in good standing under the laws of the State of Delaware and has all requisite corporate power and authority to carry on its business as presently conducted and as proposed to be conducted. The Company is duly qualified to transact business and is in good standing in each jurisdiction in which the failure to so qualify would have a Material Adverse Effect.

2.2 Capitalization.

(a) The authorized capital of the Company, upon the filing of the Certificate of Amendment, shall consist of:

(1) 10,000,000 shares of Common Stock. Immediately prior to the Initial Closing, 493,483 shares of Common Stock are issued and outstanding. All of the outstanding shares of Common Stock have been duly authorized, are fully paid and non-assessable and were issued in compliance with all applicable federal and state securities laws. The Company holds no shares of Common Stock in treasury.

(2) 7,500,000 shares of Preferred Stock, all of which have been designated Series A Preferred Stock. Immediately prior to the Initial Closing, 3,999,864 shares of Series A Preferred Stock are issued and outstanding, and 1,500,000 shares of Series A Preferred Stock are reserved for conversion of the outstanding Series A Convertible Notes. All of the outstanding shares of Series A Preferred Stock have been duly authorized, are fully paid and non-assessable and were issued in compliance with all applicable federal and state securities laws. The rights, privileges and preferences of the Series A Preferred Stock are as stated in the Restated Certificate and as provided by the general corporation law of the jurisdiction of the Company's incorporation. The Company holds no shares of Preferred Stock in treasury.

(b) Immediately prior to the Initial Closing, the Company has reserved 1,447,485 shares of Common Stock for issuance to officers, directors, employees and consultants of the Company pursuant to its 2008 Stock Option and Restricted Stock Plan, as amended, duly adopted by the Board of Directors and approved by the Company stockholders (the "**Stock Plan**"). Of such reserved shares of Common Stock, options to purchase 1,239,493 shares have been granted and are currently outstanding, and 207,992 shares of Common Stock remain available for issuance to officers, directors, employees and consultants pursuant to the Stock Plan. The Company has made available to the Investors complete and accurate copies of the Stock Plan and forms of agreements used thereunder.

(c) *Section 2.2(c)* of the Disclosure Schedule sets forth the capitalization of the Company immediately following the Initial Closing including the number of shares of the following: (i) issued and outstanding Common Stock, including, with respect to restricted Common Stock, vesting schedule and repurchase price; (ii) issued stock options, including vesting schedule and exercise price; (iii) stock options not yet issued but reserved for issuance; (iv) the Series A Preferred Stock; and (v) warrants to acquire shares of Common Stock. Except for (A) the rights provided in Section 5.3 of the Investors' Rights Agreement and (B) the securities and rights described in Section 2.2(b) of this Agreement and *Section 2.2(c)* of the Disclosure Schedule, there are no outstanding options, warrants, rights (including conversion or preemptive rights and rights of first refusal or similar rights) or agreements, orally or in writing, to purchase or acquire from the Company any shares of Common Stock or Series A Preferred Stock, or any securities convertible into or exchangeable for shares of Common Stock or Series A Preferred Stock.

(d) Except as set forth on *Section 2.2(d)* of the Disclosure Schedule, none of the Company's stock purchase agreements or stock option documents contains a provision for acceleration of vesting (or lapse of a repurchase right) or other changes in the vesting provisions or other terms of such agreement or understanding upon the occurrence of any event or combination of events. The Company has never adjusted or amended the exercise price of any stock options previously awarded, whether through amendment, cancellation, replacement grant, repricing, or any other means. Except as set forth in the Restated Certificate, the Company has no obligation (contingent or otherwise) to purchase or redeem any of its capital stock.

(e) Attached hereto as Exhibit H-1 is the capitalization of the Company as of February 11, 2015. Attached hereto as Exhibit H-2 is the capitalization of the Company immediately following the Initial Closing.

2.3 Subsidiaries. The Company does not currently own or control, directly or indirectly, any interest in any other corporation, partnership, trust, joint venture, limited liability company, association, or other business entity. The Company is not a participant in any joint venture, partnership or similar arrangement.

2.4 Authorization. All corporate action required to be taken by the Company's Board of Directors and stockholders in order to authorize the Company to enter into this Agreement at the Initial Closing, and to issue and sell the Notes and Warrants at the Initial Closing or any additional Closing, including the reservation of Securities issuable upon conversion of the Notes and exercise of the Warrants, has been taken or will be taken prior to the Initial Closing. All action on the part of the officers of the Company necessary for the execution and delivery of this Agreement, the performance of all obligations of the Company under this Agreement to be performed as of the Initial Closing, and the issuance and delivery of the Securities has been taken or will be taken prior to the Initial Closing. This Agreement, when executed and delivered by the Company, shall constitute valid and legally binding obligations of the Company, enforceable against the Company in accordance with their respective terms except (i) as limited by applicable bankruptcy, insolvency, reorganization, moratorium, fraudulent conveyance, or other laws of general application relating to or affecting the enforcement of creditors' rights generally, (ii) as limited by laws relating to the availability of specific performance, injunctive relief, or other equitable remedies, or (iii) to the extent the indemnification provisions contained in the Investors' Rights Agreement and the Indemnification Agreements may be limited by applicable federal or state securities laws.

2.5 Valid Issuance of the Securities.

(a) The Securities, when issued, sold and delivered in accordance with the terms and for the consideration set forth in this Agreement, will be validly issued, fully paid and non-assessable and free of restrictions on transfer other than restrictions on transfer under this Agreement, the Right of First Refusal Agreement, applicable state and federal securities laws and liens or encumbrances created by or imposed by an Investor. Assuming the accuracy of the representations of the Investors in Section 3 of this Agreement and subject to the filings described in Section 2.6(ii) below, the Securities will be issued in compliance with all applicable federal and state securities laws.

(b) The Securities issuable upon conversion of the Notes or exercise of the Warrants have been duly reserved for issuance and, upon issuance in accordance with the terms of the Notes, will be validly issued, fully paid and non-assessable and free of restrictions on transfer other than restrictions on transfer under this Agreement, the Right of First Refusal Agreement, applicable state and federal securities laws and liens or encumbrances created by or imposed by an Investor.

2.6 Governmental Consents and Filings. Assuming the accuracy of the representations made by the Investors in Section 3 of this Agreement, no consent, approval, order or authorization of, or registration, qualification, designation, declaration or filing with, any federal, state or local governmental authority is required on the part of the Company in connection with the consummation of the transactions contemplated by this Agreement, except for (i) the filing of the Certificate of Amendment, which will have been filed as of the Initial Closing, and (ii) filings pursuant to Regulation D of the Securities Act, and applicable state securities laws, which have been made or will be made in a timely manner.

2.7 Litigation. Except as set forth on *Section 2.7* of the Disclosure Schedule, there is no claim, action, suit, proceeding, arbitration, complaint, charge or investigation pending or to the Company's knowledge, currently threatened (i) against the Company or any officer, director or Key Employee of the Company arising out of their employment or board relationship with the Company; or (ii) that questions the validity of this Agreement or the right of the Company to enter into it, or to consummate the transactions contemplated by this Agreement; or (iii) that would reasonably be expected to have, either individually or in the aggregate, a Material Adverse Effect. Neither the Company nor, to the Company's knowledge, any of its officers, directors or Key Employees is a party or is named as subject to the provisions of any order, writ, injunction, judgment or decree of any court or government agency or instrumentality (in the case of officers, directors or Key Employees, such as would affect the Company). There is no action, suit, proceeding or investigation by the Company pending or which the Company intends to initiate. The foregoing includes, without limitation, actions, suits, proceedings or investigations pending or threatened in writing (or any basis therefor known to the Company) involving the prior employment of any of the Company's employees, their services provided in connection with the Company's business, or any information or techniques allegedly proprietary to any of their former employers, or their obligations under any agreements with prior employers.

2.8 Intellectual Property.

(a) *Section 2.8(a)(i)* of the Disclosure Schedule lists all Company Intellectual Property, other than trade secrets, that is owned by the Company. *Section 2.8(a)(ii)* of the Disclosure Schedule lists all contracts relating to intellectual property rights owned by Persons other than the Company, other than with respect to commercially available software products under standard end-user object code license agreements, which are used or held for use by the Company with the permission of the owner. Except as set forth on *Section 2.8(a)(ii)* of the Disclosure Schedule, each of the contracts listed or required to be listed on *Section 2.8(a)(ii)* of the Disclosure Schedule grants the Company exclusive rights in regard to the intellectual property covered by the contract, is in full force and effect, and all actions required to keep such rights pending or in effect or to provide full protection, including payment of filing, examination, annuity, and maintenance fees and filing of renewals, statements of use or working, affidavits of incontestability and other similar actions, have been taken. No intellectual property right for which the Company has rights pursuant to a contract listed or required to be listed on *Section 2.8(a)(ii)* of the Disclosure Schedule is the subject of any interference, opposition, cancellation, nullity, re-examination or other proceeding placing in question the validity or scope of such right. The Company has no present expectation or intention of not fully performing any obligation pursuant to any license, and, to the Company's knowledge, there is no breach, anticipated breach or default by any other party to any license. There are no renegotiations of, attempts to renegotiate, demands for or outstanding rights to renegotiate any license that have been communicated to the Company. All rights under each license will be fully available to the Company after the Initial Closing to the full extent available to the Company prior to the Initial Closing. There are no outstanding options, licenses, agreements, claims, encumbrances or shared ownership interests of any kind relating to the Company Intellectual Property other than those licenses set forth in *Section 2.8(a)(ii)* of the Disclosure Schedule, nor is the Company bound by or a party to any options, licenses or agreements of any kind with respect to the patents, trademarks, service marks, trade names, copyrights, trade secrets, licenses, information, proprietary rights and processes of any other Person, other than those licenses and agreements set forth in *Section 2.8(a)(ii)* of the Disclosure Schedule. *Section 2.8(a)(iii)* of the Disclosure Schedule lists any agreements pursuant to which the Company has disclosed, delivered, licenses or otherwise made available to any Person of any of the Company Intellectual Property.

(b) Except as set forth on *Section 2.8(b)* of the Disclosure Schedule, the Company owns or possesses or can acquire or license on commercially reasonable terms sufficient legal rights to all Company Intellectual Property without any known conflict with the rights of others. To the Company's knowledge and in the Company's opinion, no product or service marketed or sold (or proposed to be marketed or sold) by the Company violates any license or infringes any intellectual property rights of any other party.

(c) The Company has not received any communications alleging that the Company has violated or, by conducting its business, would violate any of the patents, trademarks, service marks, trade names, copyrights, trade secrets, mask works or other proprietary rights or processes of any other Person. The Company has obtained and possesses valid licenses to use all of the software programs present on the computers and other software-enabled electronic devices that it owns or leases or that it has otherwise provided to its employees for their use in connection with the Company's business. To the Company's knowledge, it will not be necessary to use any inventions of any of its employees or consultants (or Persons it currently intends to hire) made prior to their employment by the Company.

(d) Except as set forth on *Section 2.8(d)* of the Disclosure Schedule, each employee and consultant has assigned or has agreed to assign to the Company all intellectual property rights he or she owns that are related to the Company's business as now conducted and as presently proposed to be conducted.

(e) Except as set forth in *Section 2.8(e)* of the Disclosure Schedule, the Company has not embedded any open source, copyleft or community source code in any of its products generally available or in development, including but not limited to any libraries or code licensed under any General Public License, Lesser General Public License or similar license arrangement.

(f) For purposes of this *Section 2.8*, the Company shall be deemed to have knowledge of a patent right if the Company has actual knowledge of the patent right or would be found to be on notice of such patent right as determined by reference to United States patent laws after reasonable inquiry.

2.9 Compliance with Other Instruments. Except as set forth in *Section 2.9* of the Disclosure Schedule, the Company is not in violation or default (a) of any provisions of its Restated Certificate or Bylaws, nor will be at the time of filing, in violation or default under any provisions of its Certificate of Amendment, (b) of any instrument, judgment, order, writ or decree, (c) under any note, indenture or mortgage, or (d) under any lease, agreement, contract or purchase order to which it is a party or by which it is bound that is required to be listed on the Disclosure Schedule, or of any provision of federal or state statute, rule or regulation applicable to the Company, the violation of which would have a Material Adverse Effect. The execution, delivery and performance of this Agreement and the consummation of the transactions contemplated by this Agreement will not result in any such violation or be in conflict with or constitute, with or without the passage of time and giving of notice, either (i) a default under any such provision, instrument, judgment, order, writ, decree, contract or agreement or (ii) an event which results in the creation of any lien, charge or encumbrance upon any assets of the Company or the suspension, revocation, forfeiture, or nonrenewal of any material permit or license applicable to the Company.

2.10 Agreements; Actions.

(a) Except for this Agreement or as set forth in *Section 2.10(a)* of the Disclosure Schedule, there are no agreements, understandings, instruments, contracts or proposed transactions to which the Company is a party or by which it is bound that involve (i) obligations (contingent or otherwise) of, or payments to, the Company in excess of $50,000, (ii) the license of any patent, copyright, trademark, trade secret or other proprietary right to or from the Company, (iii) the grant of rights to manufacture, produce, assemble, license, market, or sell its products to any other Person that limit the Company's exclusive right to develop, manufacture, assemble, distribute, market or sell its products, or (iv) indemnification by the Company with respect to infringements of proprietary rights.

(b) Except as set forth in *Section 2.10(b)* of the Disclosure Schedule, the Company has not (i) declared or paid any dividends, or authorized or made any distribution upon or with respect to any class or series of its capital stock, (ii) incurred any indebtedness for money borrowed or incurred any other liabilities in excess of $25,000 or in excess of $50,000 in the aggregate, (iii) made any loans or advances to any Person, other than ordinary advances for travel expenses, or (iv) sold, exchanged or otherwise disposed of any of its assets or rights, other than the sale of its inventory in the ordinary course of business. For the purposes of subsections (b) and (c) of this Section 2.10, all indebtedness, liabilities, agreements, understandings, instruments, contracts and proposed transactions involving the same Person (including Persons the Company has reason to believe are affiliated with each other) shall be aggregated for the purpose of meeting the individual minimum dollar amounts of such subsection.

(c) The Company is not a guarantor or indemnitor of any indebtedness of any other Person.

2.11 Certain Transactions.

(a) Except as set forth on *Section 2.11(a)* of the Disclosure Schedule, other than (i) standard employee benefits generally made available to all employees, (ii) non-disclosure, non-competition, assignment of inventions agreements and similar agreements between the Company and certain Key Employees and consultants, (iii) standard director and officer indemnification agreements approved by the Board of Directors, and (iv) the purchase of shares of the Company's capital stock and the issuance of options to purchase shares of the Company's Common Stock, in each instance, approved in the written minutes or by action by written consent of the Board of Directors (previously made available to the Investors or their counsel), there are no agreements, understandings or proposed transactions between the Company and any of its officers, directors, consultants or Key Employees, or any Affiliate thereof.

(b) Except as set forth on *Section 2.11(b)* of the Disclosure Schedule, the Company is not indebted, directly or indirectly, to any of its directors, officers or employees or to their respective spouses or children or to any Affiliate of any of the foregoing, other than in connection with expenses or advances of expenses incurred in the ordinary course of business or employee relocation expenses and for other customary employee benefits made generally available to all employees. None of the Company's directors, officers or employees, or any members of their immediate families, or any Affiliate of the foregoing are, directly or indirectly, indebted to the Company.

2.12 Rights of Registration and Voting Rights. Except as provided in the Investors' Rights Agreement, the Company is not under any obligation to register under the Securities Act any of its currently outstanding securities or any securities issuable upon exercise or conversion of its currently outstanding securities. To the Company's knowledge, except as contemplated in the Voting Agreement, no stockholder of the Company has entered into any agreements with respect to the voting of capital shares of the Company.

2.13 Absence of Liens. Except as set forth in *Section 2.13* of the Disclosure Schedule, the property and assets that the Company owns are free and clear of all mortgages, deeds of trust, liens, loans and encumbrances, except for statutory liens for the payment of current taxes that are not yet delinquent and encumbrances and liens that arise in the ordinary course of business and do not materially impair the Company's ownership or use of such property or assets. With respect to the property and assets it leases, the Company is in compliance with such leases and, to its knowledge, holds a valid leasehold interest free of any liens, claims or encumbrances other than those of the lessors of such property or assets.

2.14 Financial Statements. The Company has made available to each Investor its audited financial statements as of December 31, 2012 and December 31, 2013, and its unaudited financial statements (including balance sheet, income statement and statement of cash flows) as of and for the fiscal period ended December 31, 2014 (collectively, the "**Financial Statements**"). The Financial Statements have been prepared in accordance with generally accepted accounting principles applied on a consistent basis throughout the periods indicated, except that the Financial Statements may not contain all footnotes required by generally accepted accounting principles, subject in the case of the unaudited Financial Statements to normal year end audit adjustments. The Financial Statements fairly present in all material respects the financial condition and operating results of the Company as of the dates, and for the periods, indicated therein. Except as set forth in the Financial Statements, the Company has no material liabilities or obligations, contingent or otherwise, other than (a) liabilities incurred in the ordinary course of business subsequent to December 31, 2013, (b) obligations under contracts and commitments incurred in the ordinary course of business, and (c) liabilities and obligations of a type or nature not required under generally accepted accounting principles to be reflected in the Financial Statements, which, in all such cases, individually and in the aggregate would not have a Material Adverse Effect. The Company maintains and will continue to maintain a standard system of accounting established and administered in accordance with generally accepted accounting principles.

2.15 Changes. To the Company's knowledge, since December 31, 2013, there have been no events or circumstances of any kind that have had or could reasonably be expected to result in a Material Adverse Effect.

2.16 Employee Matters.

(a) As of the date hereof, the Company employs 29 full-time employees and no part-time employees and engages 13 consultants or independent contractors. *Section 2.16* of the Disclosure Schedule sets forth a detailed description of all compensation, including salary, bonus, severance obligations and deferred compensation paid or payable for each officer, employee, consultant and independent contractor of the Company.

(b) To the Company's knowledge, none of its employees is obligated under any contract (including licenses, covenants or commitments of any nature) or other agreement, or subject to any judgment, decree or order of any court or administrative agency, that would materially interfere with such employee's ability to promote the interest of the Company or that would conflict with the Company's business. Neither the execution or delivery of this Agreement, nor the carrying on of the Company's business by the employees of the Company, nor the conduct of the Company's business as now conducted and as presently proposed to be conducted, will, to the Company's knowledge, conflict with or result in a breach of the terms, conditions, or provisions of, or constitute a default under, any contract, covenant or instrument under which any such employee is now obligated.

(c) The Company is not delinquent in payments to any of its employees, consultants, or independent contractors for any wages, salaries, commissions, bonuses, or other direct compensation for any service performed for it to the date hereof or amounts required to be reimbursed to such employees, consultants, or independent contractors. The Company has complied in all material respects with all applicable state and federal equal employment opportunity laws and with other laws related to employment, including those related to wages, hours, worker classification, and collective bargaining. The Company has withheld and paid to the appropriate governmental entity or is holding for payment not yet due to such governmental entity all amounts required to be withheld from employees of the Company and is not liable for any arrears of wages, taxes, penalties, or other sums for failure to comply with any of the foregoing.

(d) To the Company's knowledge, no Key Employee intends to terminate employment with the Company or is otherwise likely to become unavailable to continue as a Key Employee, nor does the Company have a present intention to terminate the employment of any of the foregoing. The employment of each employee of the Company is terminable at the will of the Company. Except as set forth in *Section 2.16* of the Disclosure Schedule or as required by law, upon termination of the employment of any such employees, no severance or other payments will become due. Except as set forth in *Section 2.16* of the Disclosure Schedule, the Company has no policy, practice, plan, or program of paying severance pay or any form of severance compensation in connection with the termination of employment services.

(e) The Company has not made any representations regarding equity incentives to any officer, employees, director or consultant that are inconsistent with the share amounts and terms set forth in the minutes of meetings of the Company's board of directors.

(f) Each former Key Employee whose employment was terminated by the Company has entered into an agreement with the Company providing for the full release of any claims against the Company or any related party arising out of such employment.

(g) *Section 2.16* of the Disclosure Schedule sets forth each employee benefit plan maintained, established or sponsored by the Company, or which the Company participates in or contributes to, which is subject to the Employee Retirement Income Security Act of 1974, as amended ("**ERISA**"). Except as set forth on *Section 2.16* of the Disclosure Schedule, the Company has made all required contributions and has no liability to any such employee benefit plan, other than liability for health plan continuation coverage described in Part 6 of Title 1(B) of ERISA, and has complied in all material respects with all applicable laws for any such employee benefit plan.

(h) To the Company's knowledge, none of the Key Employees of the Company has been (a) subject to voluntary or involuntary petition under the federal bankruptcy laws or any state insolvency law or the appointment of a receiver, fiscal agent or similar officer by a court for his business or property; (b) convicted in a criminal proceeding or named as a subject of a pending criminal proceeding (excluding traffic violations and other minor offenses); (c) subject to any order, judgment, or decree (not subsequently reversed, suspended, or vacated) of any court of competent jurisdiction permanently or temporarily enjoining him from engaging, or otherwise imposing limits or conditions on his engagement in any securities, investment advisory, banking, insurance, or other type of business or acting as an officer or director of a public company; or (d) found by a court of competent jurisdiction in a civil action or by the Securities and Exchange Commission or the Commodity Futures Trading Commission to have violated any federal or state securities, commodities, or unfair trade practices law, which such judgment or finding has not been subsequently reversed, suspended, or vacated.

2.17 Tax Returns and Payments. There are no federal, state, county, local or foreign taxes due and payable by the Company which have not been timely paid. There are no accrued and unpaid federal, state, county, local or foreign taxes of the Company which are due, whether or not assessed or disputed. There have been no examinations or audits of any tax returns or reports by any applicable federal, state, local or foreign governmental agency. The Company has duly and timely filed all federal, state, county, local and foreign tax returns required to have been filed by it and there are in effect no waivers of applicable statutes of limitations with respect to taxes for any year.

2.18 Insurance. Except as set forth on *Section 2.18* of the Disclosure Schedule, the Company has in full force and effect fire and casualty insurance policies with extended coverage, sufficient in amount (subject to reasonable deductions) to allow it to replace any of its properties that might be damaged or destroyed.

2.19 Confidential Information and Invention Assignment Agreements. Each current and former employee, consultant and officer of the Company has executed an agreement with the Company regarding confidentiality and proprietary information substantially in the form or forms made available to the counsel for the Investors (the "**Confidential Information Agreements**"). No current or former Key Employee has excluded works or inventions from his or her assignment of inventions pursuant to such Key Employee's Confidential Information Agreement. The Company is not aware that any of its Key Employees is in violation thereof. Except as set forth on *Section 2.19* of the Disclosure Schedule, each Key Employee has entered into a non-competition agreement with the Company.

2.20 Permits; Compliance with Laws. The Company has all franchises, permits, licenses and any similar authority necessary for the conduct of its business, the lack of which could reasonably be expected to have a Material Adverse Effect. The Company is not in default in any material respect under any of such franchises, permits, licenses or other similar authority. The Company is in compliance in all material respects with all applicable federal, state and local laws, regulations, orders and decrees.

2.21 Corporate Documents. The Restated Certificate, the Certificate of Amendment and Bylaws of the Company are in the form provided to the Investors. Except as set forth on *Section 2.21* of the Disclosure Schedule, the copy of the minute books of the Company made available to the Investors contains minutes of all meetings of directors and stockholders and all actions by written consent without a meeting by the directors and stockholders since the date of incorporation which are in the possession of the Company and such minutes and actions accurately reflect in all material respects all actions by the directors (and any committee of directors) and stockholders with respect to all transactions referred to in such minutes.

2.22 Environmental and Safety Laws. Except as could not reasonably be expected to have a Material Adverse Effect to the best of its knowledge (a) the Company is and has been in compliance with all Environmental Laws; (b) there has been no release or to the Company's knowledge threatened release of any pollutant, contaminant or toxic or hazardous material, substance or waste, or petroleum or any fraction thereof, (each a "**Hazardous Substance**") on, upon, into or from any site currently or heretofore owned, leased or otherwise used by the Company; (c) there have been no Hazardous Substances generated by the Company that have been disposed of or come to rest at any site that has been included in any published U.S. federal, state or local "superfund" site list or any other similar list of hazardous or toxic waste sites published by any governmental authority in the United States; and (d) there are no underground storage tanks located on, no polychlorinated biphenyls ("**PCBs**") or PCB-containing equipment used or stored on, and no hazardous waste as defined by the Resource Conservation and Recovery Act, as amended, stored on, any site owned or operated by the Company, except for the storage of hazardous waste in compliance with Environmental Laws. The Company has made available to the Investors true and complete copies of all material environmental records, reports, notifications, certificates of need, permits, pending permit applications, correspondence, engineering studies, and environmental studies or assessments. For purposes of this Section 2.22, "**Environmental Laws**" means any law, regulation, or other applicable requirement relating to (a) releases or threatened release of Hazardous Substance; (b) pollution or protection of employee health or safety, public health or the environment; or (c) the manufacture, handling, transport, use, treatment, storage, or disposal of Hazardous Substances.

2.23 No Disqualification Events.

(a) With respect to the Notes and Warrants to be offered and sold hereunder in reliance on Rule 506 under the Securities Act, none of the Company, any of its predecessors, any affiliated company, any director, executive officer, other officer of the Company participating in the offering, any beneficial owner of 20% or more of the Company's outstanding voting equity securities, calculated on the basis of voting power, nor any promoter (as that term is defined in Rule 405 promulgated under the Securities Act) connected with the Company in any capacity at the time of sale (each, a "**Company Covered Person**" and, together, "**Company Covered Persons**") is subject to any of the "Bad Actor" disqualifications described in Rule 506(d)(1)(i) to (viii) promulgated under the Securities Act (a "**Disqualification Event**"), except for a Disqualification Event covered by Rule 506(d)(2) or (d)(3). The Company has exercised reasonable care to determine whether any Company Covered Person is subject to a Disqualification Event. The Company has complied, to the extent applicable, with its disclosure obligations under Rule 506(e).

(b) The Company is not aware of any Person (other than any Company Covered Person) that has been or will be paid (directly or indirectly) remuneration for solicitation of purchasers in connection with the sale of any Regulation D Securities.

(c) The Company will notify the Investors in writing, prior to the Closing Date of (i) any Disqualification Event relating to any Company Covered Person and (ii) any event that would, with the passage of time, become a Disqualification Event relating to any Company Covered Person.

2.24 Disclosure. The Company has made available to the Investors all the information reasonably available to the Company that the Investors have requested for deciding whether to acquire the Notes and Warrants. No representation or warranty of the Company contained in this Agreement, as qualified by the Disclosure Schedule, and no certificate furnished or to be furnished to Investors at the Closing contains any untrue statement of a material fact or, to the Company's knowledge, omits to state a material fact necessary in order to make the statements contained herein or therein not misleading in light of the circumstances under which they were made. It is understood that this representation (but not any other representation) is qualified by the fact that the Company has not delivered to the Investors, and has not been requested to deliver, a private placement or similar memorandum or any written disclosure of the types of information customarily furnished to purchasers of securities.

3. Representations and Warranties of the Investors. Each Investor hereby represents and warrants to the Company, severally and not jointly, that:

3.1 Authorization. The Investor has full power and authority to enter into this Agreement to which the Investor is a party. This Agreement to which the Investor is a party, when executed and delivered by the Investor, will constitute valid and legally binding obligations of the Investor, enforceable in accordance with their terms, except (a) as limited by applicable bankruptcy, insolvency, reorganization, moratorium, fraudulent conveyance, and any other laws of general application affecting enforcement of creditors' rights generally, and as limited by laws relating to the availability of specific performance, injunctive relief, or other equitable remedies or (b) to the extent the indemnification provisions contained in the Investors' Rights Agreement may be limited by applicable federal or state securities laws.

3.2 Purchase Entirely for Own Account. This Agreement is made with the Investor in reliance upon the Investor's representation to the Company, which by the Investor's execution of this Agreement, the Investor hereby confirms, that the Securities to be acquired by the Investor will be acquired for investment for the Investor's own account, not as a nominee or agent, and not with a view to the resale or distribution of any part thereof, and that the Investor has no present intention of selling, granting any participation in, or otherwise distributing the same. By executing this Agreement, the Investor further represents that the Investor does not presently have any contract, undertaking, agreement or arrangement with any Person to sell, transfer or grant participations to such Person or to any third Person, with respect to any of the Securities. The Investor has not been formed for the specific purpose of acquiring the Securities.

3.3 Disclosure of Information. The Investor has had an opportunity to discuss the Company's business, management, financial affairs and the terms and conditions of the offering of the Securities with the Company's management and has had an opportunity to review the Company's facilities. The foregoing, however, does not limit or modify the representations and warranties of the Company in Section 2 of this Agreement or the right of the Investors to rely thereon.

3.4 Restricted Securities. The Investor understands that the Securities have not been, and will not be, registered under the Securities Act, by reason of a specific exemption from the registration provisions of the Securities Act which depends upon, among other things, the bona fide nature of the investment intent and the accuracy of the Investor's representations as expressed herein. The Investor understands that the Securities are "restricted securities" under applicable U.S. federal and state securities laws and that, pursuant to these laws, the Investor must hold the Securities indefinitely unless they are registered with the Securities and Exchange Commission and qualified by state authorities, or an exemption from such registration and qualification requirements is available. The Investor acknowledges that the Company has no obligation to register or qualify the Securities for resale except as set forth in the Investors' Rights Agreement. The Investor further acknowledges that if an exemption from registration or qualification is available, it may be conditioned on various requirements including, but not limited to, the time and manner of sale, the holding period for the Securities, and on requirements relating to the Company which are outside of the Investor's control, and which the Company is under no obligation and may not be able to satisfy.

3.5 No Public Market. The Investor understands that no public market now exists for the Securities, and that the Company has made no assurances that a public market will ever exist for the Securities.

3.6 Legends. The Investor understands that the Securities, including any securities issued in respect of or exchange for the Securities, may bear one or all of the following legends:

(a) "THE SECURITIES REPRESENTED BY THIS NOTE HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AND HAVE BEEN ACQUIRED FOR INVESTMENT AND NOT WITH A VIEW TO, OR IN CONNECTION WITH, THE SALE OR DISTRIBUTION THEREOF. NO SUCH TRANSFER MAY BE EFFECTED WITHOUT AN EFFECTIVE REGISTRATION STATEMENT RELATED THERETO OR AN OPINION OF COUNSEL IN A FORM SATISFACTORY TO THE COMPANY THAT SUCH REGISTRATION IS NOT REQUIRED UNDER THE SECURITIES ACT OF 1933."

(b) Any legend set forth in, or required by, this Agreement or a substantially similar legend set forth in, or required by, this Agreement.

(c) Any legend required by the securities laws of any state to the extent such laws are applicable to the Securities represented by the certificate so legended.

3.7 Accredited Investor. The Investor is an accredited investor as defined in Rule 501(a) of Regulation D promulgated under the Securities Act.

3.8 No Disqualification Event. With respect to the Securities, neither the Investor nor any of its directors, executive officers, other officers is subject to any of the "Bad Actor" disqualifications described in Rule 506(d)(1)(i) to (viii) promulgated under the Securities Act. To the extent that the Investor delivered a Rule 506 Disqualification Event Questionnaire to the Company in November 2013, as of the applicable Closing Date, such Investor represents and warrants that the statements made in such November 2013 Rule 506 Disqualification Event Questionnaire remain true, correct and complete.

3.9 Foreign Investors. If the Investor is not a United States person (as defined by Section 7701(a)(30) of the Code), the Investor hereby represents that it has satisfied itself as to the full observance of the laws of its jurisdiction in connection with any invitation to subscribe for the Securities or any use of this Agreement, including (i) the legal requirements within its jurisdiction for the purchase of the Securities, (ii) any foreign exchange restrictions applicable to such purchase, (iii) any governmental or other consents that may need to be obtained, and (iv) the income tax and other tax consequences, if any, that may be relevant to the purchase, holding, redemption, sale, or transfer of the Securities. The Investor's subscription and payment for and continued beneficial ownership of the Securities will not violate any applicable securities or other laws of the Investor's jurisdiction.

3.10 No General Solicitation. Neither the Investor, nor any of the Investor's officers, directors, employees, agents, stockholders or partners has either directly or indirectly, including through a broker or finder (a) engaged in any general solicitation, or (b) published any advertisement in connection with the offer and sale of the Securities.

3.11 Exculpation Among Investors. The Investor acknowledges that the Investor is not relying upon any Person, other than the Company and its officers and directors and the Investor's advisors, in making its investment or decision to invest in the Company. The Investor agrees that neither any Investor nor the respective controlling Persons, officers, directors, partners, agents, or employees of any Investor shall be liable to any other Investor for any action heretofore taken or omitted to be taken by any of them in connection with the purchase of the Securities.

3.12 Residence. If the Investor is an individual, then the Investor resides in the state or province identified in the address of the Investor set forth on Exhibit A; if the Investor is a partnership, corporation, limited liability company or other entity, then the office or offices of the Investor in which it maintains its principal place of business is identified in the address or addresses of the Investor set forth on Exhibit A.

4. Conditions to the Investors' Obligations at Closing. The obligations of each Investor to purchase the Notes and Warrants at the Initial Closing or any other Closing are subject to the fulfillment, on or before such Closing, of each of the following conditions, unless otherwise waived:

4.1 Representations and Warranties. The representations and warranties of the Company contained in Section 2 shall be true and correct in all respects as of such Closing.

4.2 Performance. The Company shall have performed and complied with all covenants, agreements, obligations and conditions contained in this Agreement that are required to be performed or complied with by the Company on or before such Closing.

4.3 Compliance Certificate. The Chief Financial Officer of the Company shall deliver to the Investors at such Closing a certificate certifying that the conditions specified in Sections 4.1, 4.2 and 4.4 through 4.13 have been fulfilled or satisfied.

4.4 Qualifications. All authorizations, approvals or permits, if any, of any governmental authority or regulatory body of the United States or of any state that are required in connection with the lawful issuance and sale of the Notes and Warrants pursuant to this Agreement shall be obtained and effective as of such Closing.

4.5 Certificate of Amendment. The Company shall have filed the Certificate of Amendment with the Secretary of State of Delaware on or prior to the Initial Closing, and the Restated Certificate, as amended by the Certificate of Amendment, shall continue to be in full force and effect as of each Closing.

4.6 Secretary's Certificate. The Secretary of the Company shall have delivered to the Investors at the Closing a certificate certifying with respect to (i) the Restated Certificate and the Certificate of Amendment, (ii) the Amended and Restated Bylaws of the Company, (iii) resolutions of the Board of Directors of the Company approving the Agreement, the Notes, the Warrants, the Second Stockholders' Agreements Amendment, the Security Agreement, and the Amended and Restated Intercreditor Agreement (collectively, the "**Transaction Documents**"), the Certificate of Amendment and the transactions contemplated under the Transaction Documents, and (iv) resolutions of the stockholders of the Company approving the Certificate of Amendment and the Transaction Documents.

4.7 Proceedings and Documents. All corporate and other proceedings in connection with the transactions contemplated at the Closing and all documents incident thereto shall be reasonably satisfactory in form and substance to each Investor, and each Investor (or its counsel) shall have received all such counterpart original and certified or other copies of such documents as reasonably requested. Such documents may include good standing certificates.

4.8 Preemptive Rights. The Company shall have fully satisfied (including with respect to rights of timely notification) or obtained enforceable waivers in respect of any preemptive or similar rights directly or indirectly affecting any of its securities; provided, however, compliance with the participation rights provided to Investors under Section 4.1 of the Investors' Rights Agreement shall be conducted in accordance with Section 1.3(b) of this Agreement.

4.9 Second Stockholders' Agreements Amendment. The Second Stockholders' Agreements Amendment shall have been executed and delivered by the Company and the stockholders party thereto.

4.10 Security Agreement. The Security Agreement shall have been executed and delivered by the Company and the stockholders party thereto.

4.11 Amended and Restated Intercreditor Agreement. The Amended and Restated Intercreditor Agreement shall have been executed and delivered by the Company and the stockholders party thereto.

4.12 Required Number of Investors. At least five Investors must agree to purchase Notes; provided that H&H, jVen Capital, LLC, Versant Venture Capital III, L.P. and Versant Side Fund III, L.P. may collectively agree to waive this closing condition.

4.13 Investment Banker. An engagement letter with at least one investment banker to act as the managing underwriter of an initial public offering of the Company's securities shall have been executed and delivered by the Company and the investment banker(s) party thereto.

5. Conditions of the Company's Obligations at Closing. The obligations of the Company to sell the Notes and the Warrants to the Investors at the Initial Closing or any other Closing are subject to the fulfillment, on or before such Closing, of each of the following conditions, unless otherwise waived:

5.1 Representations and Warranties. The representations and warranties of each Investor contained in Section 3 shall be true and correct in all respects as of such Closing.

5.2 Performance. The Investors shall have performed and complied with all covenants, agreements, obligations and conditions contained in this Agreement that are required to be performed or complied with by them on or before such Closing.

5.3 Qualifications. All authorizations, approvals or permits, if any, of any governmental authority or regulatory body of the United States or of any state that are required in connection with the lawful issuance and sale of the Notes and Warrants pursuant to this Agreement shall be obtained and effective as of such Closing.

5.4 Certificate of Amendment. The Certificate of Amendment shall have been approved by the requisite stockholders, shall have been filed with the Secretary of State of Delaware on or prior to the Initial Closing, and the Restated Certificate, as amended by the Certificate of Amendment, shall continue to be in full force and effect as of each Closing.

5.5 Second Stockholders' Agreements Amendment. The Second Stockholders' Agreements Amendment shall have been approved by the Board of Directors of the Company and the applicable stockholders and executed and delivered by the Company and the stockholders party thereto.

5.6 Security Agreement. The Security Agreement shall have been approved by the Board of Directors of the Company and the applicable stockholders and executed and delivered by the Company and the stockholders party thereto.

5.7 Amended and Restated Intercreditor Agreement. The Amended and Restated Intercreditor Agreement shall have been approved by the Board of Directors of the Company and the applicable stockholders and executed and delivered by the Company and the stockholders party thereto.

6. Miscellaneous.

6.1 Survival of Warranties. Unless otherwise set forth in this Agreement, the representations and warranties of the Company and the Investors contained in or made pursuant to this Agreement shall survive the execution and delivery of this Agreement and each Closing and shall in no way be affected by any investigation or knowledge of the subject matter thereof made by or on behalf of the Investors or the Company.

6.2 Successors and Assigns. The terms and conditions of this Agreement shall inure to the benefit of and be binding upon the respective successors and assigns of the parties. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and assigns any rights, remedies, obligations, or liabilities under or by reason of this Agreement, except as expressly provided in this Agreement.

6.3 Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of Delaware excluding that body of law pertaining to conflict of law.

6.4 Counterparts; Facsimile. This Agreement may be executed and delivered by facsimile signature and in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

6.5 Titles and Subtitles. The titles and subtitles used in this Agreement are used for convenience only and are not to be considered in construing or interpreting this Agreement.

6.6 Notices. All notices and other communications given or made pursuant to this Agreement shall be in writing and shall be deemed effectively given upon the earlier of actual receipt or: (a) personal delivery to the party to be notified, (b) when sent, if sent by electronic mail or facsimile during normal business hours of the recipient, and if not sent during normal business hours, then on the recipient's next business day, (c) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid, or (d) one (1) business day after deposit with a nationally recognized overnight courier, freight prepaid, specifying next business day delivery, with written verification of receipt. All communications shall be sent to the respective parties at their address as set forth on the signature page or Exhibit A, or to such e-mail address, facsimile number or address as subsequently modified by written notice given in accordance with this Section 6.6.

If notice is given to the Company, a copy shall also be sent to

Ballard Spahr LLP
1735 Market Street, 51st Floor
Philadelphia, PA 19103-7599
Attn: Mary J. Mullany

6.7 No Finder's Fees. Except as set forth on *Section 6.7* of the Disclosure Schedule, each party represents that it neither is nor will be obligated for any finder's fee or commission in connection with this transaction. Each Investor agrees to indemnify and to hold harmless the Company from any liability for any commission or compensation in the nature of a finder's or broker's fee arising out of this transaction (and the costs and expenses of defending against such liability or asserted liability) for which such Investor or any of its officers, employees, or representatives is responsible. The Company agrees to indemnify and hold harmless each Investor from any liability for any commission or compensation in the nature of a finder's or broker's fee arising out of this transaction (and the costs and expenses of defending against such liability or asserted liability) for which the Company or any of its officers, employees or representatives is responsible.

6.8 Amendments and Waivers. Any term of this Agreement may be amended, terminated or waived only with the written consent of the Company and the holders of at least 67% of the then-outstanding aggregate value of the Notes. Any amendment or waiver effected in accordance with this Section 6.8 shall be binding upon the Investors and each transferee of the Securities, each future holder of all such Securities, and the Company. This Agreement may not be terminated or amended and the observance of any term of this Agreement may not be waived with respect to any Investor without the consent of such Investor unless such amendment, termination or waiver applies to all Investors in the same fashion. Any waiver, permit, consent or approval of any kind or character on the part of any party of any breach or default under this Agreement, or any waiver on the part of any party of any provisions or conditions of this Agreement, must be in writing; and shall be effective only to the extent specifically set forth in such writing.

6.9 Severability. The invalidity or unenforceability of any provision hereof shall in no way affect the validity or enforceability of any other provision.

6.10 Delays or Omissions. No delay or omission to exercise any right, power or remedy accruing to any party under this Agreement, upon any breach or default of any other party under this Agreement, shall impair any such right, power or remedy of such non-breaching or non-defaulting party nor shall it be construed to be a waiver of any such breach or default, or an acquiescence therein, or of or in any similar breach or default thereafter occurring; nor shall any waiver of any single breach or default be deemed a waiver of any other breach or default theretofore or thereafter occurring. All remedies, either under this Agreement or by law or otherwise afforded to any party, shall be cumulative and not alternative.

6.11 Entire Agreement. This Agreement (including the Exhibits hereto) and the Restated Certificate, as amended by the Certificate of Amendment, constitute the full and entire understanding and agreement between the parties with respect to the subject matter hereof, and any other written or oral agreement relating to the subject matter hereof existing between the parties are expressly canceled.

6.12 Exculpation Among Investors. Each Investor acknowledges to the other Investors that such Investor is not relying upon any person, firm, or corporation, other than the Company and its officers and directors, in making its investment or decision to invest in the Company. Each Investor agrees that no Investor, nor the respective Affiliates of any Investor, shall be liable to each of the other Investors for any action heretofore or hereafter taken or omitted to be taken by any of them in connection with the transactions described in this Agreement.

[Remainder of Page Intentionally Left Blank]

IN WITNESS WHEREOF, the parties have executed this Notes Purchase Agreement as of the date first written above.

COMPANY:

OPGEN, INC.

By: /s/ C. Eric Winzer
Name: C. Eric Winzer
Its: Chief Financial Officer

IN WITNESS WHEREOF, the parties have executed this Notes Purchase Agreement as of the date first written above.

INVESTORS:

HARRIS & HARRIS GROUP, INC.

By: /s/ Daniel Wolfe
Name: Daniel Wolfe
Title:

IN WITNESS WHEREOF, the parties have executed this Notes Purchase Agreement as of the date first written above.

INVESTORS:

jVEN CAPITAL, LLC

By: /s/ Evan Jones
Name: Evan Jones
Title: Managing Member

IN WITNESS WHEREOF, the parties have executed this Notes Purchase Agreement as of the date first written above.

INVESTORS:

VERSANT VENTURE CAPITAL III, L.P.

By: Versant Ventures III, LLC,
its General Partner

By: /s/ Brian Atwood
Name: Brian Atwood
Title: Managing Director

VERSANT SIDE FUND III, L.P.

By: Versant Ventures III, LLC,
its General Partner

By: /s/ Brian Atwood
Name: Brian Atwood
Title: Managing Director

IN WITNESS WHEREOF, the parties have executed this Notes Purchase Agreement as of the date first written above.

INVESTORS:

CROSS CREEK CAPITAL, L.P.

By: Cross Creek Capital GP, L.P.,
its Sole General Partner

By: /s/ Tyler Christenson
Name:
Title:

CROSS CREEK CAPITAL EMPLOYEES FUND, L.P.

By: Cross Creek Capital GP, L.P.,
its Sole General Partner

By: /s/ Tyler Christenson
Name:
Title:

IN WITNESS WHEREOF, the parties have executed this Notes Purchase Agreement as of the date first written above.

INVESTOR:

/s/ Virginia Collett
VIRGINIA COLLETT

IN WITNESS WHEREOF, the parties have executed this Notes Purchase Agreement as of the date first written above.

INVESTOR:

/s/ John C. Lee
JOHN C. LEE IV

IN WITNESS WHEREOF, the parties have executed this Notes Purchase Agreement as of the date first written above.

INVESTOR:

THUNDER RIVER LLC

By: /s/ Charles M. Fleischman
Name: Charles M. Fleischman
Title: Authorized Signatory

EXHIBITS

Exhibit A -	**Schedule of Investors**
Exhibit B -	**Form of Note**
Exhibit C -	**Form of Certificate of Amendment of Certificate of Incorporation**
Exhibit D -	**Form of Warrant**
Exhibit E -	**Form of Security Agreement**
Exhibit F -	**Form of Second Stockholders' Agreements Amendment**
Exhibit G -	**Disclosure Schedule**
Exhibit H-1 -	**Capitalization as of February 11, 2015**
Exhibit H-2 -	**Capitalization Immediately Following the Initial Closing**
Exhibit I -	**Form of Amended and Restated Intercreditor Agreement**

Investor	Principal Amount of Note
Versant Venture Capital III, L.P. **Versant Side Fund III, L.P.**	$400,452 $2,366
jVen Capital, LLC	$540,443
Harris & Harris Group, Inc.	$208,035
Cross Creek Capital, L.P. **Cross Creek Capital Employees Fund, L.P.**	$59,578 $5,855
Virginia Collett	$13,101
John C. Lee IV	$11,115
Thunder River LLC	$3,054
TOTAL	$1,243,999

EXHIBIT B

FORM OF NOTE

THE SECURITIES REPRESENTED BY THIS NOTE HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED, AND HAVE BEEN ACQUIRED FOR INVESTMENT AND NOT WITH A VIEW TO, OR IN CONNECTION WITH, THE SALE OR DISTRIBUTION THEREOF. NO SUCH TRANSFER MAY BE EFFECTED WITHOUT AN EFFECTIVE REGISTRATION STATEMENT RELATED THERETO OR AN OPINION OF COUNSEL IN A FORM SATISFACTORY TO THE COMPANY THAT SUCH REGISTRATION IS NOT REQUIRED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

OPGEN, INC.
SECURED CONVERTIBLE PROMISSORY NOTE

Note No. N-_____

Amount: $_____ Issue Date: February __, 2015

1. **Principal Amount**. For value received, OpGen, Inc., a Delaware corporation (the "Company), does hereby promise to pay to the order of _____ or its permitted assignee (the "Holder"), the principal sum of _____ and ___/100 Dollars ($_____), plus interest accrued thereon, as hereinafter specified (collectively, the "Obligations") on the earliest to occur of (i) February __, 2016 (the "Maturity Date") or (ii) an Event of Default (as defined below).

2. **Notes Purchase Agreement**. This Note is one of a series of promissory notes (the "Financing Notes") issued pursuant to the Notes Purchase Agreement, dated as of February 11, 2015, among the Company and the investors named therein (as the same may be amended from time to time, the "Purchase Agreement"), and is subject to the provisions thereof. Capitalized terms used but not defined herein have the meanings given to them in the Purchase Agreement.

3. **Definitions**. In addition to the other terms defined herein, the following terms shall have the following meanings ascribed to them:

3.1 "Bankruptcy Law" means Title 11, United States Code or any similar Federal or state law for the relief of debtors.

3.2 "IPO" means an initial public offering of the securities of the Company registered under the Securities Act.

3.3 "Requisite Holders" means the holders holding at least 67% of the principal amount then outstanding of the Financing Notes.

3.4 "Securities Act" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

3.5 "QPO" means the closing of the sale of shares of Common Stock to the public at a price per share of at least $4.00 (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock), in a firm-commitment underwritten public offering pursuant to an effective registration statement under the Securities Act resulting in at least $30,000,000 of proceeds, net of the underwriting discount and commissions, to the Company, as this definition may be amended from time to time in an amendment or amendment and restatement of the Restated Certificate.

4. **Interest**. The Company agrees to pay interest, from the date hereof on the unpaid principal amount, at a rate equal to eight percent (8%) per annum, compounded annually (the "Interest Rate"), until the principal amount and all interest accrued thereon are paid (or converted, as provided in Section 5 hereof). Subject to Section 5 hereof, interest shall be due and payable to the Holder on the Maturity Date. In no event shall the amount of interest paid or agreed to be paid to the Holder hereunder exceed the highest lawful rate permissible under any law which a court of competent jurisdiction may deem applicable hereto. In such event, the Interest Rate shall automatically be reduced to the maximum rate permitted by such law.

5. **Conversion**.

5.1 This Note will be convertible (the "Conversion"), in whole and not in part:

(a) at the option of the Holder, into shares of the Company's common stock, par value $0.01 per share ("Common Stock"), at any time after the closing of a QPO;

(b) at the option of the Holder, into either (i) shares of Common Stock, or (ii) shares of the Company's Series A Convertible Preferred Stock, par value $0.01 per share ("Series A Preferred Stock"), at any time after the closing of an IPO that is not a QPO; or

(c) at the option of the Holder, into shares of Series A Preferred Stock, if no IPO has been consummated. Notwithstanding anything in this Section 5.1 to the contrary, if an IPO is not consummated on or before June 30, 2015, then this Note will be convertible only pursuant to this Section 5.1(c) as long as this Note remains outstanding.

5.2 Conversion Rate.

(a) Upon Conversion pursuant to Section 5.1(a), this Note shall be converted into one (1) share of Common Stock for each $1.00 of principal remaining on the Note.

(b) Upon Conversion pursuant to Section 5.1(b), this Note shall be converted, at the option of the Holder, into either (i) one (1) share of Common Stock for each $1.00 of principal remaining on this Note, or (ii) one (1) share of Series A Preferred Stock for each $1.00 of principal remaining on this Note.

(c) Upon Conversion pursuant to Section 5.1(c), this Note shall be converted into one and one quarter (1.25) shares of Series A Preferred Stock for each $1.00 of principal remaining on this Note.

Any accrued and unpaid interest on this Note shall be paid in cash at the time of Conversion.

5.3 Mechanics and Effect of Conversion.

(a) No fractional units will be issued upon conversion of this Note. In lieu of any fractional units to which the Holder may otherwise be entitled, the Company will pay to the Holder in cash the unconverted amount that would otherwise be converted into such fractional units.

(b) Upon Conversion of this Note and payment of all accrued and unpaid interest due hereunder, the Holder shall surrender this Note, duly endorsed, at the principal offices of the Company or any transfer agent of the Company, and this Note shall be canceled in all respects. The Company will, at its expense, as soon as practicable thereafter, issue and deliver to the Holder a certificate or certificates for the number of shares of Common Stock or Series A Preferred Stock, as applicable, to which the Holder is entitled upon the Conversion.

(c) Upon Conversion of this Note and payment of all accrued and unpaid interest due hereunder, the Company will be forever released from all of its obligations and liabilities under this Note with regard to that portion of the principal amount and accrued interest being converted, including, without limitation, the obligation to pay such portion of the principal amount and accrued interest.

5.4 Authorization of Conversion Shares. The Company hereby covenants and agrees to take all such actions as may be necessary to authorize such number of additional shares of Common Stock and Series A Preferred Stock as will be sufficient to accomplish the Conversion.

6. **Security Agreement**. This Note is subject to the terms and conditions of that certain Security Agreement dated as of February ___, 2015, by and between the Company and each holder of the Financing Notes (as amended or restated from time to time, the "Security Agreement"), and each holder of this Note, by his, her or its acceptance hereof, is entitled to the rights and benefits of, and agrees to be bound by, the Security Agreement.

7. **Payment.**

7.1 Repayment. All payment of principal shall be due and payable in lawful money of the United States of America at the principal office of the Holder, or at such other place as the holder hereof may from time to time designate in writing to the Company, not later than 1:00 p.m. Pacific Time on the Maturity Date, unless this Note shall have been previously converted pursuant to Section 5 above. All payments shall be applied first to interest accrued and unpaid hereunder, and thereafter to principal.

7.2 Prepayment. The Company may prepay, without penalty, any principal amount on this Note, in whole or in part, at any time following the three-month anniversary of the closing of an IPO, provided that any prepayment between the 3-month anniversary of the closing of an IPO and the 6-month anniversary of an IPO may only be paid from capital raised by the Company subsequent to such IPO. Any prepayment will be applied first to interest accrued and unpaid hereunder, and thereafter to principal.

8. **Events of Default**. The occurrence of any one or more of the following events shall constitute an "Event of Default" under this Note:

8.1 Payment Default. The Company shall fail to pay the outstanding principal or accrued interest amount due hereunder or the outstanding principal due or accrued interest amount due under any of the Financing Notes, or any portion thereof when due, whether on the Maturity Date, or on such earlier date as is required by Section 9, or otherwise;

8.2 Other Default. The Company shall materially breach the terms of this Note, or other material agreements between the Company and the holders of the Financing Notes, and shall fail to cure such material breach within ten (10) days after written notice thereof to the Company;

8.3 Other Indebtedness. The Company shall default under any other material indebtedness of the Company, and shall fail to cure such default within ten (10) days after written notice thereof to the Company; or

8.4 Bankruptcy, Etc. (a) The Company, pursuant to or within the meaning of any Bankruptcy Law, (i) admits in writing its inability to pay its debts generally as they become due, (ii) commences a voluntary case or proceeding under any Bankruptcy Law with respect to itself, (iii) consents to the entry of a judgment, decree or order for relief against it in an involuntary case or proceeding under any Bankruptcy Law, (iv) consents to the appointment of a custodian of it or for any part of its assets, (v) consents to or acquiesces in the institution of bankruptcy or insolvency proceedings against it, (vi) applies for, consents to or acquiesces in the appointment of or taking possession by a custodian of the Company or for any part of its assets, (vii) makes a general assignment for the benefit of its creditors, or (viii) takes any corporate act to authorize any of the foregoing; or (b) an involuntary petition is filed against the Company (unless such petition is dismissed or discharged within sixty (60) days) under any Bankruptcy Law now or hereafter in effect, or a custodian, receiver, trustee or assignee for the benefit of creditors (or other similar official) is appointed to take possession, custody or control of any property of the Company.

9. **Remedies**. Upon or at any time after the occurrence of an Event of Default specified in Sections 8.1, 8.2, or 8.3 hereof, all Obligations under this Note shall, upon the demand of the Holder, become due and payable without further presentment, demand, protest or other notice of any kind, all of which are hereby expressly waived. Upon the occurrence of an Event of Default specified in Section 8.4 hereof, all Obligations shall thereupon and concurrently therewith become due and payable without presentment, demand, protest or other notice of any kind, all of which are hereby expressly waived.

10. **Waiver and Amendment**. Any waiver by the Holder of a breach of any provision of this Note shall not operate as or be construed to be a waiver of any other breach of such provision or of any breach of any other provision of this Note. The failure or delay of the Holder to insist upon strict adherence to any term of this Note on one or more occasions shall not be considered a waiver or deprive Holder of the right thereafter to insist upon strict adherence to that term or any other term of this Note. Any waiver must be in writing. Any term of this Note may be amended and the observance of any term of this Note may be waived (either generally or in a particular instance and either retroactively or prospectively), with the written consent of the Company and the Requisite Holders, except for the provisions of Section 5 or other provisions related to the Conversion of this Note, which provisions can only be amended with the written consent of the Holder. This Note may not be terminated or amended and the observance of any term of this Note may not be waived with respect to the Holder without the consent of such Holder unless such amendment, termination or waiver applies to all holders of the Financing Notes in the same fashion. Any waiver or amendment effected in accordance with this section shall be binding upon the Company and the Holder.

11. **Governing Law**. EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN THE PURCHASE AGREEMENT, IN ALL RESPECTS, INCLUDING ALL MATTERS OF CONSTRUCTION, VALIDITY AND PERFORMANCE, THIS NOTE AND THE OBLIGATIONS ARISING HEREUNDER SHALL BE GOVERNED BY, AND CONSTRUED AND ENFORCED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF DELAWARE APPLICABLE TO OBLIGATIONS MADE AND PERFORMED IN THAT STATE, AND ANY APPLICABLE LAWS OF THE UNITED STATES OF AMERICA.

12. **Transfer**. This Note may not be transferred or assigned in any manner without the prior written consent of the Company (which consent may be withheld in its sole and absolute discretion); *provided, however*, that no prior written consent of the Company shall be required for any transfer of this Note to any venture capital fund now or hereafter existing which is controlled by or under common control with one or more general partners or managing members of the Holder or shares the same management company with the Holder, and, *provided, further*, that no pledge of this Note by the Holder pursuant to a credit facility or other bank indebtedness shall be considered an assignment hereunder requiring the Company's consent. Any attempted transfer or assignment of this Note (or any portion thereof) not complying with this Section 12 shall be null and void.

13. **Notices**. Notices hereunder shall be made as described in the Purchase Agreement.

14. **Stockholders, Officers and Directors Not Liable**. In no event shall any stockholder, officer or director of the Company be liable for any amounts due or payable pursuant to this Note. This Note is solely an obligation of the Company.

15. **Loss of Note**. Upon receipt by the Company of evidence satisfactory to it of the loss, theft, destruction or mutilation of this Note or any Note exchanged for it, and indemnity satisfactory to the Company (in case of loss, theft or destruction) or surrender and cancellation of such Note (in the case of mutilation), the Company will make and deliver in lieu of such Note a new Note of like tenor.

[Signature page follows]

IN WITNESS WHEREOF, the Company has executed and delivered this Note as of the day and year first above written.

COMPANY:

OPGEN, INC.,
a Delaware corporation

By: _____
Name: C. Eric Winzer
Title: Chief Financial Officer

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the inclusion in this Registration Statement on Form S-1 of OpGen, Inc. of our report, which includes an explanatory paragraph related to OpGen, Inc.'s ability to continue as a going concern,dated March 2, 2015, on our audits of the financial statements of OpGen, Inc. as of December 31, 2014 and 2013 and for the years then ended. We also consent to the reference to our firm under the caption "Experts".

/s/ CohnReznick LLP

Vienna, Virginia
March 2, 2015

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March 3, 2015

By Electronic Filing

United States Securities and Exchange Commission
100 F Street N.E.
Washington D.C. 20549
Attn: John Reynolds

Re: OpGen, Inc.
Amendment No. 2 to Draft Registration Statement on Form S-1
Submitted January 16, 2015
CIK No. 0001293818

Ladies and Gentlemen:

We are providing this response letter on behalf of OpGen, Inc. (the "Company") with respect to the Staff's comment letter dated January 27, 2015, regarding the Company's Amendment No. 2 to Draft Registration Statement on Form S-1, submitted December 31, 2014 ("Amendment No. 2"). For your convenience, the Staff's comments have been reproduced below, followed by the Company's response.

Business

Clinical Studies and Publications, page 61

1. Please revise the studies on page 62 to provide narrative disclosure understandable to the average investor, including explanations of the meaning and significance of the various results.

RESPONSE: We have revised the disclosure regarding clinical studies, including CLIA validation studies, on page 63 and 64 of the Form S-1 Registration Statement filed today (the "Form S-1") to provide explanations regarding the meaning and significance of the results.

Executive Compensation, page 83

2. Please update our executive compensation disclosure pursuant to Item 402 of Regulation S-K with respect to your last fiscal year ended December 31, 2014. Correspondingly, please update your disclosure pursuant to Item 404 of Regulation S-K as applicable, including any required disclosure relating to transactions with related persons since the beginning of your last fiscal year.

RESPONSE: We have updated the Form S-1 to disclose information with respect to the year ended December 31, 2014, as required by Items 402 and 404 of Regulation S-K, including the related persons transaction disclosure.

Certain Relationships and Related Person Transactions, page 89

3. We note your response to comment 7 and revisions to pages 46 and 90 of the registration statement. Please revise to indicate that there is "no firm commitment on the part of any investor to participate in such bridge funding" and include the specific dollar amount of each related party's interest. See Item 404(a)(4) of Regulation S-K.

RESPONSE: We have updated pages 48 and 92 of the Form S-1 to update the information regarding the bridge funding in response to this comment.

C. Eric Winzer, the CFO of the Company (240-813-1273) or Mary Mullany at Ballard Spahr LLP (215-864-8631) are available to answer questions you may have about our responses.

Very truly yours,

/s/ Mary J. Mullany

Mary J. Mullany

MJM/seh

cc: Evan Jones
C. Eric Winzer
Hillary Daniels
John Archfield
James Lopez
Brian McAllister