As filed with the Securities and Exchange Commission on November 21, 2014

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 201
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
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(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
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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. o

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. o

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. o

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. o

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 o	Accelerated Filer o
Non-Accelerated Filer o	Smaller Reporting Company x

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	$	$

(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 that the underwriters have the option to purchase to cover over-allotments, if any.

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 November 21, 2014.

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 intend to apply to list our common stock on The NASDAQ Capital Market prior to the offering contemplated by this prospectus.

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 12.

PRICE $ 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 discounts and commission	$	$
Proceeds, before expenses, to OpGen, Inc. [1]	$	$

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

We will grant the underwriters an option to purchase up to an additional shares of common stock at the public offering price less the underwriting discount.

The underwriters expect to deliver the shares of common stock to purchasers on , 2015.

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.

Neither we nor any of the underwriters have done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than the United States. You are required to inform yourself about, and to observe any restrictions relating to, this offering and the distribution of this prospectus.

For investors outside the United States: 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 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.

Please refer to the Glossary on page 72 of this prospectus for definitions of scientific, health care, regulatory and OpGen-specific terms used in this prospectus.

Overview

We are a commercial stage company using molecular testing and bioinformatics 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 Acuitas™ MDRO Gene Test products are enabled by our Lighthouse™ bioinformatics platform which provides 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. We believe we have an important first mover advantage in providing Acuitas enabled molecular information to healthcare providers on a commercial scale.

Our lead product, the Acuitas™ MDRO Gene Test, is, to our knowledge, the first CLIA lab-based test to provide a comprehensive profile of MDRO resistance genes from patients screened for colonization or infection. The test was introduced in the first half of 2014 and is in clinical evaluations or in the implementation process at a number of prominent healthcare systems. In 2015, we expect to expand our customer base and to introduce a number of new products based on our molecular testing and bioinformatics platforms.

Antimicrobial Resistance – An Urgent Global Issue

Antimicrobial resistance is one of the most serious health threats in health care today. 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 avoidable costs to the U.S. healthcare system. In most cases, these infections require prolonged and/or costlier treatments, extended hospital stays, necessitate 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.

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 growing 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 epidemiological linked contacts.

Culture based screening methods for CRE can take up to five or more days for identification and subsequent characterization of suspected CRE bacteria. The OpGen Acuitas MDRO Gene Test provides accurate test results for CRE genes and other MDRO genes back to the healthcare provider in less than one day. 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.

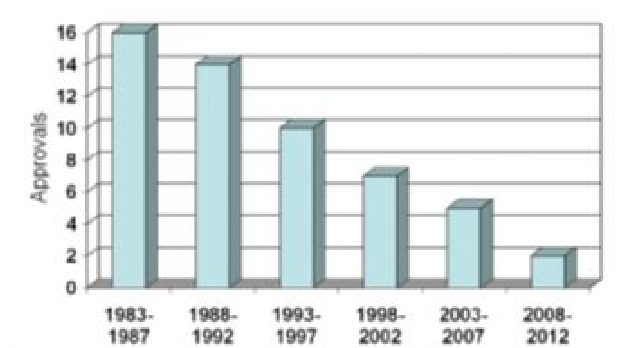
Our Acuitas MDRO Gene Test detects the presence of CRE resistance genes with higher sensitivity than conventional screening methods. In a recent comparison with CRE culture performed at a national reference lab, the Acuitas test was 100% sensitive and specific while the CRE culture method was just 72% sensitive. Culture methods also create many false positive results which potentially result in patients receiving unnecessary and costly contact precautions. In one recent pilot study of the Acuitas MDRO Gene Test, 32% of initial culture screen results were false positives while the Acuitas test had 100% agreement with the confirmed 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 is responsible for roughly 15% of gram-negative infections in hospital intensive care units. Infections caused by 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 strains leading to Klebsiella pneumonia, or K. pneumonia, 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 that makes spread difficult to control and outbreaks difficult to stop. In addition, K. pneumoniae can survive for several hours on the hands of hospital personnel, which likely facilitates nosocomial spread. Effective control of K. pneumoniae 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. With few treatment options available, screening, infection control, and antibiotic stewardship have become our most powerful weapons in the fight to contain this building epidemic.



New systemic antibacterial agents approved by the U.S. Food and Drug Administration per 5-year period, through 2012.

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 impact infection control programs and antibiotic stewardship.

The Opportunity

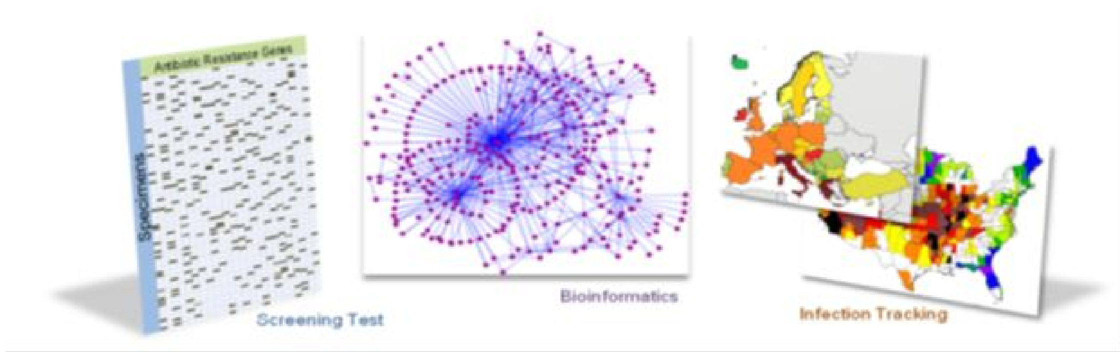
The discovery of antibiotics in the early 20th century fundamentally transformed human and veterinary medicine. Antibiotics save millions of lives each year in the U.S. and around the world. The rise of antibiotic resistant bacteria represents a growing and serious threat to public health and the economy, and now has been raised to the national security threat level. 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, comprehensive 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. The potential for improvements based on cell culture alone have reached a plateau while 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 are transforming clinical and public health microbiology practice. Using technologies developed for production genetics applications and high resolution genome sequencing it is now possible to envision 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. Researchers have shown the ability to predict antibiotic resistance with up to 99% accuracy using DNA testing. This breakthrough combined with the speed, reliability and increased information content available with evolving DNA detection methods is leading to a fundamental transformation of the field of microbiology and 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 complete 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 determine the genetic characteristics of targeted infectious organisms 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 provide customized diagnostic information for newly diagnosed patients to allow targeted antibiotic therapy earlier and more effectively.

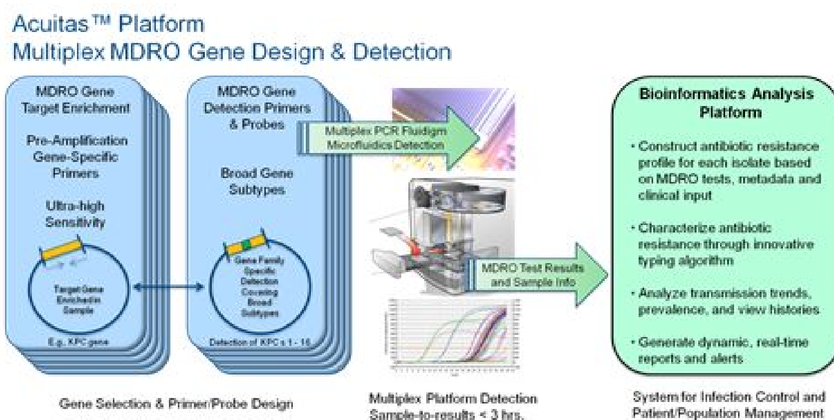
We have developed a comprehensive approach for screening for MDROs in hospitals using DNA testing. Our Acuitas Gene Tests are integrated with our Lighthouse MDRO Management System and laboratory information products to provide real-time information on the MDRO colonization status for patients, acute care ICUs, and hospitals. We combine our molecular test information and microbiology test results from our customized CLIA based tests to create Lighthouse MDRO profiles for hospitals. Lighthouse MDRO profiling facilitates MDRO tracking and results are easily aggregated with 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 help reduce overall disease rates and to strengthen the national capacity to detect and manage treatment of drug resistant bacterial strains.



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

Acuitas MDRO Gene Test

Our Acuitas MDRO Gene Test directly detects seven critical MDRO genes from one patient swab. The test provides fast, accurate molecular results for genes associated with CRE, ESBL (extended spectrum beta lactamase) and VRE (vancomycin resistance enterobacteria) resistant genes. The test identifies patients at risk for being colonized. In our CLIA evaluation studies and customer pilot studies, the test has been proven to be highly accurate when compared to established reference methods, demonstrating nearly 100% correlation in identifying patients carrying MDROs and those free of MDRO bacteria.

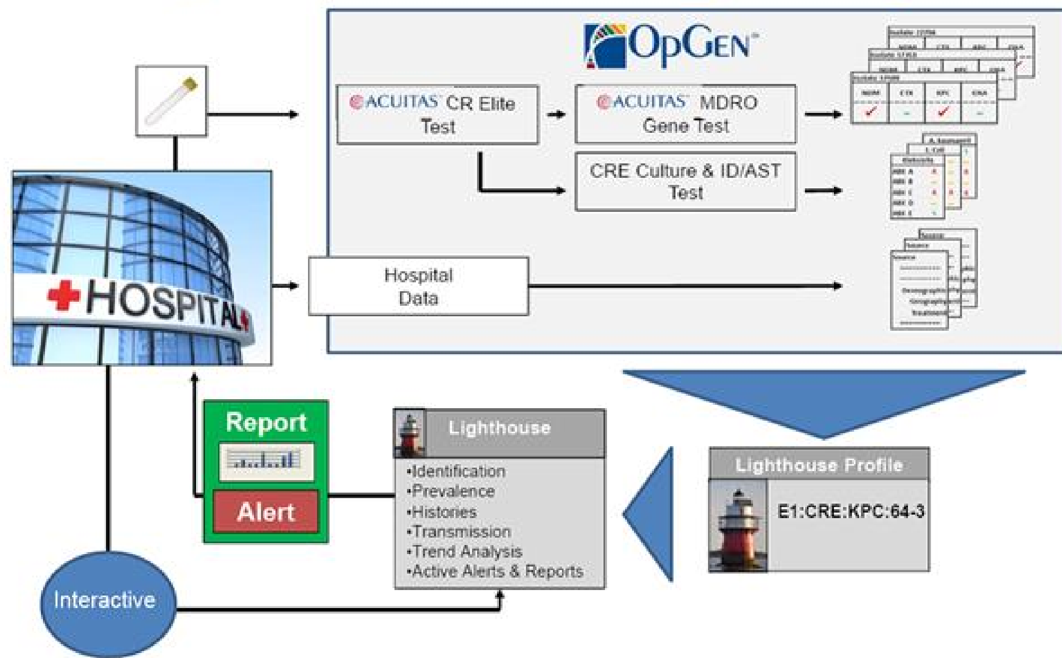


Acuitas gene tests combine state-of-the-art Fluidigm microfluidic-based production genomics technology with carefully designed and manufactured DNA probe reagents to power our CLIA Lab-based Acuitas gene tests.

Lighthouse MDRO

Our Lighthouse MDRO Management System solution 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. Lighthouse MDRO dynamic profiling incorporates identity, phenotype and MDRO gene presence and assigns unique microbe identifiers, Lighthouse MDRO profiles, based on MDRO gene composition and antibiotic susceptibility, or AST, data. Lighthouse MDRO profiling provides the first diagnostic tracking tool for MDRO infection in the hospital setting. Our Lighthouse MDRO solution is based on our CLIA and HIPAA compliant LIMS database system. We are developing unique web-based portal for access to LIMS based lab reports and Lighthouse MDRO data reports.

Lighthouse™ MDRO Management System



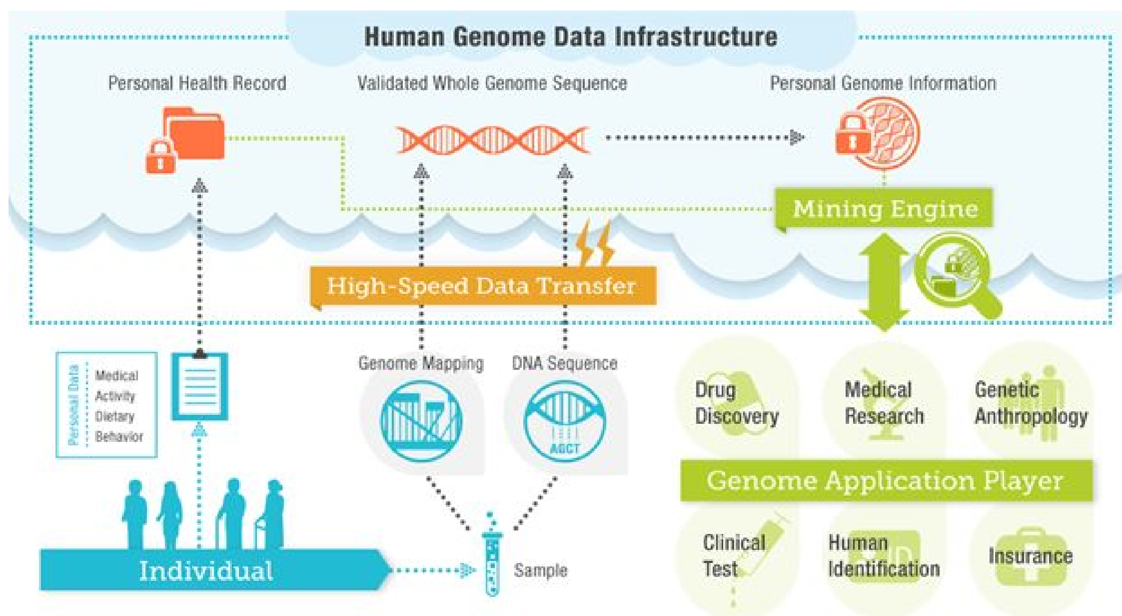
Microbial and human genome mapping and sequencing

Infectious disease testing is undergoing a transformation where DNA testing is replacing classical methods because of its accuracy and speed. DNA tests make it possible to simultaneously detect drug resistance 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. High resolution DNA analysis methods such as whole genome DNA sequencing offer the ability to accurately track hospital acquired infections 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. We have more than ten years of experience mapping microbial genomes. Our customers include government public health agencies such as the CDC, FDA, USDA and biodefense organizations.

In October 2013, we entered into a strategic collaboration with Hitachi High-Technologies Corporation, or Hitachi, to commercialize our technology for mapping, assembly and analysis of human genomes. In conjunction with Hitachi, we are developing cloud-based genome assembly capabilities for both human and microbial genomes. We intend to continue commercializing microbial configurations 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 this collaboration:



© 2014 Hitachi High-Technologies Corporation

Our Strategy

- Commercialize our Lighthouse MDRO Management System to healthcare providers, governments, and diagnostic companies.
- Develop and commercialize proprietary molecular diagnostic products with companion informatics and microbiology offerings.
- 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 and combining this information with patient specific data for healthcare providers. This complete infection control, antibiotic stewardship and patient management data will be difficult for future market entrants to replicate.
- Expand our lab service offerings and capabilities through supply of kits for use on our Fluidigm based DNA Probe assay platform and commercially available rapid diagnostic test systems, develop 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 Lighthouse MDRO solution on a global basis. Build on our established market-leading position in Whole Genome Mapping through our relationship 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 net losses for the foreseeable future and may never achieve or sustain profitability.
- We may not be able to generate sufficient revenue from the Acuitas MDRO Gene Test and Lighthouse MDRO Management System or our relationships with our healthcare facility partners to achieve or maintain profitability.
- Our success depends on the achievement of greater market acceptance of the Acuitas MDRO Gene Test and Lighthouse MDRO Management System. If physicians do not believe the Acuitas MDRO Gene Test and our 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 in the future, and our business could suffer.
- If we are unable to scale our operations to support increased demand for the Acuitas MDRO Gene Test and Lighthouse MDRO Management System, our business could suffer.
- We depend on our information technology systems, and any failure of these systems could harm our business.
- We must expand our sales and marketing capabilities in order to increase demand for the Acuitas MDRO Gene Test and Lighthouse MDRO Management System.
- In order to further develop and successfully commercialize our the Acuitas MDRO Gene Test, Lighthouse MDRO Management System and future products, we will require substantial additional capital.
- 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 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 approval.
- Our patent and intellectual property rights may not adequately protect our technologies and tests.

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, 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 that can be accessed 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 shares, stock options 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™ is a trademark of Fluidigm Corporation and Human Chromosome Explorer℠ is a servicemark of Hitachi High-Technology 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.

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.

We have elected to take advantage of certain of the reduced disclosure obligations in this prospectus 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 than 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 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 will grant a 30-day option to the underwriters to purchase up to an aggregate of additional shares of common stock.
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 underwriting discounts and commissions and estimated offering expenses. We expect to use the net proceeds from this offering to fund increased sales and marketing, and research and development activities, and for working capital and general corporate 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	To be applied for.

The number of shares of our common stock to be outstanding after this offering is based on 5,993,041 shares of our common stock outstanding as of September 30, 2014, on an as-converted basis assuming conversion of our Series A Convertible Preferred Stock, or Series A Preferred Stock, and our convertible notes, convertible into Series A Preferred Stock, or convertible notes, and excludes:

- 410,870 shares of common stock issuable upon the exercise of stock options outstanding as of September 30, 2014 at a weighted-average exercise price of $1.13 per share;
- 51,227 shares of common stock reserved for future issuance under our 2008 Stock Option and Restricted Stock Plan, as amended, or the 2008 Plan; and
- 37,078 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 stock options on or after September 30, 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, 2013 and 2012 and the nine months ended September 30, 2014 and 2013, and the balance sheet data as of September 30, 2014 have been derived from our audited financial statements and unaudited interim condensed financial statements included elsewhere in this prospectus. Historical results are not necessarily indicative of the results that may be expected in the future and results of interim periods are not necessarily indicative of the results for the entire year.

	Year Ended December 31,		Nine Months Ended September 30,	
	2013	**2012**	**2014**	**2013**
	(In thousands, except share and per share data)			
			(Unaudited)	
Statements of Operations Data:				
Revenue	$ 2,411	$ 5,802	$ 3,004	$ 1,795
Operating expenses:				
Cost of sales	1,823	3,211	691	1,307
Research and development[1]	4,152	4,782	3,300	3,303
General and administrative[1]	2,762	2,473	1,652	2,189
Sales and marketing[1]	3,053	4,274	1,583	2,310
Argus Whole Genome obsolescence	951	--	--	--
Total operating expenses[1]	12,741	14,740	7,227	9,109
Loss from operations	(10,330)	(8,938)	(4,223)	(7,314)
Interest income	1	4	--	1
Interest expense	(32)	(119)	(47)	(9)
Change in fair value of warrant liability	135	--	--	--
Other income (expense), net	91	(231)	4	99
Net loss	$ (10,135)	$ (9,284)	$ (4,266)	$ (7,223)
Net loss applicable to common stockholders	$ (15,508)	$ (14,209)	$ (4,271)	$ (11,403)
Net loss per common share, basic and diluted	$ (896.09)	$ (4,042.38)	$ (11.78)	$ (3,232.04)
Shares used in computing net loss per common share, basic and diluted	17,306	3,515	362,536	3,528

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(1) Includes stock-based compensation as follows:

	Year Ended December 31,		Nine Months Ended September 30,	
	2013	**2012**	**2014**	**2013**
	(In thousands)			
			(Unaudited)	
Research and development	$ 8	$ 24	$ 18	$ 7
General and administrative	143	177	59	133
Sales and marketing	2	14	3	2
Total stock-based compensation	$ 153	$ 215	$ 80	$ 142

	As of September 30, 2014		
	Actual	Pro Forma	Pro Forma As Adjusted
		(In thousands) (Unaudited)	
Balance Sheet Data:			
Cash and cash equivalents	$ 782	$	$
Working capital deficiency	(2,693)	(2,693)	
Total assets	2,209	2,209	
Convertible preferred stock	3,943	-	
Accumulated deficit	(95,367)	(95,367)	
Total stockholders' deficit	(6,022)	(579)	

The preceding table presents a summary of our unaudited balance sheet data as of September 30, 2014:

- 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 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 discounts and commissions and estimated expenses payable by us.

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 and Lighthouse MDRO Management System may never achieve significant commercial market acceptance.

Currently, we rely principally on the commercialization of our Acuitas MDRO Gene Test and Lighthouse MDRO Management System products and services to generate future revenue growth. 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 are using our products. We achieved our first commercial sales of these products and services in the third quarter of 2014, and experienced limited revenue and customer adoption during 2014. In addition, demand for our Acuitas and 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 MDRO assay solution 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 and 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 microbiology and molecular tests;
- our ability to convince the medical community of the accuracy and speed of our products and services, as contrasted with current methods available;
- the willingness of hospitals and physicians to utilize our products and services; and
- the agreement by inpatient health care facilities to recognize the patient safety, improved outcome and cost-effectiveness benefits of using our products and budgeting to pay for them without reimbursement.

We have a history of losses, and we expect to incur net losses for the next several years.

We have incurred substantial net losses since our inception, and we expect to continue to incur additional losses for the next several years. For the years ended December 31, 2013 and 2012 and the nine months ended September 30, 2014, we had a net loss of $10.1 million, $9.3 million and $4.3 million, respectively. From our inception through September 30, 2014, we had an accumulated deficit of $95.4 million. The report of our independent registered public accounting firm on our financial statements for the years ended December 31, 2013 and 2012 contains explanatory language that substantial doubt exists about our ability to continue as a going concern, without raising additional capital. We expect to continue to incur significant operating expenses and anticipate that our expenses will increase due to costs relating to, among other things:

- researching, developing, validating and commercializing potential future diagnostic and screening solutions, including our Acuitas MDRO Gene Test and Lighthouse MDRO Management System;
- developing, presenting and publishing additional clinical and economic utility data intended to increase clinician adoption of our current and future solutions;

- 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 solutions;
- 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 development and commercialization of our Acuitas MDRO Gene Test and 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 and 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, who 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.

New test development involves a lengthy and complex process, and we may not be successful in our efforts to develop and commercialize additional diagnostic and screening solutions. The further development and commercialization of additional diagnostic and screening solutions are key to our growth strategy. New test development involves a lengthy and complex process, and we may not be successful in our efforts to develop and commercialize such solutions.

A key element of our strategy is to discover, develop, validate and commercialize a portfolio of new diagnostic and screening solutions 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 solutions, or that they will prove to be capable of reliably being used for screening and outbreak management services in inpatient healthcare settings. Before we can successfully develop and commercialize any of our currently planned or other new products, we will need to:

- conduct substantial research and development;
- conduct clinical validation studies;
- expend significant funds;

- expand and scale-up our laboratory processes;
- expand and train our sales force; and
- seek and obtain regulatory clearance or approvals of our new solutions, as required by applicable regulations.

This process involves a high degree of risk and may take up to several years or more. Our test development and commercialization 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 clearances or approvals to market 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.

Our future success is dependent upon our ability to expand our customer base and introduce new products.

Our current customer base is primarily composed of inpatient hospitals that use our products to diagnosis the presence of MDROs in patients. 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, in patient safety and recovery, reduced length of stay and reduced costs that come from adopting our MDRO diagnosis and management solutions. 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 solutions requires substantial time and expense. Any failure to expand our existing customer base, or launch new solutions, would adversely affect our ability to improve our operating results.

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 and Lighthouse MDRO Management System products is 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 product 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 utilization of our products, has varied and could be 12 months or longer, which has made it difficult for us to accurately project revenues and other 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 financial 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 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 and Lighthouse MDRO Management System products through our own direct sales force. We have limited experience in marketing and selling these products, which had their formal commercial launch in late 2013. In addition, our assays and information 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 and launched the Acuitas MDRO Gene Test in the second quarter of 2014. During 2015, if we are unable to meet test turn-around time expectations, quality targets, retain and hire personnel, scale our LIMS data solution or if we have other failures in our commercial operations we could face significant setbacks in our ability to execute our business strategy.

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 solutions by clinicians and healthcare facilities and the rate of reimbursement of our current and future solutions by payors may be negatively affected.

The results of our clinical and economic validation studies involving our Acuitas MDRO assay 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.

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 our current and future solutions or the technology underlying Acuitas MDRO Gene Test or 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.

If we cannot enter into and maintain new clinical collaborations, our efforts to commercialize our existing products and our development of new products could be delayed.

We collaborate with hospital systems and academic medical centers to help develop, validate and prove the commercial utility of our products and services. For example, we rely on Fluidigm as a supplier and we work with them as a development partner for our Acuitas tests. In the future, we may work with a clinical collaborator to develop, gain FDA approval for, and commercialize our tests. If our clinical collaborator decides not to work with us in the future it could materially adversely impact our business.

If our sole laboratory facility becomes inoperable, we will be unable to perform Acuitas MDRO Gene Test assays 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 assays, 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. 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 substances used in the chemical reactions incorporated into our products, equipment and other materials which we use in our laboratory operations. 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. 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 this equipment. 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 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 development of our Acuitas MDRO Gene Test assays and Lighthouse MDRO Management System products and develop future 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 U.S. Food and Drug Administration, or 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.

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, 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.

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

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 turnaround 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 FDA were to begin regulating our tests, we could incur substantial costs and delays associated with trying to obtain premarket clearance or approval.

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 the Acuitas MDRO Gene Test is an LDT. 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, 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 approval, is required for the Acuitas MDRO Gene Test or any of our future tests, products or services we may develop, or we decide to voluntarily pursue FDA approval, we may be forced to stop selling our tests while we work to obtain FDA approval. Our business would be negatively affected until such review is completed and clearance to market or approval is 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 unable to develop products to keep pace with rapid technological, medical and scientific change, our operating results and competitive position could be harmed.

In recent years, there have been numerous advances in technologies relating to diagnostics, particularly diagnostics that are based on genomic information. These advances require us to continuously develop our technology and work to develop new solutions to keep pace with evolving standards of care. Our products and services could become obsolete unless we continually innovate and expand our product offerings. If we are unable to develop new products or to demonstrate the applicability of our products, our sales could decline and our competitive position could be harmed.

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 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 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 the our test products, which would eliminate our primary source of revenue and harm our business. If we were cannot secure a license from New York or from other states where we are required to hold licenses, we would not be able to test specimens from those states.

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. The Acuitas MDRO Gene Test is 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 2014 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 changes will be adopted or how such changes would affect our industry generally or our ability to successfully commercialize our product candidates, if approved. Changes in healthcare policy, such as the creation of broad test utilization limits for diagnostic products in general or requirements that Medicare patients pay for portions of clinical laboratory tests or services received, could substantially impact the sales of our tests, increase costs and divert management’s attention from our business. Such copayments by Medicare beneficiaries for laboratory services were discussed as possible cost savings for the Medicare program as part of the debt ceiling budget discussions in mid-2011 and may be enacted in the future. 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.

Complying with numerous statutes and regulations pertaining to our business is an expensive and time-consuming process, and any failure to comply could result in substantial penalties.

We are subject to other regulation by both the federal government and the states in which we conduct our business, including:

- billing and payment regulations applicable to clinical laboratories;
- the Federal anti-kickback law and state anti-kickback prohibitions;
- the Federal physician self-referral prohibition, commonly known as the Stark Law, and state equivalents;
- the Federal Health Insurance Portability and Accountability Act of 1996;
- the Medicare civil money penalty and exclusion requirements;

- the Federal False Claims Act civil and criminal penalties and state equivalents; and
- the Foreign Corrupt Practices Act of 1977, which will apply to our future international activities.

We have adopted policies and procedures designed to comply with these laws and regulations. Our compliance is subject to governmental review. The growth of our business and sales organization may increase the potential of violating these laws or our internal policies and procedures. The risk of our being found in violation of these or other laws and regulations is further increased by the fact that many have not been fully interpreted by the regulatory authorities or the courts, and their provisions are open to a variety of interpretations. Any action brought against us for violation of these or other laws or regulations, even if we successfully defend against it, could cause us to incur significant legal expenses and divert our management's attention from the operation of our business. If our operations are found to be in violation of any of these laws and regulations, we may be subject to any applicable penalties associated with the violation, including civil and criminal penalties, damages and fines, we could be required to refund payments received by us, and we could be required to curtail or cease our operations. Any of the foregoing consequences could seriously harm our business and our financial results.

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 September 30, 2014, we had license or ownership rights to 68 patents, including 19 pending United States non-provisional patent applications, and 15 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, workers' compensation, products liability 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 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 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 could lead to product liability claims if someone were to allege that Acuitas MDRO Gene Test 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 losses to offset income before such unused losses 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 net operating loss carryforwards and other pre-change tax attributes to offset its post-change income may be further limited. We do not believe that we will experience an ownership change as a result of this initial public offering. However, we may experience ownership changes in the future as a result of subsequent shifts in our stock ownership. As of December 31, 2013, we had federal net operating loss carryforwards of $26.1 million and research and development tax credits of $1.8 million that could be limited if we experience an ownership change, which could have an adverse effect on our results of operations. These federal net operating loss carryforwards will expire commencing in 2021 if not utilized.

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 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.

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.

Health insurers and other third party payors may decide not to cover, or may reduce or discontinue reimbursing for, our tests or any other diagnostic tests we may develop in the future, or may provide inadequate reimbursement, which could jeopardize our ability to expand our business and achieve profitability.

Neither we or are customers currently receive reimbursement from Medicare, Medicaid, other governmental payors or commercial third party payors for our tests. If we decide to pursue reimbursement, we will need to apply for coverage determinations from a number of payors. The Centers for Medicare and Medicaid Services, or CMS, under the U.S. Department of Health and Human Services, or HHS, establishes reimbursement payment levels and coverage rules for Medicare and Medicaid. State Medicaid plans and commercial third party payors establish rates and coverage rules independently. As a result, the coverage determination process is often a time-consuming and costly process that requires us to provide scientific and clinical support for the use of our tests to each payor separately, with no assurance that coverage or adequate reimbursement will be obtained.

Even if one or more third party payors decides to reimburse for our tests, that payor may reduce utilization or stop or lower payment at any time, which could reduce our revenues. For example, payment for clinical laboratory tests furnished to Medicare fee-for-service beneficiaries is made based on a fee schedule established from time to time by CMS. In recent years, payments under these fee schedules have decreased and may decrease more. Some commercial third party payors are guided by Medicare clinical laboratory fee schedules in establishing their reimbursement rates. We cannot predict whether or when third party payors will cover our tests or offer adequate reimbursement to make them commercially attractive. Furthermore, if we enter into contracts with commercial third party payors, we may be reimbursed at an amount lower than the contracted test price. Clinicians may decide not to order our tests if third party payments are inadequate, especially if ordering the test could result in financial liability for the patient.

Billing complexities associated with obtaining payment or reimbursement for our tests may negatively affect our revenues, cash flow and profitability.

Billing for laboratory testing services is complex. We generally perform tests in advance of payment and without certainty as to the outcome of the billing process. In cases where we receive a fixed fee per test, we may still have disputes over pricing and billing. We currently receive payment directly from hospitals and healthcare facilities, but in the future we may receive payment from a variety of payors, such as commercial insurance carriers, including managed care organizations and governmental programs, primarily Medicare and Medicaid. Each payor typically has different billing requirements, and the billing requirements of many payors have become increasingly stringent. In addition, part of the focus on healthcare cost containment activities and healthcare reform is on reimbursement and/or payment for healthcare services, including laboratory tests. Such focus includes ongoing assessment of reimbursement regulations, including balance billing, collection of copays and deductibles and other reimbursement matters, particularly in the setting of high deductible insurance plans, managed care and other healthcare reform initiatives.

Among the factors that could complicate our billing of third party payors are:

- disparity in coverage among various payors;
- disparity in information and billing requirements among payors;
- changing reimbursement laws, regulations and payor policies; and
- incorrect or missing billing information, which is required to be provided by the prescribing physician.

These billing complexities, and the related uncertainty in obtaining payment for our tests, could negatively affect our revenues, cash flow and profitability.

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, 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.

If we accept payment from federal and state healthcare programs, 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 a 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.

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 Securities and Exchange Commission, or 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 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 September 30, 2014, on an as-converted basis, assuming the conversion of our outstanding Series A Preferred Stock and convertible notes, upon the closing of this offering, we will have outstanding a total of 5,993,041 shares of common stock. Of these shares, 144,694 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 a lock-up agreement with the underwriters that restricts their ability to sell or transfer their shares. The lock-up agreements pertaining to this offering will expire 180 days from 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 September 30, 2014, up to an additional 5,848,347 shares of common stock will be eligible for sale in the public market, of which 5,158,267 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, 410,870 shares of common stock that are subject to outstanding options and 37,078 shares of common stock that are subject to outstanding warrants as of September 30, 2014 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 September 30, 2014, directors and executive officers and their affiliates beneficially owned, in the aggregate, approximately 82% of our outstanding capital stock. 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 the offering for selling and marketing activities, including expansion of our sales force to support the ongoing commercialization of our current products and future products, for research and development activities, including medical and clinical costs, related to the continued support of the Acuitas MDRO Gene Test and Lighthouse MDRO Management System, as well as the development of our product pipeline, 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 capital. 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. In addition, our loan and security agreement restricts our ability to pay cash dividends on our common stock and we may also enter into credit agreements or other borrowing arrangements in the future that will restrict our ability to declare or pay cash dividends on our common stock. 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 development and commercialization of our Acuitas MDRO Gene Test and 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 Securities and Exchange Commission 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 discounts 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 selling and marketing activities, including expansion of our sales force to support the ongoing commercialization of our current products and future products;
- approximately $ million for research and development related to the continued support of our Acuitas and Lighthouse products, as well as the further development of our product 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.

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 research and development or selling and marketing 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. In addition, the terms of our outstanding indebtedness restrict our ability to pay dividends, and any future indebtedness that we may incur could preclude us from paying dividends. 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 September 30, 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 discounts 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 September 30, 2014		
	Actual	**Pro Forma**	**Pro Forma as Adjusted**
	(In thousands, except share and per share data) (Unaudited)		
Cash and cash equivalents	$ 782	$	$
Convertible notes	$ 1,500	$ -	$
Long-term debt, net of discount	159	159	
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.	3,943	--	
Stockholder's (deficit) equity:			
Common stock, par value $0.01 per share: 7,500,000 shares authorized, 362,536 shares issued and outstanding, actual; 7,500,000 shares authorized, 5,862,400 shares issued and outstanding, pro forma; and shares authorized and shares issued and outstanding, pro forma as adjusted	4	59	
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	89,341	94,729	
Accumulated deficit	(95,367)	(95,367)	
Total stockholders' (deficit) equity	(6,022)	(579)	
Total capitalization	$ (420)	$ (420)	$

If the underwriters' over-allotment option were exercised in full, pro forma as adjusted cash and cash equivalents, common stock, additional paid-in capital, total stockholders' equity and shares issued and outstanding as of September 30, 2014 would be $____ , $______, $______ , $________ and _________, respectively.

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

- 410,870 shares of common stock issuable upon the exercise of options outstanding at September 30, 2014 at a weighted average exercise price of $1.13 per share;
- 51,227 shares of common stock reserved for future issuance under our 2008 Plan; and
- 37,078 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.

Net tangible book value per share is determined by dividing our total tangible assets less our total liabilities by the number of shares of common stock outstanding. Our historical net tangible book value (deficit) as of September 30, 2014, was ($2.1) million, or ($0.36) per share of common stock, including conversion of all outstanding shares of Series A Preferred Stock and all convertible notes. Our pro forma net tangible book value as of September 30, 2014, was $____ million, or $_____ per share of common stock, based on the total number of shares of our common stock outstanding as of September 30, 2014, after giving effect to the automatic conversion of all outstanding shares of our convertible preferred stock and convertible notes into common stock upon the closing of this offering.

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 discounts and commissions and estimated offering expenses payable by us, our pro forma as adjusted net tangible book value as of September 30, 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 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 September 30, 2014	$ (0.36)	
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 shares in this offering would be $ per share.

The following table presents, on a pro forma as adjusted basis as of September 30, 2014, the differences between existing stockholders and purchasers of shares 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 shares in this offering, is based on the initial public offering price of $ per share, before deducting underwriting discounts and commissions and estimated expenses payable by us:

	Total Shares		Total Consideration		Average Price per
	Number	**Percent**	**Amount**	**Percent**	**Share**
Existing stockholders before this offering					
Investors participating 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 shares outstanding as of September 30, 2014 after giving effect to the automatic conversion of all outstanding shares of convertible preferred stock and convertible notes into common stock upon the closing of this offering and exclude:

- 410,870 shares of common stock issuable upon the exercise of options outstanding at September 30, 2014, at a weighted average exercise price of $1.13 per share;
- 51.277 shares of common stock reserved for future issuance under our 2008 Plan; and
- 37,078 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 options 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, 2013 and 2012 and the selected balance sheets data as of December 31, 2013 and 2012 from our audited financial statements included elsewhere in this prospectus. We derived the selected statements of operations data for the nine months ended September 30, 2014 and 2013 and the selected balance sheets data as of September 30, 2014 from our unaudited interim condensed financial statements and related notes included elsewhere in this prospectus. Our unaudited interim condensed financial statements were prepared on the same basis as our audited financial statements and include, in our opinion, all adjustments, consisting of normal recurring adjustments that we consider necessary for a fair presentation of the financial information set forth in those financial statements. Historical results are not necessarily indicative of the results that may be expected in the future. 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,		Nine Months Ended September 30,	
	2013	2012	2014	2013
	(In thousands, except share and per share data)		(Unaudited)	
Statements of Operations Data:				
Revenue	$ 2,411	$ 5,802	$ 3,004	$ 1,795
Operating expenses:				
Cost of sales	1,823	3,211	691	1,307
Research and development[(1)]	4,152	4,782	3,300	3,303
General and administrative[(1)]	2,762	2,473	1,652	2,189
Sales and marketing[(1)]	3,053	4,274	1,583	2,310
Argus Whole Genome obsolescence	951	--	--	--
Total operating expenses[(1)]	12,741	14,740	7,227	9,109
Loss from operations	(10,330)	(8,938)	(4,223)	(7,314)
Interest income	1	4	--	1
Interest expense	(32)	(119)	(47)	(9)
Change in fair value of warrant liability	135	--	--	--
Other income (expense), net	91	(231)	4	99
Net loss	$ (10,135)	$ (9,284)	$ (4,266)	$ (7,223)
Net loss applicable to common stockholders	$ (15,508)	$ (14,209)	$ (4,721)	$ (11,403)
Net loss per common share, basic and diluted	$ (896.09)	$ (4,042.38)	$ (11.78)	$ (3,232.04)
Shares used in computing net loss per common share, basic and diluted	17,306	3,515	362,536	3,528

(1) Includes stock-based compensation as follows:

	Year Ended December 31,		Nine Months Ended September 30,	
	2013	2012	2014	2013
	(In thousands)		(Unaudited)	
Research and development	$ 8	$ 24	$ 18	$ 7
General and administrative	143	177	59	133
Sales and marketing	2	14	3	2
Total stock-based compensation	$ 153	$ 215	$ 80	$ 142

	September 30 2014	December 31 2013	December 31 2012
		(In thousands)	
	(Unaudited)		
Balance Sheets Data:			
Cash and cash equivalents	$ 782	$ 1,400	$ 7,118
Working capital deficiency	(2,693)	(791)	(7,185)
Total assets	2,209	3,159	10,600
Convertible preferred stock	3,943	2,000	83,745
Accumulated deficit	(95,367)	(91,101)	(75,593)
Total stockholders’ deficit	(6,022)	(1,833)	(75,593)

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. When we refer to OpGen, Inc. we use the terms "OpGen," "the Company," "us," "we" and "our."

Overview

OpGen, Inc. was incorporated in Delaware on January 22, 2001. OpGen is a commercial-stage company using rapid molecular testing and bioinformatics to combat multi-drug resistant infections. The Company's 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. Its products are enabled by our Lighthouse™ bioinformatics platform which provides 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 product is the Acuitas™ MDRO Gene Test, a CLIA-lab based test to provide a comprehensive profile of MDRO resistance genes from ICU patients screened for colonization or infection. The Company's headquarters and principal operations are in Gaithersburg, Maryland. The Company had an additional facility in Madison, Wisconsin, which was closed in April 2013. The Company operates in one business segment.

Recent Developments

In late 2013 and throughout 2014, the Company has continued to seek to raise capital to further its business. We raised $4.0 million in a convertible notes offering, which converted to Series A Convertible Preferred Stock, and two Series A Convertible Preferred Stock offerings during the fourth quarter of 2013 and early 2014, raised $1.5 million through the issuance of convertible debt in the third quarter of 2014 and raised $1.0 million through the issuance of promissory notes in October and November 2014. Management remains actively engaged in efforts to raise additional capital. Our current operating assumptions, which include our best estimate of future revenue and operating expenses, indicate that our current cash on hand as of September 30, 2014 of approximately $0.8 million will not be sufficient to fund operations through the end of 2014.

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, 2013 and 2012

Revenues

	Year ended December 31,	
	2013	**2012**
Product sales	$ 1,735,517	$ 3,767,968
Laboratory services	630,851	770,600
Collaboration revenue	44,239	1,263,159
Total revenue	**$ 2,410,607**	**$ 5,801,727**

The Company's total revenue decreased 58% in 2013, from $5.8 million to $2.4 million. This decrease is primarily attributable to:

- A decrease of 54% in products sales. Unit sales of Whole Genome Mapping systems fell from ten in 2012 to three in 2013, accounting for $1.7 million of the decline in product sales. The balance of the decrease was related to lower unit sales of Whole Genome Mapping reagents.

- A decrease of 18% in laboratory services revenue.

- A decrease of 96% in revenue generated under collaborative arrangements. The Company earned $1.3 million in 2012 under a collaboration contract that was completed in early 2013. In late 2013, the Company entered into a new collaboration contract with a different customer. Revenue in 2013 represented only a small amount of revenue for each of those contracts.

The Company expects revenues to increase in 2014 over 2013. Collaboration revenue in 2014 is expected to exceed $2.0 million related to the contract signed in late 2013. Whole Genome mapping revenues are projected to decline in 2014, primarily related to lower sales of systems.

Operating Expenses

	Year ended December 31,	
	2013	**2012**
Cost of product sales	$ 1,501,648	$ 2,903,652
Cost of services	320,938	307,539
Research and development	4,151,936	4,782,414
General and administrative	2,762,205	2,472,454
Sales and marketing	3,053,394	4,274,180
Argus™ Whole Genome obsolescence	950,881	-
Total operating expenses	**$ 12,741,002**	**$ 14,740,239**

The Company's total operating expenses decreased 14% in 2013 as contrasted with 2012, from $14.7 million to $12.7 million. This decrease is primarily attributable to:

- a decrease of 48% in cost of product sales related to lower unit sales and cost reductions in the Company's Whole Genome Mapping manufacturing operations;

- an increase of 4% in cost of services revenues, mostly related to higher operating supplies costs;

- a decrease of 29% in sales and marketing expenses as cost reductions implemented in early 2013 reduced payroll, consulting and travel expenses by $0.8 million and outside marketing expenses by $0.4 million; and

- offset by a 12% increase in general and administrative expenses, mostly related to higher legal expenses, and a write-down of the Company's Whole Genome Mapping inventory of approximately $1.0 million.

The Company expects that operating expenses will decline in 2014 compared with 2013 as costs savings from the February and April 2013 workforce and expense reductions continued into 2014. In addition, 2014 projected operating expenses are lower compared with 2013 as 2013 included a $1.0 million inventory write-down and $0.3 of restructuring costs.

Other Income (Expense)

	Year ended December 31,	
	2013	2012
Interest income	$ 1,222	$ 4,489
Interest expense	(31,598)	(118,666)
Change in fair value of derivative financial instruments	134,560	-
Other income (expense)	91,390	(231,023)
Total other income (expense)	**$ 195,574**	**$ (345,200)**

Total net other income was $0.2 million in 2013, as compared to total net other expense of $0.3 million in 2012. Significant changes from year to year consist of:

- Our interest expense was lower in 2013 as convertible loan amounts from our investors were lower and outstanding for shorter periods of time.

- The fair value of our warrant liabilities decreased to zero in 2013 as all derivative securities that gave rise to these obligations were eliminated in our December 2013 recapitalization. As a result, we recognized a gain on the elimination of this obligation.

- Other income (expense) in 2012 included $0.1 million of bad debt expense and $0.1 million for the cost of a Series C warrant granted to our collaboration partner while other income (expense) in 2013 included income for loan forgiveness, a reversal of bad debt expense and gains on the sale of excess equipment.

Results of Operations for the Nine Months Ended September 30, 2014 and 2013

Revenues

	Nine Months ended September 30,	
	2014	2013
Product sales	$ 841,567	$ 1,221,220
Laboratory services	379,339	556,902
Collaboration revenue	1,783,340	16,461
Total revenue	**$ 3,004,246**	**$ 1,794,583**

The Company’s total revenue increased 67% from the 2013 period to the 2014 period, from $1.8 million to $3.0 million. This increase is primarily attributable to:

- A decrease of 31% in products sales as Whole Genome Mapping system sales declined $0.5 million while all other product sales increased 13%.

- A decrease of 32% in laboratory services revenue.

- Collaboration revenue of $1.8 million in 2014 reflecting a full nine months of development efforts compared with almost no revenue in 2013.

Operating Expenses

	Nine Months ended September 30,	
	2014	2013
Cost of product sales	$ 292,116	$ 1,012,396
Cost of services	398,628	293,149
Research and development	3,300,124	3,303,000
General and administrative	1,652,599	2,190,595
Sales and marketing	1,583,718	2,309,673
Total operating expenses	**$ 7,227,185**	**$ 9,108,813**

In 2014, the Company's total operating expenses decreased 21% from the 2013 period, from $9.1 million to $7.2 million. This decrease is primarily attributable to:

- A decrease of 71% in cost of products sales. This decrease resulted from lower manufacturing costs, lower unit volumes and lower royalty expense.

- An increase of 36% in cost of services revenues mostly related to complex large genome projects.

- A decrease of 31% in sales and marketing expenses. Payroll, consulting and travel expenses for sales and marketing activities were $0.7 million lower in the 2014 period.

- A decrease of 25% in general and administrative expenses. Lower payroll and legal expenses were the principal reason general and administrative expenses declined.

Other Income (Expense)

	Nine Months ended September 30,	
	2014	2013
Interest income	$ 120	$ 1,176
Interest expense	(47,468)	(9,127)
Other income (expense)	4,400	98,991
Total other income (expense)	**$ (42,948)**	**$ 91,040**

Total net other expense was $43 thousand in the 2014 period, as compared to total net other income of $0.1 million in the 2013 period. Significant changes from period to period consist of:

- our interest expense was higher in 2014 due to our outstanding convertible loans principal in 2014; and

- other income (expense) in the first nine months of 2013 included loan forgiveness and the reversal of bad debt expense.

Liquidity and Capital Resources

At December 31, 2013, the Company had approximately $1.4 million in cash and cash equivalents, compared to $7.1 million at December 31, 2012. During 2014, the Company has raised gross proceeds of approximately $4.0 million through the issuance of redeemable convertible preferred stock, convertible promissory notes and promissory notes. Management remains actively engaged in efforts to raise additional capital. We have cash on hand of $0.8 million as of September 30, 2014. Our current operating assumptions, which include our best estimate of future revenue and operating expenses, indicate that our current cash on hand as of September 30, 2014 will not be sufficient to fund operations through the end of 2014.

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.

The Company's primary cash requirements are to fund operations, including operations as well as research and development programs and collaborations, and 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 $4.0 million through the issuance of redeemable convertible preferred stock, convertible promissory notes and promissory 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,		Nine Months ended September 30,	
	2013	**2012**	**2014**	**2013**
Net cash used in operating activities	$ (7,487,822)	$ (7,961,001)	$ (3,905,198)	$ (6,184,949)
Net cash used in investing activities	$ (109,871)	$ (210,528)	$ (39,537)	$ (38,459)
Net cash provided by (used) in financing activities	$ 1,880,324	$ 14,773,718	$ 3,325,963	$ (106,921)

Net Cash Used In Operations

Net cash used in operating activities was $7.5 million for the year ended December 31, 2013, compared to $8.0 million for 2012. The slight decrease was primarily due to a $0.9 million increase in net loss in 2013, offset by a $1.0 million net increase in working capital and a $0.3 million increase in noncash expenses (such as stock-based compensation expense, and inventory obsolescence reserves).

Net cash used in operating activities was $3.9 million for the nine months ended September 30, 2014, compared to $6.2 million for the comparable 2013 interim period. The decrease was primarily due to a $3.0 million decrease in net loss in 2014, offset by a $0.8 million net decrease in 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 (Used In) Financing Activities

Net cash provided by financing activities was $1.9 million during 2013, as compared to $14.8 million during 2012. Net cash provided by financing activities was $3.3 million during the nine months ended September 30, 2014, as compared to a use of funds of $0.1 million during the nine months ended September 30, 2013. The primary sources and uses of financing activities in both periods were capital raised from the sale of preferred stock and from the issuance of debt instruments, offset in part by principal payments on debt instruments and capital lease obligations.

Critical Accounting 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, and 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

Share-based payments to employees, directors and consultants are recognized at fair value. The fair value of share-based payments 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. 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.

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 Jumpstart Our Business Startups Act of 2012, or 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 irrevocable 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 as other public companies that are not emerging growth companies.

Recently Issued Accounting Standards

In July 2012, the Financial Accounting Standards Board, or FASB, issued accounting guidance to simplify the evaluation for impairment of indefinite-lived intangible assets. Under the updated guidance, an entity has the option of first performing a qualitative assessment to determine whether it is more likely than not that an indefinite-lived intangible asset is impaired before proceeding to the quantitative impairment test under which it would calculate the asset's fair value. When performing the qualitative assessment, the entity must evaluate events and circumstances that may affect the significant inputs used to determine the fair value of the indefinite-lived intangible asset. The adoption of this standard in 2013 did not have a material impact on the Company's consolidated results of operations, cash flows or financial position.

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 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 a commercial stage company using molecular testing and bioinformatics 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 Acuitas™ MDRO Gene Test products are enabled by our Lighthouse™ bioinformatics platform which provides 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. We believe we have an important first-mover advantage in providing Acuitas enabled molecular information to healthcare providers on a commercial scale.

Our lead product, the Acuitas™ MDRO Gene Test, is, to our knowledge, the first CLIA lab-based test to provide a comprehensive profile of MDRO resistance genes from patients screened for colonization or infection. The test was introduced in the first half of 2014 and is in clinical evaluations or in the implementation process at a number of prominent healthcare systems. In 2015, we expect to expand our customer base and to introduce a number of new products based on our molecular testing and bioinformatics platforms.

Please refer to the Glossary on page 72 of this prospectus for definitions of scientific, health care and regulatory terms used in this prospectus.

Antimicrobial Resistance – An Urgent Global Issue

Antimicrobial resistance is one of the most serious health threats in health care today. MDROs have been prioritized as an urgent national and global threat by the CDC, the President of the United States, and the 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 avoidable costs to the U.S. healthcare system. In most cases, these infections require prolonged and/or costlier treatments, extended hospital stays, necessitate 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.

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 growing 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 epidemiological linked contacts.

Culture based screening methods for CRE can take up to five or more days for identification and subsequent characterization of suspected CRE bacteria. The OpGen Acuitas MDRO Gene Test provides accurate test results for CRE genes and other MDRO genes back to the healthcare provider in less than one day. These test results provide actionable information to healthcare providers so that positive patients (both colonized and symptomatic) can receive appropriate isolation precautions and patients with negative results can be removed from isolation precautions if applicable.

Our Acuitas MDRO Gene Test detects the presence of CRE resistance genes with higher sensitivity than conventional screening methods. In a recent comparison with CRE culture performed at a national reference lab, the Acuitas test was 100% sensitive and specific while the CRE culture method was just 72% sensitive. Culture methods also create many false positive results which potentially result in patients receiving unnecessary and costly contact precautions. In one recent pilot study of the Acuitas MDRO Gene Test, 32% of initial culture screen results were false positives while the Acuitas test had 100% agreement with the confirmed results.

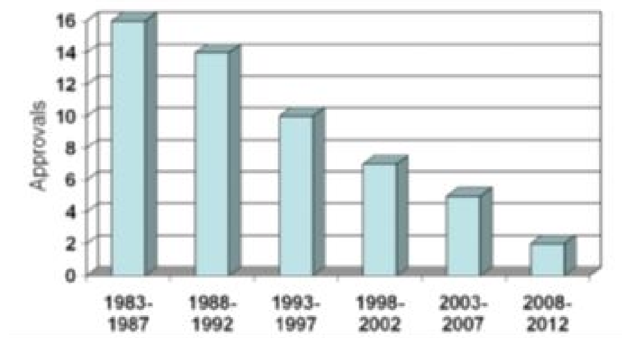
Active surveillance for antibiotic-resistant microbial colonization has been shown to reduce overall infection rates and to help reduce hospital costs by avoiding unnecessary hospital days per patient. For example, Israel had a country-wide outbreak of Klebsiella pneumonia carbapenemase, or KPC, from 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 of this national healthcare crisis, 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.

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 is responsible for roughly 15% of gram-negative infections in hospital intensive care units. Infections caused by 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 strains of pneumonia K. pneumoniae is their propensity to cause outbreaks in health care 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 that makes spread difficult to control and outbreaks difficult to stop. In addition, K. pneumoniae can survive for several hours on the hands of hospital personnel, which likely facilitates nosocomial spread. Effective control of K. pneumoniae 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. With few treatment options available, screening, infection control, and antibiotic stewardship have become our most powerful weapons in the fight to contain this building epidemic.



New systemic antibacterial agents approved by the U.S. Food and Drug Administration per 5-year period, through 2012.

Carbapenem and ESBL Resistant Gram-negative Bacteria

When gram-negative ESBL resistant bacteria become carbapenem resistant a Superbug resistant to virtually all 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 the gut floraand frequently cause 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 cephalosporins 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 Klebsiella pneumoniae carbapenemase, or 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 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 impact infection control programs and antibiotic stewardship.

The Opportunity

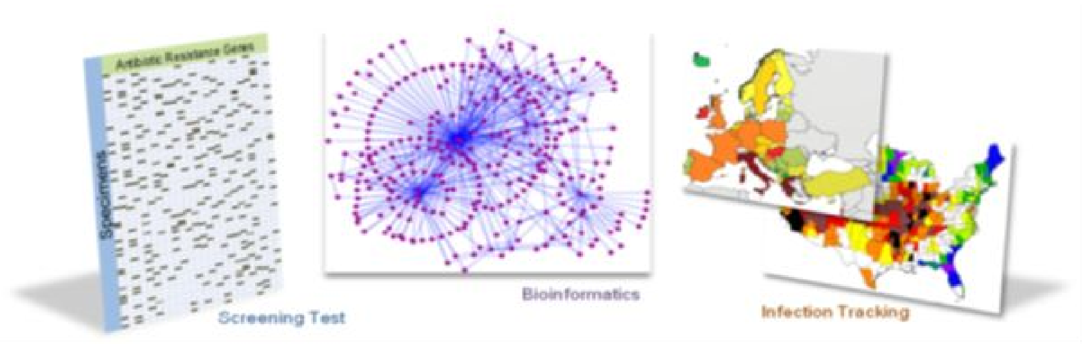
The discovery of antibiotics in the early 20th century fundamentally transformed human and veterinary medicine. Antibiotics save millions of lives each year in the U.S. and around the world. The rise of antibiotic resistant bacteria represents a growing and serious threat to public health and the economy, and now has been raised to the national security threat level. 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, comprehensive 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. The potential for improvements based on cell culture alone have reached a plateau while 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 are transforming clinical and public health microbiology practice. Using technologies developed for production genetics applications and high resolution genome sequencing it is now possible to envision 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. Researchers have shown the ability to predict antibiotic resistance with up to 99% accuracy using DNA testing. This breakthrough combined with the speed, reliability and increased information content available with evolving DNA detection methods is leading to a fundamental transformation of the field of microbiology and 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 complete 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 determine the genetic characteristics of targeted infectious organisms 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 provide customized diagnostic information for newly diagnosed patients to allow targeted antibiotic therapy earlier and more effectively.

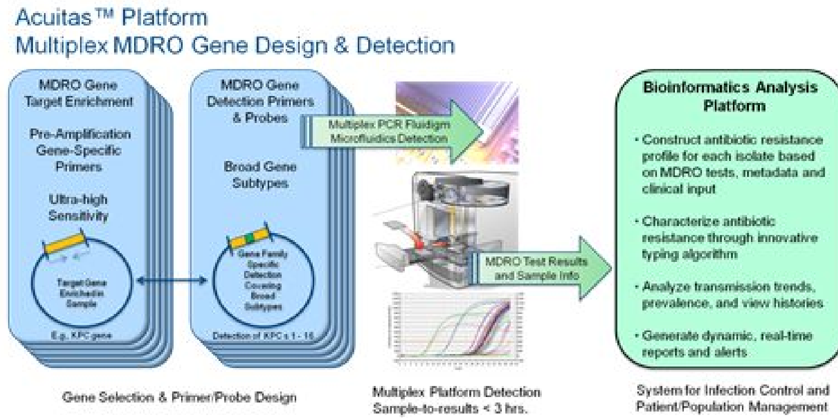
We have developed a comprehensive approach for screening for MDROs in hospitals using DNA testing. Our Acuitas Genet Tests are integrated with our Lighthouse MDRO Management System and laboratory information products to provide real-time information on the MDRO colonization status for patients, acute care ICUs, and hospitals. We combine our molecular test information and microbiology test results from our customized CLIA based tests to create Lighthouse MDRO profiles. Lighthouse MDRO profiling facilitates MDRO tracking and results are easily aggregated with 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 help reduce overall disease rates and to strengthen the national capacity to detect and manage treatment of drug resistant bacterial strains.



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

Acuitas MDRO Gene Test

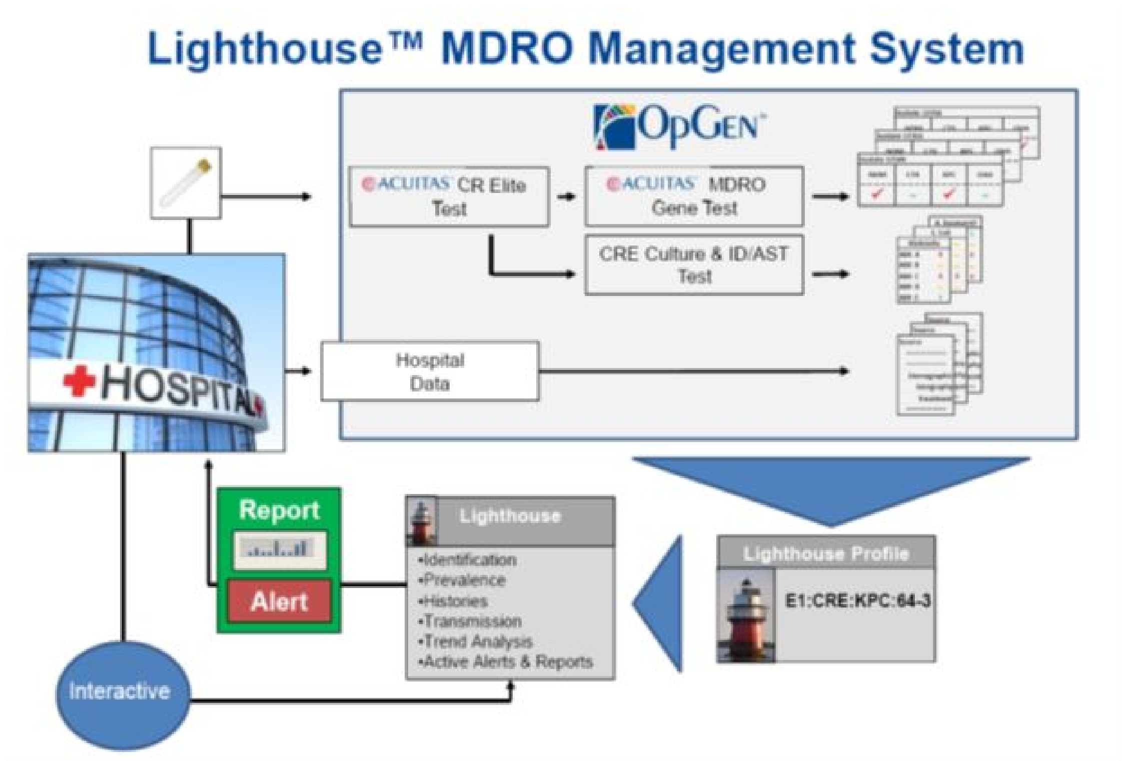
Our Acuitas MDRO Gene Test directly detects seven critical MDRO genes from one patient swab. The test provides fast, accurate molecular results for genes associated with CRE, ESBL (extended spectrum beta lactamase) and VRE (vancomycin resistance enterobacteria) resistance genes. The test identifies patients at risk for being colonized. In our CLIA evaluation studies and customer pilot studies, the test has been proven to be highly accurate when compared to established reference methods, demonstrating nearly 100% correlation in identifying patients carrying MDROs and those free of MDRO bacteria.



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

Lighthouse MDRO

Our Lighthouse MDRO Management System solution 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. Lighthouse MDRO dynamic profiling incorporates identity, phenotype and MDRO gene presence and assigns unique microbe identifiers, Lighthouse MDRO profiles, based on MDRO gene composition and antibiotic susceptibility, or AST, data. Lighthouse MDRO profiling provides the first diagnostic tracking tool for MDRO infection in the hospital setting. Our Lighthouse MDRO solution is based on our CLIA and HIPAA compliant LIMS database system. We are developing unique web-based portal for access to LIMS-based lab reports and Lighthouse MDRO data reports.



Acuitas CR Elite, Resistome and Grow on the Go

Our CR Elite culture test is designed for culture-based confirmation of CRE resistance with the Acuitas MDRO Gene test. Positive MDRO gene tests are reflex tested to determine organism ID and AST profiles. We are also developing companion culture for ESBL and our proprietary Grow on the Go technology. With Grow on the Go, specimens are cultured during transport to allow for overnight shipping and immediate analysis on receipt at the OpGen CLIA Lab.

Acuitas Resistome Gene Test

We are using our production genomics capabilities to develop the Acuitas Resistome Gene test. The test is anticipated to include resistant genes for carbapenems, ESBLs, ampicillin-resistant genes and other key MDRO genes. We anticipate using the Resistome Gene test for Lighthouse MDRO profiling of specimens collected in hospitals for MDRO surveillance and clinical isolates from infected patients. The 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 comprehensive MDRO screening and patient management solutions.

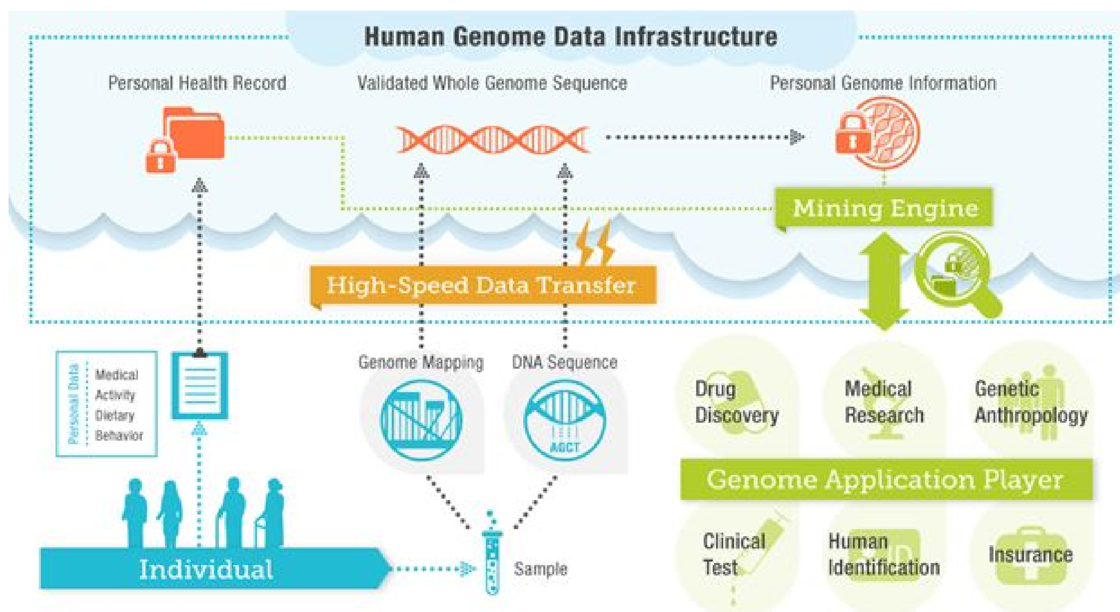
Microbial and human genome mapping and sequencing

Infectious disease testing is undergoing a transformation where DNA testing is replacing classical methods because of its accuracy and speed. DNA tests make it possible to simultaneously detect drug resistance 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. High resolution DNA analysis methods such as whole genome DNA sequencing offer the ability to accurately track hospital acquired infections 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. We have more than ten years of experience mapping microbial genomes. Our customers include government public health agencies such as the CDC, FDA, USDA and biodefense organizations.

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

The following schematic provides a summary of the potential outcome of this collaboration:



Our Strategy

- Commercialize our Lighthouse MDRO Management System to healthcare providers, governments, and diagnostic companies.
- Develop and commercialize proprietary molecular diagnostic products with companion informatics and microbiology offerings.

- 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 and combining this information with patient specific data for healthcare providers. This complete infection control, antibiotic stewardship and patient management data will be difficult for future market entrants to replicate.

- Expand our lab service offerings and capabilities through supply of kits for use on our Fluidigm based DNA Probe assay platform and commercially available rapid diagnostic test systems, develop 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 Lighthouse MDRO solution on a global basis. Build on our established market-leading position in Whole Genome Mapping through our relationship 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 in the 1,000 hospitals with between 150 and 350 beds are candidates for our products and services. 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 an attractive target market for OpGen.

The trend towards forming accountable care organizations, or ACOs, is expected to increase the focus on length of stay and the overall cost of hospital procedures. Since HAIs result in increased costs of approximately $24,000 per 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 comprehensive solutions to state public health organizations and federal government agencies for tracking of MDRO infections and internationally in the hospital market and to sovereign governments for surveillance and outbreak management.

Commercialization Strategy & Plans

Our strategy is optimized to help establish our Lighthouse MDRO Management System and our Acuitas tests 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 and the Lighthouse MDRO Management System will improve clinical outcomes and 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, the 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 trusted and professional partner to provide the information necessary so that healthcare providers can manage infection control on an institution-wide basis.
- Pilot. A detailed 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 detailed 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 Lighthouse MDRO Management System.

We may also enter into Performance Based Risk Sharing Agreements with healthcare institutions to introduce our diagnostic and screening products and services to them.

To date, approximately ten healthcare systems and long term care facilities have participated in our Partner-Pilot-Program process. During 2015 we expect these partner institutions to become long-term customers supporting our growth projections. We anticipate expanding these programs to capture cost-benefit and clinical outcomes data.

Achieving Standard of Care

We anticipate using our early adopter accounts as references as we replicate our Partner-Pilot-Program approach. A second major initiative is to develop institution-wide Lighthouse MDRO Management System surveillance programs. We intend to establish and brand our Lighthouse MDRO surveillance and control management systems. Our capitated surveillance testing programs will bring the following benefits to participating institutions:

- Platinum status as a proactive MDRO surveillance and “best practices” institution;
- Patient safety and enhanced hospital reputation 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 negative headline risk from undetected MDRO hospital wide outbreaks.

Establishing MDRO surveillance screening as the standard of care in the U.S. is an important corporate objective. Recent experience with the Ebola outbreak in West Africa is expected to help reinforce the view that early and aggressive action is important to prevent uncontrollable infectious disease outbreaks in future years. 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:

- Close early adopter institutions;

- Demonstrate the value of our complete solutions in clinical practice;

- Document and educate healthcare providers regarding the clinical validation, clinical utility and improved outcomes that can be obtained with our comprehensive solution;

- 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 comprehensive solution

Our products and services are integrated into a single comprehensive solution for healthcare providers. By completely addressing institutional needs for informatics, genetic analysis and microbiologic testing we are establishing a market leadership position as a trusted expert in MDRO testing. The OpGen solution is optimized to help hospitals reduce hospital acquired disease rates by helping rapidly identify patients colonized with MDROs who should receive contact precautions and to help guide antibiotic therapy. Additional products in development are outlined below.

R&D

Our current focus is on the development of our Acuitas and Lighthouse MDRO products and service offerings. For the years ended December 31, 2013 and 2012, our research and development expenditures were $4,151,936 and $4,782,414, respectively, and were $3,300,124 for the nine months ended September 30, 2014.

We intend to build on our market leading position and first-mover advantage by continuing to invest in the development of our Acuitas and Lighthouse MDRO product offerings. Our ongoing research and development efforts include:

- Further development of our Acuitas gene tests;
- Investments in information technology including our Lighthouse MDRO portal database interpretation capabilities, and next generation sequencing assembly and bioinformatics;
- Improved microbiology methods for MDRO culture screening such as our Grow on the Go technology, ESBL culture and additional culture methods to help improve test workflows;
- Combined testing methods from new sample types; and
- Multiplex tests addressing newly identified clinical needs.

Acuitas Resistome

We are developing the Acuitas Resistome test for rapid, high resolution, low cost testing of microbial isolates. The Resistome test will enable higher resolution Lighthouse MDRO profiling for patients with positive Acuitas MDRO Gene tests and for positive samples from infected patients and repositories of specimens at public health labs.

Lighthouse MDRO Portal

We are developing the Lighthouse MDRO portal to provide infection control personnel and physicians access to data from our CLIA Lab LIMS database and to allow users to generate customized tracking reports for MDROs in the hospital.

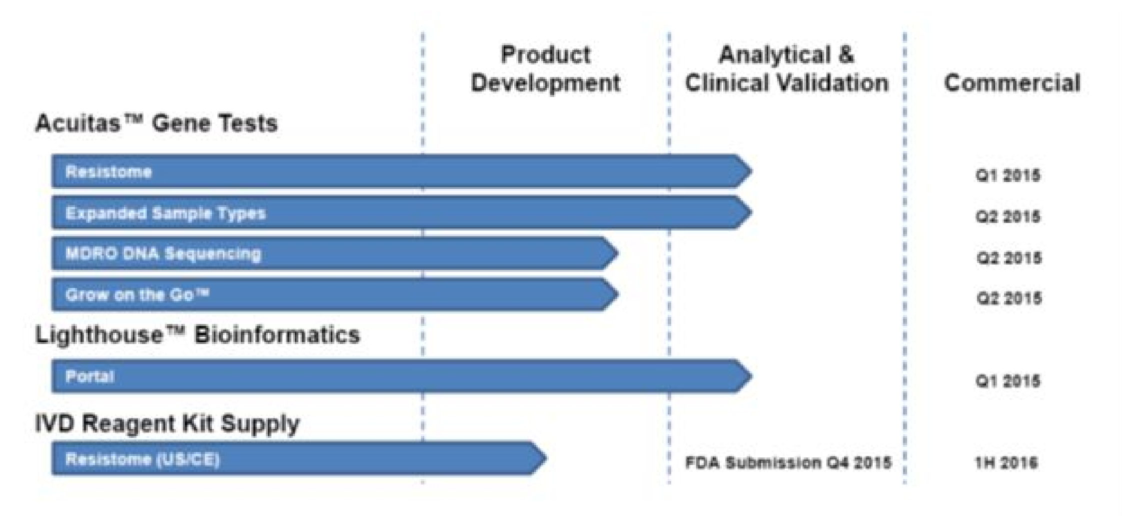
Acuitas MDRO sequencing

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

Expanded Sample Types

The Acuitas MDRO Gene Test is CLIA 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. The expanded sample types will open new market opportunities for the company including the ability to offer combined C. difficile/MDRO testing, MRSA/MDRO testing and to expand our environment testing service offerings.

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



Clinical Studies and Publications

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 studies 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 Lighthouse MDRO Management System will enable clinical decisions that favorably improve patient outcomes reducing length of stay, hospital costs, and help to reduce the overall level of disease in hospital systems.

Successful Beta studies have been completed with the Children's National Medical Center, the University of Maryland Medical System, and the University of Louisville Medical School. These studies compare the performance of our Acuitas MDRO Gene test with expert culture and third-party molecular testing methods.

CLIA validation studies are complete for our MRSA, C. difficile, and MDRO gene tests and for our CR Elite CRE culture test. Results for the Acuitas MDRO Gene test showing the excellent performance of the test are highlighted below.

Results of CLIA Laboratory analytical sensitivity study for Acuitas MDRO Gene Test:

MDRO Gene	Organism	LOD (CFU/mL)[1]
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

Results of CLIA Laboratory analytical specificity for Acuitas MDRO Gene Test:

Acuitas	MDRO Gene Presence[2]	MDRO Gene Absence[2]
+	100	0
-	0	143

Results of CLIA Laboratory reproducibilty study for Acuitas MDRO Gene Test:

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).

Results of CLIA Laboratory accuracy study for Acuitas MDRO Gene Test: (3)

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

(1) Acuitas MDRO Gene Test CLIA Validation test results. Limit of Detection, or LOD, determined in serial dilution studies with negative peri anal swabs spiked with organism containing the target.
(2) Analytical specificity determined against 100 clinical isolates with known MDRO genes and 143 without MDRO genes that are detected by the Acuitas test. Average within day %CV for low target levels across all targets was 3.7%.
(3) Accuracy study included 118 peri-anal swabs tested in a blinded manner with multiple operators. Included 108 swabs containing 42 known MDRO genes covering all Acuitas MDRO gene targets and 10 clinical isolates without known MDRO genes.

Payments and Reimbursement

Our tests, test kits, and informatics services are sold to hospitals and public health organizations on a fee for service and direct basis. We envision selling our Lighthouse MDRO Management System to health systems and hospitals under capitated, flat-rate contracts. Health systems absorb the costs of extended stay from hospital acquired infections, HAIs, and from 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 6 days or more for patients infected with MDROs resulting in increased costs of $14,000 to $33,000 per 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/deisolation 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. In addition to costs to individual hospitals, 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 comprehensive panel of results available from one patient sample. We believe the combination of the efficient Acuitas MDRO Gene Test and the 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:

- Reduced length of stays;
- Cost savings and improved patient outcomes; and
- 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 solution in order to drive adoption. As part of our marketing strategy, we educate hospitals, other health care institutions, and healthcare professionals about our unique 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 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.

Dependence on Third Party Payors

We do not currently rely on any third party payors for payment for or reimbursement of our Acuitas MDRO Gene Test.

Reimbursement Strategy

In the event we seek reimbursement from federal healthcare programs and third party payors, to employ this strategy we will:

- Meet the evidence standards necessary to be consistent with leading clinical guidelines. We believe inclusion in leading clinical practice guidelines plays a critical role in payors’ coverage decisions.

- We will employ a team of reimbursement specialists to ensure our payor outreach strategy reacts and anticipates the changing needs of our customer base and who will work with payors to obtain maximum reimbursement. A customer service team will 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 will 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 growing library of peer-reviewed studies that demonstrate the Acuitas MDRO test is 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 2013 we entered into a development relationship with Fluidigm Corporation, or Fluidigm, a leading manufacturer of microfluidic-based DNA testing systems. In March 2014, we entered into a Supply Agreement with Fluidigm for use of Fluidigm's consumables on the BioMark HD DNA detection system. As we move towards kit-based configurations of our products we anticipate expanding our supply agreement to allow OpGen to distribute Fluidigm microfluidic chips as part of our integrated Acuitas test kits for use on Fluidigm instrument systems. Fluidigm has more than 600 BioMark systems in use worldwide making this an attractive opportunity. The Supply Agreement currently has a one-year term.

Hitachi High-Technologies Collaboration

Our collaboration with Hitachi High-Technologies Corporation, or Hitachi, is strategically important to the company. Since October 2013 we have been working with Hitachi to develop the Human Chromosome Explorer^{SM}, 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 comprehensive and 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, MD, where we perform all Acuitas MDRO testing. Once received, samples are processed through our automated accessioning system, prepared for review and analyzed at our laboratory. 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. Our Gaithersburg, Maryland facility is responsible for quality assurance oversight, licensing and regulation compliance and maintenance for both of our laboratories to ensure data integrity and consistent, validated processes.

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

Quality Assurance

Our quality assurance function oversees the quality of our laboratories 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, including implementation and maintenance, document control, supplier qualification, corrective or preventive actions oversight, and employee training processes that we believe achieves excellence in operations across the entire business. We continuously monitor and improve our quality over time and believe our implementation of these processes has supported our achievement of product performance, customer satisfaction and retention and a philosophy of continuous improvement.

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.

We also face competition from commercial laboratories, such as Laboratory Corporation of America Holdings and Quest Diagnostics Incorporated, with strong infrastructure to support the commercialization of diagnostic services. We face potential competition from companies, such as Cepheid, bioMerieux and Nanosphere.

In addition, 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 and compete with us in those countries.

Many of our potential competitors have widespread brand recognition and substantially greater financial, technical and research and development resources 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 price 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 September 30, 2014, we had license or ownership rights to 68 patents, including 25 pending United States non-provisional patent applications, and 15 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 Testing and the 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 Testing and the Lighthouse MDRO Management System and to educate health care organizations about our tests. 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 may be necessary for us to shift our priorities and our plans, abandon or delay one or more of our planned activities, or otherwise adjust our proposed near- and long-term business plans. Please see "Risk Factors" for a discussion of these risks and events, and their potential effects on our business.

Regulation

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 be eligible to bill for diagnostic services provided to Medicare beneficiaries. 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 the Clinical Laboratory Improvement Amendments of 1988, or 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 (LDT) as an in vitro diagnostic test that is intended for clinical use and designed, manufactured and used within a single laboratory. We believe that the Acuitas MDRO Gene Test is an LDT. 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 is 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. 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 FDA's current and forthcoming guidance on LDTs and IUOs/RUOS 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 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.

If premarket review, including approval, is required, our business could be negatively affected until such review is completed and clearance to market or approval is obtained, and the FDA could require that we stop selling our diagnostic services pending premarket clearance or approval. If our diagnostic services are allowed to remain on the market but there is uncertainty about the legal status of our services, if we are required by the FDA to label them investigational, or if labeling claims the FDA allows us to make are limited, order levels may decline and reimbursement may be adversely affected. The regulatory process may involve, among other things, successfully completing additional clinical studies and submitting a premarket notification or filing a PMA application with the FDA. If premarket review is required by the FDA, there can be no assurance that our diagnostic services will be cleared or approved on a timely basis, if at all, nor can there any be assurance that labeling claims will be consistent with our current claims or adequate to support continued adoption of and reimbursement for our solution. Ongoing compliance with FDA regulations would increase the cost of conducting our business, and subject us to heightened requirements of the FDA and penalties for failure to comply with these requirements. We may also decide voluntarily to pursue FDA premarket review of our diagnostic services if we determine that doing so would be appropriate.

U.S. Food and Drug Administration: Diagnostic Kits

Diagnostic kits, including collection systems, like the Copan Eswab used to provide our test specimens, and our Resistome product under development, that are sold and distributed through interstate commerce are regulated as medical devices by the FDA. Devices subject to FDA regulation must undergo premarket review prior to commercialization unless the device is of a type exempted from such review. In addition, manufacturers of medical devices must comply with various regulatory requirements under the Federal Food, Drug, and Cosmetic Act, or FDC Act, and implementing regulations promulgated under that Act. Entities that fail to comply with FDA requirements may be subject to issuance of notice of observations, untitled or warning letters, and can be liable for criminal or civil penalties, such as recalls, import detentions, seizures, or injunctions, including orders to cease manufacturing.

The FDC Act classifies medical devices into one of three categories based on the risks associated with the device and the level of control necessary to provide reasonable assurance of safety and effectiveness. Class I devices are deemed to be low risk and are subject to the fewest regulatory controls. Many Class I devices are exempt from FDA premarket review requirements. Class III devices are generally the highest risk devices and are subject to the highest level of regulatory control to provide reasonable assurance of the device's safety and effectiveness. Class III devices must typically be approved by the FDA before they are marketed. For Class II devices, the FDA generally requires clearance through the premarket notification, or 510(k) clearance, process.

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 a list of the devices that they handle at their facilities.

After a 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 regulation (which requires that manufacturers report to the FDA if their 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 regulation (which requires manufacturers to report certain recalls and field actions to the FDA).

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. Our facility is registered with the FDA as a specification developer, which means that we can sell the collection system under our own name and outline the specifications used to make the collection system, but a third party assembles the collection system for us. The container we provide for collection and transport of our samples from a hospital to our clinical reference laboratory is listed with the FDA as a Class I medical device and is subject to regulation by the FDA. 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.

The FDA enforces the requirements described above by various means, including inspection and market surveillance. If the FDA finds a violation, it can institute a wide variety of enforcement actions, ranging from an Untitled Letter or Warning Letter to more severe sanctions such as:

- fines, injunctions, and civil penalties;
- recall or seizure of products;
- operating restrictions, partial suspension or total shutdown of production; and
- 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.

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.

Employees

As of October 15, 2014, we had 31 employees, of which 10 work in laboratory operations, 8 in research and development and clinical development, 6 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, or any such new facilities are 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 alternate 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:

"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 MDRO Gene Test" means our internally developed test that detects seven critical MDRO genes, including CRE, ESBL and VRE resistant organisms, from one patient swab.

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

"Argus Whole Genome Mapping" means OpGen's commercially available technology that provides a high resolution, complete visual map of a whole genome and individual chromosomes, which is based on OpGen's unique single molecule analysis technology. 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.

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

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

"CLIA Lab" means our clinical or reference laboratory meeting the requirements of the Commercial Laboratory Improvements Act of 1988, as amended.

"CRE" means Carbapenem-resistant Enterobactercaceae.

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

"ESBL" means extended spectrum beta lactamase organisms.

"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 colonized patient developing an active infection in 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 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 infection.

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

"LIMS" means a laboratory information management system.

"MDR" means multi-drug resistant.

"MDR-GNB" means gram negative bacteria that are resistant to multi 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 multi-drug resistant organisms.

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

"Resistome" means our rapid, high resolution, low cost test in development, that is anticipated to include resistant genes for carbapenems, ESBLs, ampicillin-resistant genes and other key MDRO genes.

"WHO" means the World Health Organization.

MANAGEMENT

Directors and Executive Officers

Our executive officers and directors and their respective ages and positions as of October 31, 2014:

Name	Age	Position
Executive officers:		
Evan Jones.	57	President, Chief Executive Officer and Chair of the Board
C. Eric Winzer	57	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	51	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)	56	Director
Laurence R. McCarthy Ph.D.(1)	70	Director
Misti Ushio, Ph.D.(1)	42	Director

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

Executive Officers

Evan Jones has served as our President and Chief Executive Officer since October 2013 and as Executive Chairman of our board of directors since September 2010. 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, and currently serves on the board of directors of Fluidigm Corporation (NASDAQ: FLDM), a technology company that develops, manufactures and markets microfluidic systems in the life science and agricultural biotechnology industries, 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 Chairman 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), a biotechnology company developing targeted therapeutics for oncology. Prior to Avalon, 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 Mr. Winzer’s various financial positions at Genex Corporation. Currently, Mr. Winzer serves as director and audit committee chair at Cytomedix, Inc. (OTCQX: CMXI). 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 previously led drug target validation, biomarker discovery and clinical diagnostic development at Pfizer Inc. (NYSE: PFE), GlaxoSmithKline plc (NYSE: GSK), Becton, Dickinson and Company (NYSE: BDX) (Becton), Duke University and The Biomarker Factory across most disease areas and stages of development from discovery through late clinical trials. 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 (SAIC) 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, 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 at QIAGEN NV (NASDAQ: QGEN), Cambrex Corporation (NYSE: CBM), Life Technologies, and Advanced Biotechnologies Inc. Prior to joining OpGen, Mr. Hoekzema was Vice President, Business Development at SAIC, leading the formation of technology partnerships for Frederick National Laboratory for Cancer Research. 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 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 Viracor-IBT Laboratories, Inc., Chairman of Bako Pathology Services, and as a Director of ATS, Dynex and Magellan. 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 strong technical expertise in infectious disease, as well as his senior management experience, faculty positions and extensive 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 broad experience in many biotechnology and life science companies gives him a keen understanding and appreciation of the many regulatory and developmental issues confronting diagnostic laboratory and biotechnology companies. Dr. McCarthy is also not affiliated with any of our significant investors; he was elected to fill the independent director position on our Board.

Misti Ushio, Ph.D. has been a director of OpGen since March 2012. Dr. Ushio is a Managing Director at Harris & Harris Group, Inc. (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 extensive 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 vital and 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, treatment 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 bio 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.

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 primary 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 primary 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 Securities and Exchange Commission, or SEC, rules and regulations.

Audit Committee

Brian Atwood, Timothy Howe and Evan Jones 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” for audit committee purposes as that term is defined in the rules of the SEC and the applicable NASDAQ Stock Market rules, except for Mr. Jones, who is our Chief Executive Officer. 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 party transactions for potential conflict of interest situations and approving all such transactions; and
- reviewing quarterly earnings releases.

Compensation Committee

Misti Ushio, Timothy Howe and Lawrence McCarty 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. 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 Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

EXECUTIVE COMPENSATION

Compensation Tables

Summary Compensation Table—2013 and 2012 Fiscal Years

The following table presents information regarding the total compensation awarded to, earned by, and paid during the fiscal years ended December 31, 2013 and December 31, 2012 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, 2013, and to one individual who served as our chief executive officer until October 25, 2013. These individuals are our named executive officers for 2013.

Name and Principal Position	Year	Salary	Bonus	Stock Awards (1)	Option Awards (2)	NonEquity Incentive Plan Compensation	All Other Compensation	Total
Evan Jones	2013	$ 12,500	-	$ -	$	$ -	$ -	12,500
President and Chief Executive Officer (3)	2012	$ 100,000	-	$ -	$	$ -	$ -	100,000
C. Eric Winzer,	2013	$ 260,000	-	$ 21,667	$ 6,235	$ -	$ 1,600 (4)	289,502
Executive Vice President, Chief Financial Officer	2012	$ 256,923	-	$ -	$ 1,853	$ -	$ 5,000 (4)	263,776
Thomas M. Ross,	2013	$ 255,000	-	$ 21,250	$ 2,545	$ -	$ 1,177 (4)	279,972
Senior Vice President, Commercial Operations (5)	2012	$ 29,423	-	$ -	$ 4,340	$ -	$ -	33,763
C. Douglas White,	2013	$ 262,299	-	$ -	$ -	$ -	$ 16,946 (7)	279,245
former President and Chief Executive Officer (6)	2012	$ 335,385	-	$ -	$ 17,972	$ -	$ 5,000 (4)	358,357

(1) Represents restricted preferred stock units awarded to each of Mr. Winzer and Mr. Ross as compensation for revising their change in control and severance arrangements in November 2013.

(2) 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.

(3) Mr. Jones has served as our Executive Chairman of the Board since January 2011, and as our President, Chief Executive Officer and Chairman of the Board since October 25, 2013. During 2012 and the first quarter of 2013, he received compensation for serving as our Executive Chairman. When he assumed the role of Chief Executive Officer, he agreed to receive compensation through the issuance of restricted stock, from October 25, 2013 to June 30, 2014. The restricted stock was issued to him in January 2014.

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

(5) Mr. Ross left the Company in September 2014.

(6) Mr. White was President and Chief Executive Officer from June 2010 until October 25, 2013.

(7) Represents a 401(k) plan match ($2,014) and payment of accrued and unused paid time off at the time of departure ($14,932).

Employment Agreements with Our Named Executive Officers

We have entered into an employment agreement with each of the 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 Mr. Jones to serve as our President and Chief Executive Officer at the equivalent of seventy percent (70%) of a full-time commitment, with an initial base salary at an annual adjusted rate of $190,000 and 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, 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.

C. Eric Winzer – On January 19, 2011, we entered into an executive change in control and severance benefits agreement with Eric Winzer, our Chief Financial Officer. The agreement was amended on November 1, 2013. Under such agreement, upon any termination of Mr. Winzer’s employment without “cause” that constitutes a “separation from service” under Section 409A of the Internal Revenue Code, Mr. Winzer will receive severance compensation equal to his base salary at the time of termination for six (6) months. In addition, if a change in control of the Company occurs, and Mr. Winzer is an employee on the date of such change in control, 50% of the then-unvested portion of any outstanding stock options made under the 2008 Plan on or prior to December 31, 2011 will vest and become exercisable. In addition, if such outstanding unvested stock options granted prior to December 31, 2011, or the 2011 Awards, are not continued, assumed or substituted in such change of control transaction, or if Mr. Winzer’s employment is terminated without cause in the six months after the effective date of the change in control, 100% of such 2011 Awards will become vested and exercisable. In addition, Mr. Winzer can terminate his agreement for “good reason” within twelve (12) months after a change in control and be entitled to his severance payments and acceleration of his 2011 Awards, to the extent not vested. The agreement continues in full force and effect unless and until the Company terminates the Agreement by providing Mr. Winzer with sixty (60) days prior written notice. The agreement includes standard confidentiality, general release and other provisions.

Thomas M. Ross – On November 1, 2013, we entered into an executive change in control and severance benefits agreement with Tom Ross, our Senior Vice President, Commercial Operations. Under such agreement, upon any termination of Mr. Ross’ employment without “cause” that constituted a “separation from service” under Section 409A of the Internal Revenue Code, Mr. Ross would have received severance compensation equal to his base salary at the time of termination for six (6) months. In addition, if a change in control of the Company occurred, and Mr. Ross had been an employee on the date of such change in control, 100% of the then-unvested portion of any outstanding stock options made under the 2008 Plan would have vested and become exercisable. Mr. Ross voluntarily terminated his employment with the Company in September 2014 and his agreement terminated at that time.

C. Douglas White – On June 2, 2010, we entered into an employment agreement with Doug White to serve as our President and Chief Executive Officer, and we entered into an executive change in control and severance agreement, or severance agreement, with Mr. White. Under the employment agreement, Mr. White was entitled to receive a base salary of $325,000 per year, an annual incentive bonus opportunity up to thirty-five percent (35%) of his base salary, and stock options, granted under the 2008 Plan, to acquire four percent (4%) of the fully diluted shares following the closing of the Company’s Series B Convertible Preferred Stock in 2011, or the 2011 Award. Under the severance agreement, upon a change in control, fifty percent (50%) of the unvested portion of the 2011 Award would have vested and become exercisable. In addition, any termination of Mr. White’s employment without “cause” or for “good reason” would have entitled Mr. White to receive severance compensation equal to his base salary at the time of termination for twelve (12) months, and the remainder of the 2011 Award would have vested and become exercisable. Mr. White resigned effective October 25, 2013, and his employment agreement and severance agreement terminated at that time.

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 executive's consent: (i) a 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—2013

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, 2013. 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 2013

	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**	**Option Exercise Price ($)**	**Option Expiration Date**	**(2) Number of Shares of Stock that have not Vested**	**(3) Market Value of Shares of Stock that have not Vested ($)**	**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	—	—	—	—
(4)	1,495	352	—	110.68	09/21/2020	—	—	—	—
C. Eric Winzer	253	—	—	79.05	06/15/2019	21,667	21,667	—	—
(5)	157	33	—	79.05	04/15/2020	—	—	—	—
	137	—	—	110.68	02/15/2021	—	—	—	—
	234	114	—	110.68	02/15/2021	—	—	—	—
	178	234	—	7.91	03/23/2022	—	—	—	—
		443	—	7.91	02/12/2023	—	—	—	—
		949	—	7.91	07/25/2023	—	—	—	—
Thomas M. Ross	20	44	—	7.91	07/19/2022	21,250	21,250	—	—
(6)	229	689	—	7.91	10/25/2022	—	—	—	—
	—	253	—	7.91	02/12/2023	—	—	—	—
	—	317	—	7.91	07/25/2023	—	—	—	—
C. Douglas White	2,485	—	—	110.68	02/15/2021	—	—	—	—
(7)	3,518	—	—	110.68	02/15/2021	—	—	—	—
	199	—	—	110.68	02/15/2021	—	—	—	—
	1,496	—	—	7.91	03/23/2022	—	—	—	—

(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) Represents restricted preferred stock units awarded to each of Mr. Winzer and Mr. Ross as compensation for revising their change in control and severance arrangements in November 2013. The restricted preferred stock units awarded to Mr. Ross were forfeited in September 2014 when he resigned from the Company. The restricted preferred stock units awarded to Mr. Winzer on November 1, 2013 will vest upon the lapse of forfeiture restrictions on December 18, 2014.

(3) Based on fair market value of the Company's common stock on December 31, 2013, of $0.05 per share, and of the Company's Series A Convertible Preferred Stock on December 31, 2013, of $1.00 per share.

(4) 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) and February 15, 2011 (1,847 shares). On April 24, 2014, Mr. Jones was awarded a non-qualified stock option to acquire 174,235 shares of common stock, with the standard vesting schedule, an exercise price of $0.05 per share (representing the fair market value of the common stock on the date of grant) and expiring on April 24, 2024.

(5) The stock option awards made to Mr. Winzer have the vesting schedule set forth in footnote (1) 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) and July 25, 2013 (949 shares). On April 24, 2014, Mr. Winzer was awarded an incentive stock option to acquire 13,352 shares of common stock, with the standard vesting schedule, an exercise price of $0.05 per share (representing the fair market value of the common stock on the date of grant) and expiring on April 24, 2024.

(6) Mr. Ross received stock option awards on July 19, 2012 (64 shares), October 25, 2012 (918 shares), February 12, 2013 (253 shares) and July 25, 2013 (316 shares). The vesting schedule for all stock option awards was as set forth in footnote (1). Mr. Ross left the Company in September 2014 and has not, to date, exercised any vested stock options.

(7) Mr. White received three stock option awards on February 15, 2011 (for 3,615, 3,774 and 199 shares, respectively),

and two stock option awards on March 23, 2012 (for 1,247 and 2,743 shares, respectively), Mr. White was vested in 7,698 stock options on October 25, 2013, upon his departure from the Company. Mr. White did not exercise any vested stock options and all such vested stock options expired and went back into the 2008 Plan in January 2014.

Director Compensation

The following table presents the total compensation for each person who served as a member of our board of directors during 2013, 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 2013. Compensation paid to Mr. Jones, who is also our President and Chief Executive Officer, is described above under "Summary Compensation Table—2013 and 2012." The Board of Directors intends to approve a director compensation policy to be effective following the successful 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	—	—	—	—	—	—	—
Lawrence R. McCarthy Ph.D.	$ 4,647	—	(1)	—	—	—	$ 4,647
Misti Ushio Ph.D.	—	—	—	—	—	—	—

(1) In addition to serving on our Board of Directors, Dr. McCarthy serves on our Scientific Advisory Board. Pursuant to his consulting agreement, he receives compensation of $10,000 per year, and stock option awards sufficient to maintain his ownership of our capital stock at 0.33% on a fully diluted basis. On July 25, 2013, Dr. McCarthy received a stock option to acquire 1,450 shares of common stock. The option value was $6,530, the exercise price was $7.91 per share and the options will vest in September 2017. In addition, as of the date of this prospectus, Dr. McCarthy holds stock options to acquire an aggregate of 16,610 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 stockholder 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 503,347 shares of our common stock are reserved for issuance under the 2008 Stock Option Plan. As of September 30, 2014, 410,870 shares of our common stock were subject to outstanding option awards and 51,227 shares of our common stock remain available for future issuance under the 2008 Plan.

The Compensation Committee of our Board of Directors administers the 2008 Plan. Subject to the terms of the 2008 Plan, the committee has the authority to select the persons to whom awards are to be made, to determine the type or types of awards to be granted to each person, determine the number of awards to grant, determine the number of shares to be subject to such awards, and the terms and conditions of such awards. Awards under the 2008 Plan may be granted to key employees, and directors of, and 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 acceleration 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 performance goals related to the sale of Argus Systems and MapIt Services, establishment of a clinical laboratory meeting the 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.

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 matched 50% of an employee's contributions to the 401(k) plan up to 4%. In April 2013, the Company match was discontinued. The retirement plan is intended to qualify under Sections 401(a) and 501(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 March 2014, we entered into a Supply Agreement with Fluidigm Corporation under which Fluidigm supplies us with its microfluidic test platform for use in manufacturing our Acuitas MDRO Gene Test. Evan Jones, our Chief Executive Officer and Chair of the Board, is a director of 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 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, a member 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 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 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 Convertible 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 Convertible 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 Convertible 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 were convertible into Series A Convertible 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.

Holders of our convertible 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 convertible preferred stock, which conversion will occur automatically upon the closing of this offering. 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 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 scientific advisory board is for one (1) year, commencing on July 1, 2013, and will automatically renew 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 have agreed to 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. Under this and a predecessor agreement, Dr. McCarthy earned $11,250 during the fiscal year ended December 31, 2013.

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 Party 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, or each, a related party, 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 October 15, 2014, 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 Securities and Exchange Commission 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 6,034,291 shares of common stock outstanding as of October 31, 2014 and also lists applicable percentage ownership based on shares of common stock assumed to be outstanding after the closing of the offering. Options and warrants to purchase shares of common stock that are exercisable within 60 days of October 31, 2014 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]	1,810,132	30.0%	
Entities affiliated with Versant Ventures[3]	1,643,764	27.2%	
Harris & Harris Group, Inc.[4]	848,920	14.1%	
Entities affiliated with CHL Medical Partners[5]	383,155	6.4%	
Entities affiliated with Mason Wells[6]	341,069	5.7%	
Directors and Executive Officers			
Evan Jones[7]	1,961,769	32.5%	
Brian G. Atwood[8]	1,643,764	27.2%	
Timothy Howe[9]	383,155	6.4%	
Laurence R. McCarthy, Ph.D.[10]	4,361	*	*
Misti Ushio, Ph.D.[11]	848,920	14.1%	
C. Eric Winzer[12]	26,795	*	
Thomas M. Ross[13]	528	*	*
C. Douglas White[14]	-	*	*
Directors and Executive Officers as a group (12 persons)[15]	4,903,570	80.8%	

* Less than 1%

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

(2) Includes 130,640 shares of common stock, 1,059,213 shares of common stock issuable upon the conversion of 1,059,213 shares of Series A Preferred Stock, 749,366 shares of common stock issuable upon the conversion of convertible promissory notes in the aggregate principal amount of $749,366 and warrants to purchase 1,553 shares of common stock.

(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, 402,348 shares of common stock issuable upon conversion of a convertible promissory note in the principal amount of $402,348 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, 2,377 shares of common stock issuable upon conversion of a convertible promissory note in the principal amount of $2,377 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 3000 Sand Hill Road, Bldg. 4, Suite 210, Menlo Park, CA 94025.

(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 209,020 shares of common stock issuable upon conversion of a convertible promissory note in the principal amount of $209,020. The address for Harris & Harris Group, Inc. is 1450 Broadway, 24th Floor, New York, NY 10018.

(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.

(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.

(7) Includes 130,640 shares of common stock and vested stock options to purchase 1,936 shares of common stock, which are directly owned. 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 1,810,132 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 1,643,764 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 shares that can be acquired upon the exercise of vested stock options.

(11) Consists of 848,920 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, 21,667 shares of common stock issuable upon the conversion of 21,667 restricted stock units to acquire shares of Series A Preferred Stock and vested options to purchase 5,001 shares of common stock.

(13) Consists of vested options to purchase 528 shares of common stock. Mr. Ross left the Company in September 2014, and his outstanding vested stock options will terminate, if not exercised, on December 26, 2014.

(14) Mr. White left the Company in October 2013.

(15) In addition to the beneficial ownership described in footnotes (2) through (14), includes vested stock options to purchase 34,278 shares of common stock held by other executive officers.

DESCRIPTION OF CAPITAL STOCK

The following descriptions are summaries of the material terms of our amended and restated certificate of incorporation and amended and restated bylaws. We refer in this section to our amended and restated certificate of incorporation as our certificate of incorporation, and we refer to our amended and restated bylaws as our bylaws.

General

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

Currently, our authorized capital stock consists of 7,500,000 shares of common stock, par value $0.01 per share, and 6,000,000 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 September 30, 2014, 5,993,041 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 Convertible Notes, were outstanding and held by 79 stockholders of record. In addition, as of September 30, 2014, we had outstanding options to purchase 410,870 shares of our common stock, at a weighted average exercise price of $1.13 per share, 7,143 of which were exercisable.

The following is a summary of the rights of our common stock and preferred stock and certain provisions of our 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 restated certificate of incorporation and amended and restated bylaws, which are filed as exhibits to the registration statement of which this prospectus is part.

Immediately following the closing of this offering, our authorized capital stock will consist of shares, with a par value of $0.01 per share, of which:

- shares will be designated as common stock; and
- shares will be designated as preferred stock.

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 certificate of incorporation in effect prior to the closing of this offering provides that, upon the closing of a firmly underwritten public offering pursuant to an effective registration statement under the Securities Act covering the offer and sale of our common stock with gross cash proceeds to us (before underwriting discounts, commissions and fees) of at least $30.0 million, and a purchase price per share of at least $4.00, each share of preferred stock shall automatically be converted into shares of common stock at the then-effective conversion price for such series upon the closing of this offering. Accordingly, upon the closing of this offering, each outstanding share of our Series A Preferred Stock will be converted into one share of common stock, or an aggregate of 3,999,864 shares of common stock.

Following the conversion of each share of our preferred stock into shares of common stock, our certificate of incorporation will be amended and restated to delete all references to the prior series of preferred stock and 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 between us and the holders of these shares, or the investors' rights agreement, 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.

Demand Registration Rights

As of September 30, 2014, the holders of 5,875,400 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 September 30, 2014, the holders of 5,875,400 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 of our common stock 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 September 30, 2014, the holders of 5,875,400 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 provides 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 intend to apply to list our common stock on the NASDAQ Capital Market prior to the completion of this offering.

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 September 30, 2014, 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 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 September 30, 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, which 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, substantially all of our stockholders and option holders have agreed with the underwriters, subject to certain exceptions, not to dispose of or hedge any of our common stock or securities convertible into or exchangeable for shares of common stock, enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of the common stock or such other securities, file or cause to be filed a registration statement covering shares of common stock or any securities that are convertible into, exchangeable for, or represent the right to receive, common stock or any substantially similar securities, or publicly disclose the intention to do any of the foregoing, during the period from the date of this prospectus continuing through the date days after the date of this prospectus, except with the prior written consent of the underwriter. This agreement does not apply to the issuance by us of shares under any existing employee benefit plans. These agreements are subject to certain exceptions, as set forth in “Underwriters”.

Registration Rights

As of September 30, 2014, the holders of 5,875,400 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 will be eligible for resale until the expiration of the lock-up agreements 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

The company and the underwriters named below have entered into an underwriting agreement with respect to the shares being offered. Subject to certain conditions, each underwriter has severally agreed to purchase the number of shares indicated in the following table. are the representatives of the underwriters.

Name	Number of Shares
Total	

The underwriters are committed to take and pay for all of the shares being offered, if any are taken, other than the shares covered by the option described below unless and until this option is exercised. The underwriting agreement also provides that if an underwriter defaults, the purchase commitments of non-defaulting underwriters may be increased or the offering may be terminated.

The following tables show the per share and total underwriting discounts and commissions to be paid to the underwriters by the company. Such amounts are shown assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

		Total	
	Per Share	No Exercise	Full Exercise
Public offering price	$	$	$
Underwriting discounts and commissions to be paid by us	$	$	$
Proceeds, before expenses, to us	$	$	$

Determination of Offering Price

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

- the valuation multiples of publicly traded companies in the U.S. 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, its past and present operations, and the prospects for, and timing of, our future revenues,
- the present state of our development, and
- the above factors in relation to market values and various valuation measures of other companies engaged in activities similar to ours.

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

General

The company estimates that its share of the total expenses of the offering, excluding underwriting discounts and commissions, will be approximately $.

The company has agreed to indemnify the several underwriters against certain liabilities, including liabilities under the Securities Act of 1933.

Other Relationships

The underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include sales and trading, commercial and investment banking, advisory, investment management, investment research, principal investment, hedging, market making, brokerage and other financial and non-financial activities and services. Certain of the underwriters and their respective affiliates have provided, and may in the future provide, a variety of these services to the issuer and to persons and entities with relationships with the issuer, for which they received or will receive customary fees and expenses.

In the ordinary course of their various business activities, the underwriters and their respective affiliates, officers, directors and employees may purchase, sell or hold a broad array of investments and actively trade securities, derivatives, loans, commodities, currencies, credit default swaps and other financial instruments for their own account and for the accounts of their customers, and such investment and trading activities may involve or relate to assets, securities and/or instruments of the issuer (directly, as collateral securing other obligations or otherwise) and/or persons and entities with relationships with the issuer. The underwriters and their respective affiliates may also communicate independent investment recommendations, market color or trading ideas and/or publish or express independent research views in respect of such assets, securities or instruments and may at any time hold, or recommend to clients that they should acquire, long and/or short positions in such assets, securities and instruments.

Price Stabilization, Short Positions and Penalty Bids

Shares sold by the underwriters to the public will initially be offered at the public offering price set forth on the cover of this prospectus. Any shares sold by the underwriters to securities dealers may be sold at a discount of up to $ per share from the public offering price. After the offering of the shares, the representatives may change the offering price and the other selling terms. The offering of the shares by the underwriters is subject to receipt and acceptance and subject to the underwriters' right to reject any order in whole or in part. Sales of shares made outside of the United States may be made by affiliates of the underwriters.

The company has agreed with the underwriters, subject to certain exceptions, not to dispose of or hedge any of its common stock or securities convertible into or exchangeable for shares of common stock during the period from the date of this prospectus continuing through the date 60 days, in certain instances, and 90 days, in other instances, after the date of this prospectus, except with the prior written consent of the representatives. This agreement does not apply to any existing employee benefit plans. See "Shares Available for Future Sale" for a discussion of certain transfer restrictions.

In connection with the offering, the underwriters may purchase and sell shares of common stock in the open market. These transactions may include short sales, stabilizing transactions and purchases to cover positions created by short sales. Short sales involve the sale by the underwriters of a greater number of shares than they are required to purchase in the offering, and a short position represents the amount of such sales that have not been covered by subsequent purchases. A "covered short position" is a short position that is not greater than the amount of additional shares for which the underwriters' option described above may be exercised. The underwriters may cover any covered short position by either exercising their option to purchase additional shares or purchasing shares in the open market. In determining the source of shares to cover the covered short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase additional shares pursuant to the option described above. "Naked" short sales are any short sales that create a short position greater than the amount of additional shares for which the option described above may be exercised. The underwriters must cover any such naked short position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of the common stock in the open market after pricing that could adversely affect investors who purchase in the offering. Stabilizing transactions consist of various bids for or purchases of common stock made by the underwriters in the open market prior to the completion of the offering.

The underwriters may also impose a penalty bid. This occurs when a particular underwriter repays to the underwriters a portion of the underwriting discount received by it because the representatives have repurchased shares sold by or for the account of such underwriter in stabilizing or short covering transactions.

Purchases to cover a short position and stabilizing transactions, as well as other purchases by the underwriters for their own accounts, may have the effect of preventing or retarding a decline in the market price of the company's stock, and together with the imposition of the penalty bid, may stabilize, maintain or otherwise affect the market price of the common stock. As a result, the price of the common stock may be higher than the price that otherwise might exist in the open market. The underwriters are not required to engage in these activities and may end any of these activities at any time. These transactions may be effected on NASDAQ, in the over-the-counter market or otherwise.

The company may enter into derivative transactions with third parties, or sell securities not covered by this prospectus to third parties in privately negotiated transactions. In connection with those derivatives, the third parties may sell securities covered by this prospectus, including in short sale transactions. If so, the third party may use securities pledged by the company or borrowed from the company or others to settle those sales or to close out any related open borrowings of stock, and may use securities received from the company in settlement of those derivatives to close out any related open borrowings of stock. The third party in such sale transactions will be an underwriter or will be identified in a post-effective amendment.

In addition, in connection with this offering certain of the underwriters (and selling group members) may engage in passive market making transactions in our common stock on The NASDAQ Stock Market prior to the pricing and completion of this offering. Passive market making consists of displaying bids on The NASDAQ Stock Market no higher than the bid prices of independent market makers and making purchases at prices no higher than these independent bids and effected in response to order flow. Net purchases by a passive market maker on each day are generally limited to a specified percentage of the passive market maker's average daily trading volume in the common stock during a specified period and must be discontinued when such limit is reached. Passive market making may cause the price of our common stock to be higher than the price that otherwise would exist in the open market in the absence of these transactions. If passive market making is commenced, it may be discontinued at any time.

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.

EXPERTS

The financial statements as of December 31, 2013 and for the year then ended included in this prospectus have been audited by CohnReznick LLP, an independent registered 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. Ernst & Young LLP, independent registered public accounting firm, has audited our financial statements at December 31, 2012 and for the year then ended, as set forth in their report (which contains an explanatory paragraph relating to the Company's experience of recurring operating losses and negative cash flows from operations as described in Note 2 to the financial statements). We have included our financial statements in the prospectus and elsewhere in the registration statement in reliance on Ernst & Young LLP's report, given on their authority as experts in accounting and auditing.

WHERE YOU CAN FIND ADDITIONAL INFORMATION

We have filed with the Securities and Exchange Commission 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 web site is not part of this prospectus, and any references to this web site or any other web site 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.

- "*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).

- "*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, 2013 and 2012

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Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders
OpGen, Inc.

We have audited the accompanying balance sheet of OpGen, Inc. as of December 31, 2013, and the related statements of operations, stockholders' deficit and cash flows for the year 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 audit.

We conducted our audit 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 audit 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 audit provides 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, 2013, and the results of its operations and its cash flows for the year then ended, in conformity with accounting principles generally accepted in the United States of America.

The 2013 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 2013 financial statements do not include any adjustments that might result from the outcome of this uncertainty.

/s/ CohnReznick LLP

Vienna, Virginia
November 21, 2014

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors and Stockholders
OpGen, Inc.

We have audited the accompanying balance sheet of OpGen, Inc. (the Company), as of December 31, 2012 and the related statements of operations, comprehensive income (loss), changes in stockholders' equity and cash flows for the year then ended. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit 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. We were not engaged to perform an audit of the Company's internal control over financial reporting. Our audit 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, and evaluating the overall financial statement presentation. We believe that our audit provides 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. at December 31, 2012 and the results of its operations and its cash flows for each of the year then ended in conformity with U.S. generally accepted accounting principles.

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 2 to the financial statements, the Company has recurring losses from operations and has a net capital deficiency that raise substantial doubt about its ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 2. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

/s/ Ernst & Young LLP

McLean, Virginia
November 21, 2014

OpGen, Inc.
Balance Sheets

Assets	December 31, 2013	December 31, 2012
Current assets		
Cash and cash equivalents	$ 1,400,345	$ 7,117,714
Accounts receivable, net	241,897	1,138,322
Inventory, net	175,713	914,496
Prepaid expenses and other current assets	146,438	288,138
Total current assets	**1,964,393**	**9,458,670**
Property and equipment, net	1,079,423	890,216
Licensed technology and other intangible assets, net	57,594	166,046
Other noncurrent assets	57,459	84,658
Total assets	**$ 3,158,869**	**$ 10,599,590**
Liabilities, Redeemable Convertible Preferred Stock and Stockholders' Deficit		
Current liabilities		
Accounts payable	$ 869,172	$ 597,712
Accrued compensation and benefits	517,250	831,283
Accrued liabilities	743,767	547,213
Deferred revenue	509,728	156,870
Current portion of long term debt	10,000	110,000
Current maturities of long-term capital lease obligation	105,967	30,548
Total current liabilities	**2,755,884**	**2,273,626**
Long-term capital lease obligation, less current maturities	234,562	40,963
Derivative financial instruments	–	132,921
Total liabilities	**2,990,446**	**2,447,510**
Commitments and contingencies (note 10)		
Redeemable convertible preferred stock		
Series A redeemable convertible preferred stock, $.01 par value; 2,500,000 shares authorized; 1,999,864 shares issued and outstanding at December 31, 2013; aggregate liquidation preference of $3,999,728 at December 31, 2013	1,999,864	–
Series A redeemable convertible preferred stock, $.01 par value; 26,345,800 shares authorized; 25,205,800 shares issued and outstanding at December 31, 2012	–	33,987,502
Series B redeemable convertible preferred stock, $.01 par value; 64,936,385 shares authorized; 64,936,385 shares issued and outstanding at December 31, 2012	–	27,096,513
Series C redeemable convertible preferred stock, $.01 par value; 152,869,987 shares authorized; 126,802,946 shares issued and outstanding at December 31, 2012	–	17,736,824
Series A-1 redeemable convertible preferred stock, $.01 par value; 4,857,621 shares authorized; 4,857,621 shares issued and outstanding at December 31, 2012	–	4,924,230
Total redeemable convertible preferred stock	**1,999,864**	**83,745,069**
Stockholders' deficit		
Common stock, $.01 par value; 3,500,000 shares authorized; 362,536 and 3,517 shares issued and outstanding at December 31, 2013 and 2012, respectively	3,625	35
Additional paid-in capital	89,265,757	–
Accumulated deficit	(91,100,823)	(75,593,024)
Total stockholders' deficit	**(1,831,441)**	**(75,592,989)**
Total liabilities, redeemable convertible preferred stock and stockholders' deficit	**$ 3,158,869**	**$ 10,599,590**

See Notes to Financial Statements

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

	2013	2012
Revenue		
Product sales	$ 1,735,517	$ 3,767,968
Laboratory services	630,851	770,600
Collaborations revenue	44,239	1,263,159
Total revenue	**2,410,607**	**5,801,727**
Operating expenses		
Cost of products sold	1,501,648	2,903,652
Cost of services	320,938	307,539
Research and development	4,151,936	4,782,414
General and administrative	2,762,205	2,472,454
Sales and marketing	3,053,394	4,274,180
Argus™ Whole Genome obsolescence	950,881	–
Total operating expenses	**12,741,002**	**14,740,239**
Operating loss	**(10,330,395)**	**(8,938,512)**
Other income (expense)		
Interest income	1,222	4,489
Interest expense	(31,598)	(118,666)
Change in fair value of warranty liability	134,560	–
Other income (expense)	91,390	(231,023)
Total other income (expense)	**195,574**	**(345,200)**
Net loss	**(10,134,821)**	**(9,283,712)**
Preferred stock dividends and accretion	(5,372,978)	(4,925,242)
Net loss applicable to common stockholders	**$ (15,507,799)**	**$ (14,208,954)**
Net loss per common share – basic and diluted	**$ (896.09)**	**$ (4,042.38)**
Weighted average shares outstanding – basic and diluted	**17,306**	**3,515**

See Notes to Financial Statements

OpGen, Inc.
Statements of Stockholder's Deficit
Years ended December 31, 2013 and 2012

	Common Stock				Additional		Accumulated		
	Shares		Amount		Paid-in Capital		Deficit		Total
Balances at December 31, 2011	**3,470**	**$**	**35**	**$**	**–**	**$**	**(61,602,790)**	**$**	**(61,602,755)**
Stock option exercises	47		–		3,750		–		3,750
Stock compensation expenses	–		–		214,970		–		214,970
Accrued dividends, Series A, B and C preferred stock	–		–		–		(4,630,728)		(4,630,728)
Accretion of Series A, B and C preferred stock	–		–		(218,720)		(75,794)		(294,514)
Net loss	–		–		–		(9,283,712)		(9,283,712)
Balances at December 31, 2012	**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, Series A, B and C preferred stock	–		–		–		(5,058,786)		(5,058,786)
Accretion of Series A, B and C preferred stock	–		–		–		(314,192)		(314,192)
Conversion of preferred to common stock	358,973		3,590		89,111,787		–		89,115,377
Net loss	–		–		–		(10,134,821)		(10,134,821)
Balances at December 31, 2013	**362,536**	**$**	**3,625**	**$**	**89,265,757**	**$**	**(91,100,823)**	**$**	**(1,831,441)**

See Notes to Financial Statements

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

	2013	2012
Cash flows from operating activities		
Net loss	$ (10,134,821)	$ (9,283,712)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	661,807	583,717
Amortization of debt discount	5,406	67,789
Non-cash interest expense including beneficial conversion	6,334	20,184
Bad debt expense	7,301	129,846
Recovery of bad debt	(49,050)	–
Loan forgiveness	(36,811)	–
Stock compensation expense	152,753	214,970
Inventory obsolescence	924,285	99,721
Change in fair value of derivative financial instruments	(134,560)	–
Other non-cash items	1,639	112,577
Changes in operating assets and liabilities::		
Accounts receivable	938,174	524,903
Inventory	(506,088)	461,028
All other assets	163,493	(129,104)
Accounts payable	271,460	(384,184)
Accrued compensation and other liabilities	(112,002)	(104,695)
Deferred revenue	352,858	(274,041)
Net cash used in operating activities	**(7,487,822)**	**(7,961,001)**
Cash flows from investing activities		
Purchases of property and equipment	(109,871)	(210,528)
Net cash used in investing activities	**(109,871)**	**(210,528)**
Cash flows from financing activities		
Proceeds from issuance of preferred stock, net of issuance costs	(2,670)	13,404,082
Proceeds from borrowings on convertible notes, net of issuance costs	969,864	1,389,550
Proceeds from sale of short-term notes	1,030,000	400,000
Proceeds from exercise of stock options and warrants	1,217	3,750
Payments on debt	(75,000)	(400,000)
Payments on capital lease obligations	(43,087)	(23,664)
Net cash provided by financing activities	**1,880,324**	**14,773,718**
Net (decrease) increase in cash and cash equivalents	(5,717,369)	6,602,189
Cash and cash equivalents at beginning of year	7,117,714	515,525
Cash and cash equivalents at end of year	**$ 1,400,345**	**$ 7,117,714**
Supplemental disclosure of cash flow information		
Cash paid during the year for interest	$ 26,088	$ 5,789
Supplemental disclosure of noncash investing and financing activities:		
Acquisition of equipment through capital leases	$ 312,105	$ 31,846
Conversion of convertible promissory notes to Series C preferred stock	–	$ 3,532,282
Conversion of convertible promissory notes to Series A preferred stock	$ 1,999,864	–

See Notes to Financial Statements

Note 1 - Organization

OpGen, Inc. (OpGen or the Company) was incorporated in Delaware on January 22, 2001. OpGen is a commercial stage company using molecular testing and bioinformatics to combat multi-drug resistant infections. The Company's products and services enable healthcare providers to rapidly identify hospital patients who are colonized with life threatening, multi-drug resistant organisms, or MDROs. The Company's Acuitas™ gene-based testing products are enabled by the Lighthouse™ bioinformatics platform which provides 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 believes that it has an important first-mover advantage in providing Acuitas-enabled molecular information to healthcare providers on a commercial scale.

The Company's headquarters and principal operations are in Gaithersburg, Maryland. The Company had an additional facility in Madison, Wisconsin, which was closed in April 2013. 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 availability of 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, negative operating cash flows and has a deficit in stockholders' equity.

As more fully described in Notes 5 and 13, the Company raised $4.0 million in two Series A Preferred Stock offerings during the fourth quarter of 2013 and early 2014, raised $1.5 million through the issuance of convertible debt in the third quarter of 2014, and raised $1.0 million through the issuance of promissory notes in the fourth quarter of 2014. 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 2014.

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 obtained a certificate of deposit in the amount of $52,459, which is required as collateral for a letter of credit benefiting the landlord for the Gaithersburg facility lease. The Company obtained an additional certificate of deposit of $5,000, which is required by its credit card processor. These certificates of deposits are reflected in other long-term assets on the accompanying balance sheets.

Fair value measurements
Included in the financial statements are certain financial instruments carried at fair value, including cash and cash equivalents. 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.

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, 2013 and 2012:

	December 31, 2013 Total	Quoted Prices in Active Markets for Identical Assets Level 1	Significant Other Observable Inputs Level 2	Significant Unobservable Inputs Level 3
Cash and cash equivalents	$ 1,400,345	$ 1,248,885	$ 151,460	$ –

	December 31, 2012 Total	Quoted Prices in Active Markets for Identical Assets Level 1	Significant Other Observable Inputs Level 2	Significant Unobservable Inputs Level 3
Cash and cash equivalents	$ 7,117,714	$ 362,796	$ 6,754,918	$ –
Series A convertible preferred stock warrant	(661)	–	–	(661)
Series C convertible preferred stock warrant	(132,260)	–	–	(132,260)

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 Series A convertible preferred stock warrant derivative liability, which was measured at fair value on a recurring basis using significant unobservable inputs (Level 3). This warrant was converted into a common stock warrant in connection with the 2013 recapitalization:

	December 31	
	2013	2012
Balance beginning of year	$ (661)	$ (661)
Transfers to (from) Level 3	–	–
Total gains realized/unrealized included in earnings	661	–
Balance end of year	$ –	$ (661)

The following table presents information about the Series C convertible preferred stock warrant liability when the Company issued a warrant to purchase 3,260,870 shares of Series C preferred stock as part of an existing development agreement under which the Company is performing work for the development partner. The warrant is measured at fair value on a recurring basis using significant unobservable inputs (Level 3). This warrant was converted into a common stock warrant in the 2013 recapitalization (see note 5).

	December 31	
	2013	2012
Balance beginning of year	$ (132,260)	$ (19,683)
Transfers to (from) Level 3	–	–
Total expenses realized included in earnings	(1,639)	(112,577)
Total gains realized/unrealized included in earnings	133,899	–
Balance end of year	$ –	$ (132,260)

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 $7,301 and $129,846 as bad debt expense within other expense in 2013 and 2012, respectively, for accounts it considered uncollectible. The allowance for doubtful accounts was $88,097 and $129,846 as of December 31, 2013 and 2012, respectively. Approximately $49,050 was collected from an international distributor during 2013 on the bad debt written off in 2012 and that amount was reversed in 2013.

At December 31, 2013, the Company had accounts receivable from three customers which individually represent 24%, 20%, and 10% of total accounts receivable. At December 31, 2012, the Company had accounts receivable from three customers which individually represent 33%, 31%, and 10% of total accounts receivable. For the year ended December 31, 2013 four individual customers represented 12%, 12%, 10% and 10% of revenues. For the year ended December 31, 2012 one individual customer represented 22% 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	
	2013	2012
Raw materials and supplies	$ 51,005	$ 110,274
Work-in-process	63,917	248,757
Finished goods	60,791	555,465
Total inventories	$ 175,713	$ 914,496

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. Systems placed at customer sites under the Company's Sales Evaluation Program are included in finished goods inventory and represented $0 and $416,266 at December 31, 2013 and 2012, respectively. Inventory reserve for obsolescence and expirations was $1,024,006 and $99,721 at December 31, 2013 and 2012, 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. Capitalized software costs included in other assets were $0 and $20,138 at December 31, 2013 and 2012, 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 provided for 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:

	2013	2012
Balance at beginning of year	$ 19,750	$ 70,000
Warranty expense (reversal)	8,298	(33,732)
Cost of replacement parts and related delivery	(21,548)	(16,518)
Balance at end of year	$ 6,500	$ 19,750

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 upon the termination of the fully amortized license.

Total amortization expense was $108,452 and $55,194 for the years ended December 31, 2013 and 2012, respectively. Accumulated amortization was $641,355 and $622,904 at December 31, 2013 and 2012, respectively.

Estimated amortization expense for the year ending December 31, 2014 on amortized intangible assets as of December 31, 2013, is $57,594.

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 $553,355 and $528,524 for the years ended December 31, 2013 and 2012, respectively. Property and equipment consisted of the following at December 31, 2013 and 2012:

	2013	2012
Laboratory equipment	$ 2,265,717	$ 1,947,442
Office furniture and equipment	792,129	481,607
Computers	1,167,144	1,126,184
Leasehold improvements	250,442	217,287
	4,475,432	3,772,520
Less accumulated depreciation	(3,396,009)	(2,882,304)
Property and equipment, net	$ 1,079,423	$ 890,216

In 2012, the Company began to provide Argus™ Whole Genome Systems under its Argus Reagent Rental Program to customers, to 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 and charged to selling 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, 2013 and 2012, these costs were approximately $81,000 and $38,000, respectively. The costs to maintain these systems are charged to operations as incurred.

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. As of December 31, 2013 and 2012, the Company determined that there were no impaired long-lived assets.

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 handlings 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 $35,213 and $49,467 in 2013 and 2012, 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.

Fair value of financial instruments
All current assets and liabilities are carried at cost, which approximates fair value, because of the short-term maturities of those instruments. Debt and capital leases are reflective of fair value based on instruments with similar terms available to the Company.

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
Deferred income taxes are recognized for the tax consequences in future years of differences between the tax basis of assets and liabilities and their financial reporting amounts at each year-end based on the enacted tax laws and statutory tax rates applicable to the periods in which the differences are expected to affect taxable income. 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.

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.

Loss per share
Basic loss per share is computed by dividing net loss applicable to common shareholders 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 shareholders 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 2.1 million and 0.4 million for the years ended December 31, 2013 and 2012. 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 redeemable convertible 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 Company's Series A, A-1, B, and C 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).

Share-based compensation
Share-based payments are recognized at fair value. The fair value of share-based payments 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. The board of directors made contemporaneous determinations of fair value. 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 these companies.

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 estimates of the expected term of the option term 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 distributes 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. The Company accrued $135,557 in research and development expenses in 2012 related to this project. The Company and the university amended the contract in 2014 to adjust the scope of the work to the $135,557 already incurred and to adjust the payment schedule such that the $135,557 is paid over 2014 and 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 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 and $1,263,159 in 2013 and 2012, respectively, 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 and $565,408 in 2012. Upon signing the amendment in December 2011, the Company agreed to issue the governmental entity warrants to purchase Series C preferred shares upon the successful close of a Series C financing. On March 5, 2012, the Company issued a warrant to purchase 3,260,870 shares of Series C preferred stock as part of an existing development agreement under which the Company performed work for the development partner. 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 has a term of seven years. The Company valued the warrant at $133,899, which was recorded as a liability and expensed proportional to the revenue earned. The Company recognized charges to other expense of $1,639 and $112,577 in 2013 and 2012, respectively. The 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 payment for meeting development milestones under the agreement. Since the milestones are substantive, the Company will recognize revenue in the period in which the substantive milestone is achieved. No revenue was recognized under this provision during 2013. 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 revenue of $27,778 during 2013.

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.

Reclassifications
Certain amounts present in the balance sheet, statement of operations, and statement of cash flows for 2012 have been reclassified to conform to current year presentation.

Recent Accounting Pronouncements
In July 2012, the Financial Accounting Standards Board ("FASB") issued accounting guidance to simplify the evaluation for impairment of indefinite-lived intangible assets. Under the updated guidance, an entity has the option of first performing a qualitative assessment to determine whether it is more likely than not that an indefinite-lived intangible asset is impaired before proceeding to the quantitative impairment test under which it would calculate the asset's fair value. When performing the qualitative assessment, the entity must evaluate events and circumstances that may affect the significant inputs used to determine the fair value of the indefinite-lived intangible asset. The adoption of this standard in 2013 did not have a material impact on the Company's consolidated results of operations, cash flows or financial position.

In July 2013, the 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. The adoption of this standard in 2014 did not have a material impact on the Company's consolidated results of operations, cash flows or financial position.

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. The Company is currently evaluating the impact, if any, that this new accounting pronouncement will have on its 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. The Company is currently evaluating the impact, if any, that this new accounting pronouncement will have on its financial statements.

Note 4 - Restructuring costs

In October 2011, the Company restructured its operations to reduce expenditures and conserve cash. In connection with this restructuring, the Company reduced its workforce by approximately 20%, or 10 employees. For the year ended December 31, 2011, the Company recorded restructuring charges of $197,411, of which $128,260 was paid by December 31, 2011. The remaining restructuring costs were paid in full during 2012. The restructuring charges were recorded as components of operating expenses based on the function performed by the employees receiving the severance benefits. There were no material adjustments to the recognized restructuring charges.

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, the Company reduced its workforce by approximately 36%, or 16 employees.

The following table presents the accrued restructuring costs and the amounts paid:

	2013	2012
Balance at beginning of year	$ –	$ 69,351
Restructuring expense	329,649	–
Amounts paid	(329,649)	(69,351)
Balance at end of year	$ –	$ –

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 Convertible Promissory Notes. The Convertible Promissory Notes were convertible into Series A Convertible Preferred Stock at $1.00 per Series A share. On December 18, 2013, the Company issued $1,999,864 in Convertible Promissory Notes in exchange for $969,864 in cash and in exchange for the Demand Notes. On December 30, 2013, the Convertible Promissory Notes were converted into 1,999,864 shares of Series A Convertible 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 Convertible Promissory Notes. These actions are collectively referred to as the “December 2013 recapitalization.”

1. A mandatory conversion of all outstanding shares of Senior Preferred Stock into Common Stock in accordance with the terms of the Certificate of Incorporation,
2. A mandatory conversion of all outstanding shares of the Series A-1 Preferred Stock into Common Stock on a one-to-one basis,
3. Elimination of all mandatory, accrued, cumulative and unpaid dividends on the Senior Preferred Stock,
4. A 1-for-790.5407 reverse stock split of the Company’s Common Stock as of the financing date, and
5. Conversion of all outstanding options and warrants on the terms above.

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 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 Outstanding
Series A Preferred Stock	25,205,800
Series A Anti-dilution rights	35,915,987
Series B Preferred Stock	64,936,385
Series B Anti-dilution rights	26,036,056
Series C Preferred Stock	126,802,946
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
Series A Preferred Warrants	1,140,000
Series A Anti-dilution rights	1,624,306
Series C Preferred 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 issued 1,999,864 shares of Series A Convertible Preferred Stock in December 2013 at $1.00 per share in exchange for $1,999,864 in Convertible Promissory Notes (see note 5). 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 stockholders 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.

Beginning in December 2020, 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 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.

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. At December 31, 2013, the Company has reserved 1,999,864 shares of common stock for potential conversion of Series A.

The following roll-forward tables provide activity related to the Preferred Stock issuances that were outstanding prior to the December 2013 recapitalization:

Series A-1:	
Ending balance, December 31, 2011	$ 4,916,451
Accretion of issuance costs	7,779
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	$ –
Series A:	
Ending balance, December 31, 2011	$ 31,733,883
Accrual related to cumulative dividends	2,021,989
Accretion of issuance costs	231,630
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	$ –
Series B:	
Ending balance, December 31, 2011	$ 25,233,129
Accrual related to cumulative dividends	1,849,246
Accretion of issuance costs	14,138
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	$ –
Series C:	
Ending balance, December 31, 2011	$ –
Proceeds from issuance, net of issuance costs	16,936,364
Accrual related to cumulative dividends	759,494
Accretion of issuance costs	40,966
Ending balance, December 31, 2012	17,736,824
Accrual related to cumulative dividends	1,346,209
Issuance of 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	$ –

On March 5, 2012, the Company issued 68,336,521 shares of Series C redeemable convertible preferred stock at a per share price of $0.138 to existing and new investors for gross cash proceeds of $5,834,382 and in exchange for $3,596,058 of principal and accrued interest related to convertible promissory notes issued in late 2011 and February 2012. In a subsequent participation rights offering in April 2012, the Company issued an additional 3,615,563 shares of Series C redeemable convertible preferred stock for gross proceeds of $498,948. On October 26, 2012, the Company issued an additional 54,347,826 Series C shares to several existing investors for gross proceeds of $7,500,000. In a subsequent participation rights offering in December 2012, the Company issued an additional 503,036 shares of Series C redeemable convertible preferred stock for gross proceeds of $69,419. The Company incurred issuance costs of $562,443 related to these Series C preferred stock sales. Holders of the Series A, Series B, and Series C preferred stock (senior preferred) 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 senior preferred stock holders would receive a greater amount upon the conversion of their shares to common. First, to the holders of Series C preferred stock, an amount per share equal to two times the Series C Original Issue Price; second, to the holders of Series A and B preferred stock, pari passu, an amount per share equal to the Series A Original Issue Price and the Series B Original Issue Price (as applicable); third, to the holders of Series C preferred stock an amount equal to all unpaid Series C dividends; fourth, to the holders of Series A and Series B preferred stock, pari passu, an amount equal to all unpaid Series A and Series B dividends (as applicable); and the remainder to common stockholders.

The holders of the 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 Series A-1 preferred stock would have automatically converted into common stock at $1.02 per share or, at the Company’s option, could be settled in cash for an amount not to exceed $4,857,622.

Note 7 - Debt

Debt consists of the following:

	December 31	
	2013	2012
Note payable to State of Maryland	$ –	$ 100,000
Note payable to Montgomery County	10,000	10,000
	10,000	110,000
Less current portion	(10,000)	(110,000)
	$ –	$ –

In November 2011, the Company entered into a note and warrant purchase agreement with certain holders of the Company's then outstanding Series A and B preferred stock under which the Company could borrow up to $2,499,250 in exchange for convertible promissory notes (the "Notes") and common stock warrants. The Company borrowed $2,132,656 under this agreement in exchange for convertible promissory notes and warrants to purchase 4,635,741 shares of common stock at $0.01 per share. The Notes originally matured on June 30, 2012, and bore interest at 8%. The Company issued additional convertible promissory notes in the amount of $1,400,000 in February 2012 on terms similar to the November 2011 note and warrant agreement except that no warrants were issued with the February 2012 notes. The November 2011 and February 2012 notes, plus accrued interest, were converted into Series C preferred stock in March 2012 (see Note 6). In January 2012, the Company borrowed $400,000 from one of its existing shareholders and issued a short-term demand note, which bore interest at 8%. The note, plus accrued interest, was paid in full in February 2012.

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 recorded the loan and interest forgiveness of $36,811 as Other Income in 2013 for these two loans.

The Company sold $1,030,000 of Demand Notes in November 2013. The 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 Demand Note holders.

On December 18, 2013, the Company sold $1,999,864 of Convertible Promissory Notes in exchange for the Demand Notes above and $969,869 in cash. The Convertible Promissory Notes were due on the earlier of December 18, 2014, an event of default, or a change in control as defined in the Convertible Promissory Note. Interest accrued at 8% per annum and the Convertible Promissory Notes were convertible into one share of Series A Convertible Preferred Stock for each $1.00 principal remaining on the note. The Convertible Promissory Notes were unsecured. The Convertible Promissory Notes were converted into 1,999,864 shares of Series A Preferred Stock on December 30, 2013.

The weighted average interest rate in 2013 on the Company's debt instruments was approximately 8%. Interest in the amount of $10,691 was accrued and paid in cash on the Demand Notes in 2013. Interest in the amount of $5,120 was accrued in 2013 on the Convertible Promissory Notes and paid in 2014.

Note 8 - Stockholders' deficit

Stock option plan

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 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 vested, determined at the date of the grant, 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% shareholders. 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 amended and restated the 2002 Stock Option and Restricted Stock Plan through the adoption of 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, shares of restricted stock, or other stock-based awards to officers, directors, employees, consultants and advisors. Upon adoption, the 2008 plan authorized grants of options to purchase a total of 7,569 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 to 8,738 shares in 2009, 20,332 shares in 2011, and 36,668 shares in 2012. 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. At December 31, 2013, there were 183,153 shares available for grant under the 2008 plan.

For the years ended December 31, 2013 and 2012, the Company recorded $152,753 and $214,970, respectively, of stock compensation expense. There were no amounts capitalized for the years ended December 31, 2013 and 2012. The allocation of stock compensation expense by operating expenses category is as follows:

	Year Ended December 31	
	2013	2012
Research and development	$ 7,876	$ 23,927
General and administrative	142,583	176,695
Sales and marketing	2,294	14,348
	$ 152,753	$ 214,970

At December 31, 2013, the Company had unrecognized expense related to its stock options of $73,443 which will be recognized over a weighted-average period of 1.91 years. A summary of the status of options granted under the plan is presented below as of and for the years ended December 31, 2013 and 2012:

	Number of Stock Options	Weighted-Average Exercise Price	Weighted-Average Contractual Term (in Years)
Outstanding at January 1, 2012	16,305	$ 103.32	8.34
Granted	7,948	$ 7.91	
Forfeited	(2,078)	$ 83.40	
Exercised	(47)	$ 79.79	
Outstanding at December 31, 2012	22,128	$ 70.97	7.89
Granted	7,064	$ 7.91	
Forfeited	(8,190)	$ 57.86	
Exercised	(46)	$ 27.17	
Outstanding at December 31, 2013	20,956	$ 54.93	8.05
Exercisable at end of year	11,975	$ 85.17	7.28
Vested and expected to vest	20,400	$ 56.85	8.00

The weighted-average grant-date fair value for the option awards granted during the years ended December 31, 2013 and 2012 was $3.56 and $4.47, respectively. The total fair value of options vested in the years ended December 31, 2013 and 2012, was $164,248 and $221,570, 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	
	2013	2012
Dividend yield	0.00%	0.00%
Expected life (years)	6.25	6.25
Risk-free interest rate	.93-1.69%	.81-1.38%
Volatility	60%	60%

Stock warrants
As of December 31, 2013, the following common stock warrants were outstanding:

Issuance	Type	Number	Exercise Price	Expiration
August 2007	Common	8,921	$ 7.91	August 2017
September 2007	Common	3,451	$ 790.54	September 2014
March 2008	Common	46	$ 790.54	March 2018
April 2009	Common	33	$ 790.54	April 2014
November 2009	Common	6,674	$ 7.91	November 2019
January 2010	Common	6,674	$ 7.91	January 2020
March 2010	Common	1,277	$ 7.91	March 2020
November 2011	Common	5,213	$ 7.91	November 2021
December 2011	Common	664	$ 7.91	December 2021
March 2012	Common	4,125	$ 109.09	March 2019

As described in Note 5, these warrants were converted into 37,078 common stock warrants in the December 2013 recapitalization.

The warrants listed above were issued in connection with various debt, preferred stock or development contract agreements. The estimated fair value of those 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, 2013 and 2012, the Company recorded $5,406 and $18,199, respectively, for the amortization of the value of warrants related to debt issued in 2011. 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. The preferred stock is being accreted to its redemption value. The Company recorded $314,192 and $294,513, respectively, for the years ended December 31, 2013 and 2012, for the accretion of these equity issuance costs. The warrants exercisable into Series A and 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 is redeemable for cash in certain circumstances outside of the Company's control. For the years ended December 31, 2013 and 2012, the Company recorded $134,560 and $0, respectively, as a change in the estimated fair value. The estimated fair value of the warrants for preferred stock issued in connection with the 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, 2013 and 2012, the Company recorded $1,639 and $112,577, respectively, as other expense.

Note 9 - Income taxes

At December 31, 2013 and 2012, the Company has net deferred tax assets of $28,704,670 and $23,947,196, respectively, consisting of net operating loss (NOL) carry forwards, research and development (R&D) credits, and differences between depreciation and amortization recorded for financial statement and tax purposes. The Company's net deferred tax assets at December 31, 2013 and 2012 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 asset.

Deferred taxes - tax basis
The Company's deferred tax assets and liabilities as of December 31, 2013 and 2012 are as follows:

	2013	2012
Shared based compensation	$ 127,429	$ 81,578
Accrued employee benefits and severance	17,036	102,340
Deferred rent	23,342	48,069
Depreciation and amortization	172,357	260,404
Inventory reserve	377,674	35,614
Accrued bonus	13,640	–
Amortization	80,525	–
R&D credit carryforward	1,759,478	1,609,546
Federal NOL carryforward	26,137,776	21,809,859
Total deferred tax assets	28,709,257	23,947,410
Less: Valuation allowance	(28,704,670)	(23,947,196)
Deferred tax liabilities:		
Fixed assets	$ (4,587)	$ (214)
Net deferred tax asset/liability	$ –	$ –

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:

	2013	**2012**
US Federal statutory rate	34.0%	34.0%
State income tax, net of Federal benefit	2.9%	1.5%
Change in valuation allowance	(46.7%)	(14.7%)
Changes in state tax rates and other	9.8%	(20.8%)
	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 has federal NOL carryforwards of $70,903,156 and $61,373,248 at December 31, 2013 and 2012, respectively. The NOL carry forwards 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 fully utilized.

Note 10 - Lease commitments

Operating leases
During 2008, the Company relocated its headquarters to Gaithersburg, Maryland. Under the terms of an operating lease for that facility, the Company was obligated to pay $26,229 per month beginning in July 2008 with a 3% increase each anniversary date ending in September 2012. In April 2011, this lease was modified and extended until September 2014. The monthly base rent was increased to $40,218 beginning in July 2011, and includes a 3% increase in August of each year. In addition, the Company leased space in Madison, Wisconsin under an operating lease which was terminated in April 2013.

For all of the operating leases, the Company is responsible for all utilities, repairs, insurance, and taxes. Expense under the Company's leases for the years ended December 31, 2013 and 2012, was $885,310 and $943,049, respectively.

The Company leases computer equipment, office furniture, and equipment under various capital leases. The leases commenced beginning in 2006 and expire at various dates through 2018. Five new leases commenced in 2013. 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, 2013:

	Capital Leases	Operating Leases	Total
Years ending December 31:			
2014	$ 132,433	$ 409,128	$ 541,561
2015	117,592	–	117,592
2016	89,765	–	89,765
2017	29,622	–	29,622
2018	27,153	–	27,153
	$ 396,565	$ 409,128	$ 805,693
Less amount representing interest	(56,036)		
Present value of minimum lease payments	340,529		
Less current maturities	(105,967)		
Long-term portion of capital lease obligation	$ 234,562		

Amortization expense associated with equipment under capital leases for the years ended December 31, 2013 and 2012 was $52,599 and $26,321, 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:

	2013	2012
Laboratory equipment	$ 364,471	$ 26,860
Computers	153,693	112,734
Less accumulated amortization	(122,619)	(70,220)
Capital lease assets, net	$ 395,545	$ 69,374

Note 11 - Employee benefit plan

Substantially all employees are eligible to participate in a retirement Savings Plan, the OpGen 401(k) Plan. The Company made matching contributions up to 2% of eligible compensation (subject to a $255,000 compensation limit for 2013) until April 2013 when they were suspended. For the years ended December 31, 2013 and 2012, the Company contributed $27,299 and $81,911, 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 $199,449 and $238,405 of total royalty expense for the years ended 2013 and 2012, respectively, which are classified as cost of sales in the accompanying statements of operations. In 2014, future minimum royalty fees are $90,000 under these agreements.

Note 13 - 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.

Sales of Preferred Stock
In February 2014, the Company sold 1,405,096 shares of Series A Convertible Preferred Stock at $1.00 per share for gross proceeds of $1,405,096. In April 2014, the Company sold an additional 594,904 shares of Series A Convertible Preferred Stock for gross proceeds of $594,904. The terms and provisions of the Series A Convertible Preferred Stock were the same as that issued in December 2013.

In conjunction with the Series A Preferred Stock sold above, the Company increased the number of shares available for grant under the 2008 plan to 503,347.

Issuance of Debt
In July, August and September 2014, the Company raised $1.5 million through the issuance of convertible debt. 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.

In October 2014, the Company raised $0.5 million in capital through the issuance of 8% secured promissory notes, due in February 2015. In November 2014, the Company raised $0.5 million of capital through the issuance of 8% secured promissory notes due in March 2015.

Lease Extension
In March 2014, the Company extended the termination date of its Gaithersburg, Maryland facility lease to April 2015 under the terms and provisions of the existing lease except that 50% of the monthly rental fee for October and November 2014 will be abated. The lease extension increased the estimated future minimum payments under this lease by $271,593.

OPGEN, INC.

Index to Unaudited Interim Condensed Financial Statements

Nine Months Ended September 30, 2014 and 2013

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OpGen, Inc.
Condensed Balance Sheet
(Unaudited)

	September 30, 2014
Assets	
Current assets	
Cash and cash equivalents	$ 781,573
Accounts receivable, net	184,046
Inventory, net	379,482
Prepaid expenses and other current assets	90,935
Total current assets	**1,436,036**
Property and equipment, net	700,720
Licensed technology and other intangible assets, net	14,398
Other noncurrent assets	57,459
Total assets	**$ 2,208,613**
Liabilities, Preferred Stock and Stockholders' Deficit	
Current liabilities	
Accounts payable	$ 899,025
Accrued liabilities	1,234,318
Deferred revenue	388,177
Convertible notes	1,500,000
Current maturities of long-term debt and capital lease obligation	107,560
Total current liabilities	**4,129,080**
Capital lease obligation, less current maturities	158,644
Total liabilities	**4,287,724**
Commitments and contingencies	
Redeemable convertible preferred stock	
Series A redeemable convertible preferred stock, $.01 par value; 6,000,000 shares authorized; 3,999,864 shares issued and outstanding at September 30, 2014; liquidation preference of $8 million at September 30, 2014	3,942,585
Total redeemable convertible preferred stock	**3,942,585**
Stockholders' deficit	
Common stock, $.01 par value; 7,500,000 shares authorized; 362,536 shares issued and outstanding at September 30, 2014	3,625
Additional paid-in capital	89,341,395
Accumulated deficit	(95,366,716)
Total stockholders' deficit	**(6,021,696)**
Total liabilities, preferred stock and stockholders' deficit	**$ 2,208,613**

See notes to unaudited condensed financial statements.

OpGen, Inc.
Condensed Statements of Operations
Nine Months Ended September 30,
(Unaudited)

	2014	2013
Revenue		
Product sales	$ 841,567	$ 1,221,220
Laboratory services	379,339	556,902
Collaborations revenue	1,783,340	16,461
Total revenue	**3,004,246**	**1,794,583**
Operating expenses		
Cost of products sold	292,116	1,012,396
Cost of services	398,628	293,149
Research and development	3,300,124	3,303,000
General and administrative	1,652,599	2,190,595
Sales and marketing	1,583,718	2,309,673
Total operating expenses	**7,227,185**	**9,108,813**
Operating loss	**(4,222,939)**	**(7,314,230)**
Other income (expense)		
Interest income	120	1,176
Interest expense	(47,468)	(9,127)
Other income (expense)	4,400	98,991
Total other income (expense)	**(42,948)**	**91,040**
Net loss	**(4,265,887)**	**(7,223,190)**
Preferred stock dividends and accretion	(4,819)	(4,179,450)
Net loss available to common stockholders	**$ (4,270,706)**	**$ (11,402,640)**
Net loss per common share - basic and diluted	**$ (11.78)**	**$ (3,232.04)**
Weighted average shares outstanding - basic and diluted	**362,536**	**3,528**

See notes to unaudited condensed financial statements.

OpGen, Inc.
Condensed Statements of Cash Flows
Nine Months Ended September 30,

	2014	2013
Cash flows from operating activities		
Net loss	$ (4,265,887)	$ (7,223,190)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	461,432	474,149
Amortization of debt discount	4,807	–
Non-cash interest expense	16,076	10,098
Recovery of bad debt	(4,400)	(49,050)
Loan forgiveness	–	(36,811)
Stock compensation expense	80,457	140,860
Inventory obsolescence	(44,595)	(70,144)
Other non-cash items	–	1,339
Changes in operating assets and liabilities:		
Accounts receivable	62,251	789,924
Inventory	(159,174)	(619,172)
All other assets	78,311	187,924
Accounts payable	29,853	210,723
Accrued liabilities	(42,778)	(301,578)
Deferred revenue	(121,551)	299,979
Net cash used in operating activities	**(3,905,198)**	**(6,184,949)**
Cash flows from investing activities		
Purchases of property and equipment	(39,537)	(38,459)
Net cash used in investing activities	**(39,537)**	**(38,459)**
Cash flows from financing activities		
Proceeds from issuance of preferred stock, net of issuance costs	1,937,902	(2,670)
Proceeds from borrowings on convertible notes, net of issuance costs	1,472,386	–
Proceeds from exercise of stock options and warrants	–	1,061
Payments on debt	(3,750)	(75,000)
Payments on capital lease obligations	(80,575)	(30,312)
Net cash provided by (used in) financing activities	**3,325,963**	**(106,921)**
Net (decrease) increase in cash and cash equivalents	(618,772)	(6,330,329)
Cash and cash equivalents at beginning of period	1,400,345	7,117,714
Cash and cash equivalents at end of period	**$ 781,573**	**$ 787,385**
Supplemental disclosure of cash flow information		
Cash paid during the period for interest	$ 26,088	$ 7,624
Supplemental disclosure of noncash investing and financing activities:		
Acquisition of equipment purchased through capital leases	$	$ 40,959

See notes to unaudited condensed financial statements.

Note 1 - Organization

OpGen, Inc. (OpGen or the Company) was incorporated in Delaware on January 22, 2001. OpGen is a commercial stage company using molecular testing and bioinformatics to combat multi-drug resistant infections. The Company's products and services enable healthcare providers to rapidly identify hospital patients who are colonized with life threatening, multi-drug resistant organisms, or MDROs. The Company's Acuitas™ gene-based testing products are enabled by the Lighthouse™ bioinformatics platform which provides 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 believes that it has an important first-mover advantage in providing Acuitas-enabled molecular information to healthcare providers on a commercial scale.

The Company's headquarters and principal operations are in Gaithersburg, Maryland. The Company had an additional facility in Madison, Wisconsin, which was closed in April 2013. 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 availability of 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, negative operating cash flows and has a deficit in stockholders' equity.

The Company raised $4.0 million in two Series A Preferred Stock offerings during the fourth quarter of 2013 and early 2014, raised $1.5 million through the issuance of convertible debt in the third quarter of 2014, and raised $1.0 million through the issuance of promissory notes in the fourth quarter of 2014. 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 2014.

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

Basis of Presentation

The accompanying unaudited interim condensed financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP"). In our opinion, the accompanying unaudited interim condensed financial statements include all adjustments, consisting of normal recurring adjustments, which are necessary to present fairly our financial position, results of operations and cash flows. The interim condensed results of operations are not necessarily indicative of the results that may occur for the full fiscal year. Certain information and footnote disclosure normally included in financial statements prepared in accordance with U.S. GAAP have been omitted pursuant to instructions, rules and regulations prescribed by the United States Securities and Exchange Commission. We believe that the disclosures provided herein are adequate to make the information presented not misleading when these unaudited interim condensed financial statements are read in conjunction with the audited financial statements and notes included elsewhere herein.

Use of estimates

In preparing financial statements in conformity with accounting principles generally accepted in the United States, 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.

Fair value of financial instruments

All current assets and liabilities are carried at cost, which approximates fair value, because of the short-term maturities of those instruments. Debt and capital leases are reflective of fair value based on instruments with similar terms available to the Company.

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.

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 allowance for doubtful accounts was $79,697 as of September 30, 2014.

At September 30, 2014, the Company had accounts receivable from two customers which individually represent 41%, and 19% of total accounts receivable. For the nine months ended September 30, 2014 one individual customer represented 64% of revenues. For the nine months ended September 30, 2013 four individual customers represented 16%, 16%, 13% and 12% of revenues.

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 upon the termination of the fully amortized license.

Total amortization expense was $43,195 and $81,521 for the nine months ended September 30, 2014 and 2013, respectively. Accumulated amortization was $684,551 at September 30, 2014.

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. During the nine months ended September 30, 2014 and 2013, the Company determined that there were no impaired long-lived assets.

Redeemable convertible preferred stock
The carrying value of the Company's redeemable convertible 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. As of September 30, 2014, the Company has 3,999,864 of Series A redeemable convertible preferred stock outstanding. 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.

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.

<u>Revenue from sales of the Argus™ System</u>
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.

<u>Revenue from sales of Genome Builder Software and consumables (on a stand-alone basis)</u>
Revenue is recognized for Genome Builder Software and for consumables, when sold on a stand-alone basis, upon delivery to the customer.

<u>Revenue from Extended Warranty Service Contracts</u>
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.

<u>Revenue from Funded Software Development Arrangements</u>
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.

Income taxes

Deferred income taxes are recognized for the tax consequences in future years of differences between the tax basis of assets and liabilities and their financial reporting amounts at each year-end based on the enacted tax laws and statutory tax rates applicable to the periods in which the differences are expected to affect taxable income. 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.

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.

The Company has federal NOL carryforwards of $70,903,156 and $61,373,248 at December 31, 2013 and 2012, respectively. Despite the NOL carryforwards, which begin to expire in 2012, the Company may have future tax liability due to alternative minimum tax or state tax requirements. Also, use 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 fully utilized.

Loss per share

Basic loss per share is computed by dividing net loss available to common shareholders 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 shareholders 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 6.1 million and 0.4 million for the nine months ended September 30, 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.

Stock-based compensation

Stock-based payments to employees are recognized at fair value. The fair value of share-based payments 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. 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.

Recent accounting pronouncements

In July 2012, the Financial Accounting Standards Board ("FASB") issued accounting guidance to simplify the evaluation for impairment of indefinite-lived intangible assets. Under the updated guidance, an entity has the option of first performing a qualitative assessment to determine whether it is more likely than not that an indefinite-lived intangible asset is impaired before proceeding to the quantitative impairment test under which it would calculate the asset's fair value. When performing the qualitative assessment, the entity must evaluate events and circumstances that may affect the significant inputs used to determine the fair value of the indefinite-lived intangible asset. The adoption of this standard in 2013 did not have a material impact on the Company's consolidated results of operations, cash flows or financial position.

In July 2013, the 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. The adoption of this guidance in 2014 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. The Company is currently evaluating the impact, if any, that this new accounting pronouncement will have on its 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. The Company is currently evaluating the impact, if any, that this new accounting pronouncement will have on its financial statements.

Note 4 - Fair value measurements

Included in the financial statements are certain financial instruments carried at fair value, including cash and cash equivalents. The Company classifies its financial instruments using 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. 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 September 31, 2014:

	September 30, 2014 Total	Quoted Prices in Active Markets for Identical Assets Level 1	Significant Other Observable Inputs Level 2	Significant Unobservable Inputs Level 3
Cash and cash equivalents	$ 781,573	$ 780,104	$ 1,469	$ –

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.

Prior to the December 2013 Recapitalization (see Note 6), the Company had outstanding stock purchase warrants entitling the holders to purchase its Series A redeemable convertible preferred stock. The following table presents information about the Series A convertible preferred stock warrant derivative liability, which was measured at fair value on a recurring basis using significant unobservable inputs (Level 3):

	September 30	
	2014	2013
Balance beginning of year	$ –	$ (661)
Transfers to (from) Level 3	–	–
Total gains realized/unrealized included in earnings	–	–
Balance at September 30	$ –	$ (661)

The warrant derivative liability was settled in December 2013 when the warrant was converted into a common stock warrant in connection with the December 2013 Recapitalization.

Prior to the December 2013 Recapitalization (see Note 6), the Company had outstanding stock purchase warrants entitling the holders to purchase its Series C redeemable convertible preferred stock. The following table presents information about the Series C convertible preferred stock warrant derivative liability to purchase 3,260,870 shares of Series C preferred stock as part of an existing development agreement under which the Company is performing work for the development partner. The warrant is measured at fair value on a recurring basis using significant unobservable inputs (Level 3):

	September 30	
	2014	2013
Balance beginning of year	$ –	$ (132,260)
Transfers to (from) Level 3	–	–
Total gains realized/unrealized included in earnings	–	(1,339)
Balance at September 30	$ –	$ (133,599)

The warrant derivative liability was settled in December 2013 when the warrant was converted into a common stock warrant in connection with the December 2013 Recapitalization.

The Company has not nonfinancial assets and liabilities measured at fair value on a recurring basis. The Company measures its long-lived assets (intangible assets and property and equipment) on a nonrecurring basis when impairments are identified; no such impairments were identified during the nine months ended September 30, 2014 and 2013.

Note 5 - 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 distributes 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. The Company accrued $135,557 in research and development expenses in 2012 related to this project. The Company and the university amended the contract in 2014 to adjust the scope of the work to the $135,557 already incurred and to adjust the payment schedule such that the $135,557 is paid over 2014 and 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 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. Upon signing the amendment in December 2011, the Company agreed to issue the governmental entity warrants to purchase Series C preferred shares upon the successful close of a Series C financing. On March 5, 2012, the Company issued a warrant to purchase 3,260,870 shares of Series C preferred stock as part of an existing development agreement under which the Company performed work for the development partner. 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 has a term of seven years. The Company valued the warrant at $133,899, which was recorded as a liability and expensed proportional to the revenue earned. The 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.

In September 2013, the Company entered into a technology development agreement in which the Company would receive fixed milestone payment for meeting development milestones under the agreement. Since the milestones are substantive, the Company will recognize revenue in the period in which the substantive milestone is achieved. 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 attained twelve milestones during the first nine months of 2014 and recognized $1.8 million of revenue under this agreement.

Note 6 - 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, the Company reduced its workforce by approximately 36%, or 16 employees. The Company incurred and paid approximately $330,000 of restructuring costs during the nine months ended September 30, 2013 (none in 2014).

Note 7 - December 2013 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 Convertible Promissory Notes. The Convertible Promissory Notes were convertible into Series A redeemable convertible preferred stock at $1.00 per share. On December 18, 2013, the Company issued $1,999,864 in Convertible Promissory Notes in exchange for $969,864 in cash and in exchange for the Demand Notes. On December 30, 2013, the Convertible Promissory Notes were converted into 1,999,864 shares of Series A redeemable convertible 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 Convertible Promissory Notes. These actions are collectively referred to as the "December 2013 Recapitalization."

- A mandatory conversion of all outstanding shares of 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 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 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 for preferred stock into options and warrants for common stock on the terms above.

As of December 31, 2013, and as a result of the (i) December 31, 2013 Recapitalization and (ii) December 2013 issuance of Convertible Promissory Notes and their subsequent conversion into Series A redeemable convertible preferred stock, the Company had the following equity securities outstanding:

- 362,537 shares of common stock outstanding;
- 1,999,864 shares of Series A redeemable convertible preferred stock outstanding and convertible into 1,999,864 shares of common stock;
- Stock purchase warrants outstanding to purchase 37,078 shares of common stock; and
- Stock options outstanding to purchase 20,956 shares of common stock.

Note 8 - Redeemable convertible preferred stock

The Company's redeemable convertible preferred stock is classified as temporary equity due to redemptions provisions outside of the Company's control.

Series A redeemable convertible preferred stock
The Company issued 1,999,864 shares of Series A redeemable convertible preferred stock in December 2013 at $1.00 per share in exchange for $1,999,864 in Convertible Promissory Notes. In February 2014, the Company sold 1,405,096 shares of Series A redeemable convertible preferred stock for gross proceeds of $1,405,096. In April 2014, the Company sold an additional 594,904 shares of Series A redeemable convertible preferred stock for gross proceeds of $594,904. The Company incurred issuance costs of $62,098 related to these Series A preferred stock sales. As of September 30, 2014, the Company had a total of 3,999,864 shares of Series A redeemable convertible preferred stock outstanding, convertible into 3,999,864 shares of common stock.

The Series A redeemable convertible 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 redeemable convertible 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 redeemable convertible preferred stock purchase price. The Series A redeemable convertible preferred stockholders 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 redeemable convertible preferred stock has broad based anti-dilution rights.

The holders of Series A redeemable convertible 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 2020, the Company may be obligated to redeem shares of Series A redeemable convertible preferred stock, if requested, by holders of at least 70% of the then-outstanding shares of preferred stock. The redemption, if requested, would take place in three equal annual installments. Series A redeemable convertible 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.

Senior preferred stock

Holders of the Series A, Series B, and Series C preferred stock (senior preferred) 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 senior preferred stock holders would receive a greater amount upon the conversion of their shares to common. First, to the holders of Series C preferred stock, an amount per share equal to two times the Series C Original Issue Price; second, to the holders of Series A and B preferred stock, *pari passu*, an amount per share equal to the Series A Original Issue Price and the Series B Original Issue Price (as applicable); third, to the holders of Series C preferred stock an amount equal to all unpaid Series C dividends; fourth, to the holders of Series A and Series B preferred stock, *pari passu*, an amount equal to all unpaid Series A and Series B dividends (as applicable); and the remainder to common stockholders. The Company accrued dividends of $3,934,612 during the nine months ended September 30, 2013; all such dividends were eliminated in connection with the December 2013 Recapitalization. All senior preferred stock was converted to common stock in connection with the December 2013 Recapitalization.

The holders of the 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 Series A-1 preferred stock would have automatically converted into common stock at $1.02 per share or, at the Company’s option, could be settled in cash for an amount not to exceed $4,857,622. The Series A-1 redeemable convertible preferred stock was converted to common stock in connection with the December 2013 Recapitalization.

Note 9 - Debt

In July, August and September 2014, the Company raised $1.5 million through the issuance of convertible debt. 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 convertible debt holders, into either (i) one share of Series A Convertible 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 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 recorded the loan and interest forgiveness of $38,242 as Other Income in 2013 for these two loans.

The Company sold $1,030,000 of Demand Notes in November 2013. The 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 Demand Note holders.

On December 18, 2013, the Company sold $1,999,864 of Convertible Promissory Notes in exchange for the Demand Notes above and $969,869 in cash. The Convertible Promissory Notes were due on the earlier of December 18, 2014, an event of default, or a change in control as defined in the Convertible Promissory Note. Interest accrued at 8% per annum and the Convertible Promissory Notes were convertible into one share of Series A redeemable convertible preferred stock for each $1.00 principal remaining on the note. The Convertible Promissory Notes were unsecured. The Convertible Promissory Notes were converted into 1,999,864 shares of Series A redeemable convertible preferred stock on December 30, 2013.

The weighted average interest rate for the nine months ended September 30, 2014 on the Company's debt instruments was approximately 8%.

Note 10 - Stockholders' equity (deficit)

Stock options and restricted stock awards
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 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 vested, determined at the date of the grant, 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% shareholders. 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 amended and restated the 2002 Stock Option and Restricted Stock Plan through the adoption of 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, shares of restricted stock, or other stock-based awards to officers, directors, employees, consultants and advisors. At September 30, 2014, there were 51,227 shares available for grant under the 2008 plan.

For the nine months ended September 30, 2014 and 2013, the Company recorded $80,457 and $140,860, respectively, of stock compensation expense. The allocation of stock compensation expense by operating expenses is as follows:

	Nine Months Ended September 30,	
	2014	2013
Research and development	$ 18,443	$ 6,544
General and administrative	59,492	132,801
Sales and marketing	2,522	1,515
	$ 80,457	$ 140,860

During the nine months ended September 30, 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. The Company has total stock options to acquire 410,870 shares of common stock outstanding at September 30, 2014.

In March of 2014 the Company granted 130,640 shares of restricted common stock to its Chief Executive Officer, Evan Jones. The shares were compensation to the Mr. Jones for his service as Chief Executive Officer from before the grant date through June 2014 and were subject to forfeiture if Mr. Jones did not continue to perform management services through October 24, 2014. The Company reported compensation expense of $6,532 for these restricted shares in 2014 which was based on the fair market value of the shares at the date of grant.

Stock purchase warrants
The Company has total stock purchase warrants to acquire 37,078 shares of common stock outstanding at September 30, 2014.

Note 11 - 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 Company incurred $73,142 and $150,840 of total royalty expense for the nine months ended September 30, 2014 and 2013, respectively, which are classified as cost of sales in the accompanying statements of operations.

Note 12 - 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 October 2014, the Company raised $0.5 million of capital through the issuance of 8% secured promissory notes, due in February 2015. In November 2014, the Company raised $0.5 million of capital through the issuance of 8% secured promissory notes due in March 2015.

Shares

COMMON STOCK

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 discounts 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	$	*
Legal fees and expenses	$	*
Accounting fees and expenses	$	*
FINRA filing fee	$	*
Printer costs and expenses	$	*
Total	$	*

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***** 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 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 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 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 Convertible 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 Convertible 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 new Series A Convertible 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 Convertible 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 Convertible 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 original issue price, and the denominator of which is the Series A 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 $2,000,000 to existing investors. The notes were convertible, in whole, at any time upon the approval of the requisite note holders, into Series A Convertible Preferred Stock. The notes are convertible into either (i) one share of Series A Convertible 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. Since January 1, 2011, we have issued to employees, consultants, and members of the Board of Directors options to purchase an aggregate of 402,065 shares of our common stock at a weighted-average exercise price of $0.46 per share as of October 31, 2014.

8. As of October 31, 2014, 24,865 of the options issued since January 1, 2011 had been exercised or forfeited.

9. As of October 31, 2014, 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 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. 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 (7) and the issuances of shares of common stock upon the exercise of stock options described in paragraph (8) 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) and the shares of common stock issued pursuant to the exercise of the warrants described in paragraph (9) 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.

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.

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 November 21, 2014.

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)	November 21, 2014
/s/ C. Eric Winzer C. Eric Winzer	Senior Vice President and Chief Financial Officer (principal financial officer and principal accounting officer)	November 21, 2014
/s/ Brian G. Atwood Brian G. Atwood	Director	November 21, 2014
Timothy Howe	Director	November__, 2014
/s/ Laurence R. McCarthy Laurence R. McCarthy	Director	November 21, 2014
/s/ Misti Ushio Misti Ushio	Director	November 21, 2014

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	*	Form of Tenth Amended and Restated Certificate of Incorporation, to be in effect immediately prior to the consummation of this offering.
3.2		Bylaws of the Registrant
3.2.1	*	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		Third Amended and Restated Right of First Refusal and Co-Sale Agreement, dated as of December 18, 2013, among the Registrant and certain investors.
4.4		Third Amended and Restated Voting Agreement, dated as of December 18, 2013, among the Registrant and certain investors.
4.4.1		Amendment No. 1 to the Third Amended and Restated Voting Agreement, dated as of February 18, 2014, among the Registrant and certain investors.
4.5		Stockholders' Agreements Amendment, dated as of July 11, 2014, among the Registrant and certain investors.
4.6		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	*±	Master Services Agreement, dated as of August 1, 2012, between the Registrant and GGA Software Services LLC.
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.
23.1		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 to be requested.

\# 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]

Exhibit 3.2

BY-LAWS

OF

OPGEN, INC.

ARTICLE I

STOCKHOLDERS

SECTION 1. Place of Meetings. All meetings of stockholders shall be held at the principal office of the corporation or at such other place as may be named in the notice.

SECTION 2. Annual Meeting. The annual meeting of stockholders for the election of directors and the transaction of such other business as may properly come before the meeting shall be held on such date and at such hour and place as the directors or an officer designated by the directors may determine. If the annual meeting is not held on the date designated therefor, the directors shall cause the meeting to be held as soon thereafter as convenient.

SECTION 3. Special Meetings. Special meetings of the stockholders may be called at any time by the President, the Chairman of the Board, if any, or the Board of Directors, or by the Secretary or any other officer upon the written request of one or more stockholders holding of record at least a majority of the outstanding shares of stock of the corporation entitled to vote at such meeting. Such written request shall state the purpose or purposes of the proposed meeting. Business transacted at any special meeting of stockholders shall be limited to matters relating to the purpose or purposes stated in the notice of meeting.

SECTION 4. Notice of Meetings. Except where some other notice is required by law, written notice of each meeting of stockholders, stating the place, date and hour thereof and the purposes for which the meeting is called, shall be given by or under the direction of the Secretary, not less than ten nor more than sixty days before the date fixed for such meeting, to each stockholder entitled to vote at such meeting of record at the close of business on the day fixed by the Board of Directors as a record date for the determination of the stockholders entitled to vote at such meeting or, if no such date has been fixed, of record at the close of business on the day before the day on which notice is given. Notice shall be given personally to each stockholder or left at his or her residence or usual place of business or mailed postage prepaid and addressed to the stockholder at his or her address as it appears upon the records of the corporation. In case of the death, absence, incapacity or refusal of the Secretary, such notice may be given by a person designated either by the Secretary or by the person or persons calling the meeting or by the Board of Directors. A waiver of such notice in writing, signed by the person or persons entitled to said notice, whether before or after the time stated therein, shall be deemed equivalent to such notice. Attendance of a person at a meeting of stockholders shall constitute a waiver of notice of such meeting, except when the stockholder 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. Neither the business to be transacted at, nor the purpose of, any regular or special meeting of the stockholders need be specified in any written waiver of notice. Except as required by statute, notice of any adjourned meeting of the stockholders shall not be required.

SECTION 5. Voting List. The officer who has charge of the stock ledger of the corporation shall prepare and make, at least ten days before every meeting of stockholders, a complete list of the stockholders, arranged in alphabetical order, and showing the address of each stockholder 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 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 whole time thereof, and may be inspected by any stockholder who is present. The stock ledger shall be the only evidence as to who are the stockholders entitled to examine the stock ledger, the list required by this section or the books of the corporation, or to vote at any meeting of stockholders.

SECTION 6. Quorum of Stockholders. At any meeting of the stockholders, the holders of a majority in interest of all stock issued and outstanding and entitled to vote upon a question to be considered at the meeting, present in person or represented by proxy, shall constitute a quorum for the consideration of such question, but a smaller group may adjourn any meeting from time to time. When a quorum is present at any meeting, a majority of the stock represented thereat and entitled to vote shall, except where a larger vote is required by law, by the certificate of incorporation, or by these by-laws, decide any question brought before such meeting. Any election by stockholders shall be determined by a plurality of the vote cast by the stockholders entitled to vote at the election.

SECTION 7. Proxies and Voting. Unless otherwise provided in the certificate of incorporation, each stockholder shall at every meeting of the stockholders be entitled to one vote in person or by proxy for each share of the capital stock held of record by such stockholder, but no proxy shall be voted or acted upon after three years from its date, unless said proxy provides for a longer period. Persons holding stock in a fiduciary capacity shall be entitled to vote the shares so held, and persons whose stock is pledged shall be entitled to vote, unless in the transfer by the pledgor on the books of the corporation the pledgee shall have been expressly empowered to vote thereon, in which case only the pledgee or the pledgee’s proxy may represent said stock and vote thereon. Shares of the capital stock of the corporation belonging to the corporation or to another corporation, a majority of whose shares entitled to vote in the election of directors is owned by the corporation, shall neither be entitled to vote nor be counted for quorum purposes.

SECTION 8. Conduct of Meeting. Meetings of the stockholders shall be presided over by one of the following officers in the order of seniority and if present and acting: the Chairman of the Board, if any, the Vice-Chairman of the Board, if any, the President, a Vice-President, or, if none of the foregoing is in office and present and acting, a chairman to be chosen by the stockholders. The Secretary of the corporation, if present, or an Assistant Secretary, shall act as secretary of every meeting, but if neither the Secretary nor an Assistant Secretary is present the chairman of the meeting shall appoint a secretary of the meeting.

SECTION 9. Action Without Meeting. Any action required or permitted to be taken at any annual or special meeting of stockholders of the corporation may be taken without a meeting, without prior notice and without a vote, if a consent in writing, setting forth the action so taken, is signed by the holders or by proxy for 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 on such action were present and voted. Prompt notice of the taking of corporate action without a meeting by less man unanimous written consent shall be given to those stockholders who have not consented in writing.

ARTICLE II

DIRECTORS

SECTION 1. General Powers. The business and affairs of the corporation shall be managed by or under the direction of a Board-of Directors, who may exercise all of the powers of the corporation which are not by law required to be exercised by the stockholders. In the event of a vacancy in the Board of Directors, the remaining directors, except as otherwise provided by law, may exercise the powers of the full Board until the vacancy is filled.

SECTION 2. Number; Election: Tenure and Qualification. The number of initial Directors shall be fixed by the incorporator, and the initial Board of Directors shall be elected by the incorporator. Thereafter, the number of directors which shall constitute the whole Board shall be fixed by resolution of the Board of Directors, but in no event shall be less than one. Each director shall be elected by the stockholders at the annual meeting and all directors shall hold office until the next annual meeting and until their successors are elected and qualified, or until their earlier death, resignation or removal. The number of directors may be increased or decreased by action of the Board of Directors. Directors need not be stockholders of the corporation.

SECTION 3. Enlargement of the Board. The number of the Board of Directors may be increased at any time, such increase to be effective immediately, by vote of a majority of the directors then in office.

SECTION 4. Vacancies. Unless and until filled by the stockholders, any vacancy in the Board of Directors, however occurring, including a vacancy resulting from an enlargement of the Board and an unfilled vacancy resulting from the removal of any director for cause or without cause, may be filled by vote of a majority of the directors then in office although less than a quorum, or by the sole remaining director. A director elected to fill a vacancy shall hold office until the next annual meeting of stockholders and until his or her successor is elected and qualified or until his or her earlier death, resignation, or removal. When one or more directors shall resign from the Board, effective at a future date, a majority of the directors then in office, including those who have so resigned, shall have the power to fill such vacancy or vacancies, the vote thereon to take effect when such resignation or resignations shall become effective. If at any time there are no directors in office, then an election of directors may be held in accordance with the General Corporation Law of the State of Delaware.

SECTION 5. Resignation. Any director may resign at any time upon written notice to the corporation. Such resignation shall take effect at the time specified therein, or if no time is specified, at the time of its receipt by the President or Secretary.

SECTION 6. Removal. Except as may otherwise be provided by the General Corporation Law, any director or the entire Board of Directors may be removed, with or without cause, at an annual meeting ox at a special meeting called for that purpose, by the holders of a majority of the shares then entitled to vote at an election of directors. The vacancy or vacancies thus created may be filled by the stockholders at the meeting held for the purpose of removal or, if not so filled, by the directors in the mariner provided in Section 4 of this Article II.

SECTION 7. Committees. The Board of Directors may designate one or more committees, each committee to consist of one or more directors of the corporation. The Board of Directors may designate one or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee.

Any such committee may fix its rules of procedure and fix the time and place, whether within or without the State of Delaware, of its meetings and specify what notice thereof, if any, shall be given, unless the Board of Directors shall otherwise by resolution provide. The Board of Directors shall have the power to change the members of any such committee at any time, to fill vacancies therein and to discharge any such committee, either with or without cause, at any time.

Any such committee, unless otherwise provided in the resolution of the Board of Directors, or in these by-laws, shall have and may exercise all the powers and authority of the Board of Directors in the management of the business and affairs of the corporation, and may authorize the seal of the corporation to be affixed to all papers which may require it; but no such committee shall have the power or authority denied it by Section 141 of the General Corporation Law of the State of Delaware.

Each committee shall keep regular minutes of its meetings and make such reports as the Board of Directors may from time to time request.

SECTION 8. Meetings of the Board of Directors. Regular meetings of the Board of Directors may be held without call or formal notice at such places either within or without the State of Delaware and at such times as the Board may from time to time determine. A regular meeting of the Board of Directors may be held without call or formal notice immediately after and at the same place as the annual meeting of the stockholders, or any special meeting of the stockholders at which a Board of Directors is elected.

Special meetings of the Board of Directors may be held at any place either within or without the State of Delaware at any time when called by the Chairman of the Board of Directors, the President, Treasurer, Secretary, or two or more directors. Forty-eight hours' notice by mail, facsimile, telephone or word of mouth shall be given for a special meeting unless shorter notice or a different method of notice is adequate under the circumstances. A notice or waiver of notice need not specify the purpose of any special meeting. Notice of a meeting need not be given to any director, if a written waiver of notice, executed by him before or after the meeting, is filed with the records of the meeting, or to any director who attends the meeting without protesting prior thereto or at its commencement the lack of notice to him. No notice of any adjourned meeting of the Board of Directors shall be required.

Directors or members of any committee designated by the directors may participate in a meeting of the Board of Directors or such committee by means of conference telephone or similar communications equipment by means of which all persons participating in the meeting can hear each other, and participation by such means shall constitute presence in person at such meeting.

SECTION 9. Quorum and Voting. A majority of the total number of directors shall constitute a quorum, except that when a vacancy or vacancies exist in the Board, a majority of the directors then in office (but not less than one-third of the total number of the directors) shall constitute a quorum. A majority of the directors present, whether or not a quorum is present, may adjourn any meeting from time to time. The vote of a majority of the directors present at any meeting at which a quorum is present shall be the act of the Board of Directors, except where a different vote is required or permitted by law, by the certificate of incorporation, or by these by-laws.

SECTION 10. Compensation. The Board of Directors may fix fees for their services and for their membership on committees, and expenses of attendance may be allowed for attendance at each meeting. Nothing herein contained shall be construed to preclude any director from serving the corporation in any other capacity as an officer, agent or otherwise, and receiving compensation therefor.

SECTION 11. Action Without Meeting. Any action required or permitted to be taken at any meeting of the Board of Directors, or of any committee thereof, may be taken without a meeting, and without notice, if a written consent thereto Is signed by all members of the Board of Directors, or of such committee, as the case may be, and such written consent is filed with the minutes of proceedings of the Board of Directors or such committee.

ARTICLE III

OFFICERS

SECTION 1. Titles. The officers of the corporation shall consist of a President, a Secretary, a Treasurer, and such other officers with such other titles as the Board of Directors shall determine, including without limitation a Chairman of the Board, a Vice-Chairman of the Board, and one or more Vice-Presidents, Assistant Treasurers, or Assistant Secretaries.

SECTION 2. Election and Term of Office. The officers of the corporation shall be elected annually by the Board of Directors at its first meeting following the annual meeting of the stockholders. Each officer shall hold office until his or her successor is elected and qualified, unless a different term is specified in the vote electing such officer, or until his or her earlier death, resignation or removal.

SECTION 3. Qualification. Unless otherwise provided by resolution of the Board of Directors, no officer, other than the Chairman or Vice-Chairman of the Board, need be a director. No officer need be a stockholder. Any number of offices may be held by the same person, as the directors shall determine.

SECTION 4. Removal. Any officer may be removed, with or without cause, at any time, by resolution adopted by the Board of Directors.

SECTION 5. Resignation. Any officer may resign by delivering a written resignation to the corporation at its principal office or to the President or Secretary. Such resignation shall be effective upon receipt or at such later time as may be specified therein.

SECTION 6. Vacancies. The Board of Directors may at any time fill any vacancy occurring in any office for the unexpired portion of the term and may leave unfilled for such period as it may determine any office other than those of President, Treasurer and Secretary.

SECTION 7. Powers and Duties. The officers of the corporation shall have such powers and perform such duties as are specified herein and as may be conferred upon or assigned to them by the Board of Directors, and shall have such additional powers and duties as are incident to their office except to the extent that resolutions of the Board of Directors are inconsistent therewith.

SECTION 8. President and Vice-Presidents. The President shall be the chief executive officer of the corporation, shall preside at all meetings of the stockholders and the Board of Directors unless a Chairman or Vice-Chairman of the Board is elected by the Board, empowered to preside, and present at such meeting, shall have general and active management of the business of the corporation and general supervision of its officers, agents and employees, and shall see that all orders and resolutions of the Board of Directors are carried into effect.

In the absence of the President or in the event of his or her inability or refusal to act, the Vice-President if any (or in the event there be more than one Vice-President, the Vice-Presidents in the order designated by the directors, or in the absence of any designation, then In the order of their election) shall perform the duties of the President, and when so acting, shall have all the powers of and be subject to all the restrictions upon the President. The Board of Directors may assign to any Vice-President the title of Executive Vice-President, Senior Vice-President or any other title selected by the Board of Directors.

SECTION 9. Secretary and Assistant Secretaries. The Secretary shall attend all meetings of the Board of Directors and of the stockholders and record all the proceedings of such meetings in a book to be kept for that purpose, shall give, or cause to be given, notice of all meetings of the stockholders and special meetings of the Board of Directors, shall maintain a stock ledger and prepare lists of stockholders and their addresses as required and shall have custody of the corporate seal which the Secretary or any Assistant Secretary shall have authority to affix to any instrument requiring it and attest by any of their signatures. The Board of Directors may give general authority to any other officer to affix and attest the seal of the corporation.

The Assistant Secretary if any (or if there be more than one, the Assistant Secretaries in the order determined by the Board of Directors of if there be no such determination, then in the order of their election) shall, in the absence of the Secretary or in the event of the Secretary’s inability or refusal to act, perform the duties and exercise the powers of the Secretary.

SECTION 10. Treasurer and Assistant Treasurers. The Treasurer shall have the custody of the corporate funds and securities, shall keep full and accurate accounts of receipts and disbursements in books belonging to the corporation and shall deposit all moneys and other valuable effects in the name and to the credit of the corporation in such depositories as may be designated by the Board of Directors. The Treasurer shall disburse the funds of the corporation as may be ordered by the Board of Directors or the President, taking proper vouchers for such disbursements, and shall render to the President and the Board of Directors, at its regular meetings, or whenever they may require it, an account of all transactions and of the financial condition of the corporation.

The Assistant Treasurer if any (or if there be more than one, the Assistant Treasurers in the order determined by the Board of Directors or if there be no such determination, then in the order of their election) shall, in the absence of the Treasurer or in the event of his or her inability or refusal to act, perform the duties and exercise the powers of the Treasurer.

SECTION 11. Bonded Officers. The Board of Directors may require any officer to give the corporation a bond in such sum and with such surety or sureties as shall be satisfactory to the Board of Directors upon such terms and conditions as the Board of Directors may specify, including without limitation a bond for the faithful performance of the duties of such officer and for the restoration to the corporation of all property in his or her possession or control belonging to the corporation.

SECTION 12. Salaries. Officers of the corporation shall be entitled to such salaries, compensation or reimbursement as shall be fixed or allowed from time to time by the Board of Directors.

ARTICLE IV

STOCK

SECTION 1. Certificates of Stock. One or more certificates of stock, signed by the Chairman or Vice-Chairman of the Board of Directors or by the President or Vice-President and by the Treasurer or an Assistant Treasurer or the Secretary or an Assistant Secretary, shall be issued to each stockholder certifying, in the aggregate, the number of shares owned by the stockholder in the corporation. Any or all signatures on any such certificate may be facsimiles. In case any officer, transfer agent or registrar who shall have signed or whose facsimile signature shall have 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 he or she were such officer, transfer agent or registrar at the date of issue.

Each certificate for shares of stock which are subject to any restriction on transfer pursuant to the certificate of incorporation, the by-laws, applicable securities laws, or any agreement among any number of shareholders or among such holders and the corporation shall have conspicuously noted on the face or back of the certificate either the full text of the restriction or a statement of the existence of such restriction.

SECTION 2. Transfers of Shares of Stock. Subject to the restrictions, if any, stated or noted on the stock certificates, shares of stock may be transferred on the books of the corporation by the surrender to the corporation or its transfer agent of the certificate representing such shares properly endorsed or accompanied by a written assignment or power of attorney properly executed, and with such proof of authority or the authenticity of signature as the corporation or its transfer agent may reasonably require. The corporation shall be entitled to treat the record holder of stock as shown on its books as the owner of such stock for all purposes, including the payment of dividends and the right to vote with respect to that stock, regardless of any transfer, pledge or other disposition of that stock, until the shares have been transferred on the books of the corporation in accordance with the requirements of these by-laws.

SECTION 3. Lost Certificates. A new certificate of stock may be issued in the place of any certificate theretofore issued by the corporation and alleged to have been lost, stolen, destroyed, or mutilated, upon such terms in conformity with law as the Board of Directors shall prescribe. The directors may, in their discretion, require the owner of the lost, stolen, destroyed or mutilated certificate, or the owner's legal representatives, to give the corporation a bond, in such sum as they may direct, to indemnify the corporation against any claim that may be made against it on account of the alleged loss, theft, destruction or mutilation of any such certificate, or the issuance of any such new certificate.

SECTION 4. Record Pate. The Board of Directors may fix in advance a record date for the determination of the stockholders entitled to notice of or to vote at any meeting of stockholders or to express consent to corporate action in writing without a meeting, 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. Such record date shall not be more than 60 nor less than 10 days before the date of such meeting, nor more than 60 days prior to any other action to which such record date relates.

If no record date is fixed, the record date for determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the day next preceding the day on which notice is given, or, if notice is waived, at the close of business on the day next preceding the day on which the meeting is held. Unless otherwise fixed by the Board of Directors, the record date for determining stockholders entitled to express consent to corporate action in writing without a meeting, when no prior action by the Board of Directors is necessary, shall be the day on which the first written consent is expressed. 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 to such purpose.

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 5. Fractional Share Interests. The corporation may, but shall not be required to, issue fractions of a share. If the corporation does not issue fractions of a share, it shall (1) arrange for the disposition of fractional interests by those entitled thereto, (2) pay in cash the fair value of fractions of a share as of the time when those entitled to receive such fractions are determined, or (3) issue scrip or warrants in registered or bearer form which shall entitle the holder to receive a certificate for a full share upon the surrender of such scrip or warrants aggregating a full share. A certificate for a fractional share shall, but scrip or warrants shall not unless otherwise provided therein, entitle the holder to exercise voting rights, to receive dividends thereon, and to participate in any of the assets of the corporation in the event of liquidation. The Board of Directors may cause scrip or warrants to be issued subject to the conditions that they shall become void if not exchanged for certificates representing full shares before a specified date, or subject to the conditions that the shares for which scrip or warrants are exchangeable may be sold by the corporation and the proceeds thereof distributed to the holders of scrip or warrants, or subject to any other conditions which the Board of Directors may impose.

SECTION 6. Dividends. Subject to the provisions of the certificate of incorporation, the Board of Directors may, out of funds legally available therefor, at any regular or special meeting, declare dividends upon the common stock of the corporation as and when they deem expedient.

ARTICLE V

INDEMNIFICATION AND INSURANCE

SECTION 1. Indemnification. The corporation shall, to the extent permitted by the certificate of incorporation, as amended from time to time, indemnify each person whom it may indemnify pursuant thereto.

SECTION 2. Insurance. The corporation shall have power to purchase and maintain insurance on behalf of any person who 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 or agent of another corporation, partnership, joint venture, trust or other enterprise against any liability asserted against such person and incurred by such person in any such capacity or arising out of such person’s status as such, whether or not the corporation would have the power to indemnify such person against such liability under the provisions of the General Corporation Law of the State of Delaware.

ARTICLE VI

GENERAL PROVISIONS

SECTION 1. Fiscal Year. The fiscal year of the corporation shall be determined from time to time by the Board of Directors.

SECTION 2. Corporate Seal The corporate sea] shall be in such form as shall be approved by the Board of Directors. The Secretary shall be the custodian of the seal. The Board of Directors may authorize a duplicate seal to be kept and used by any other officer.

SECTION 3. Certificate of Incorporation. All references in these by-laws to the certificate of incorporation shall be deemed to refer to the certificate of incorporation of the corporation, as in effect from time to time.

SECTION 4. Execution of Instruments. The Chairman and Vice-Chairman of the Board of Directors, if any, the President, any Vice-President, and the Treasurer shall have power to execute and deliver on behalf and in the name of the corporation any instrument requiring the signature of an officer of the corporation, including deeds, contracts, mortgages, bonds, notes, debentures, checks, drafts, and other orders for the payment of money. In addition, the Board of Directors may expressly delegate such powers to any other, officer or agent of the corporation.

SECTION 5. Voting of Securities, Except as the directors may otherwise designate, the President or Treasurer may waive notice of, and act as, or appoint any person or persons to act as, proxy or attorney-in-fact for this corporation (with or without power of substitution) at any meeting of stockholders or shareholders of any other corporation or organization the securities of which may be held by this corporation.

SECTION 6. Evidence of Authority. A certificate by the Secretary, or an Assistant Secretary, or a temporary secretary, as to any action taken by the stockholders, directors, a committee or any officer or representative of the corporation shall, as to all persons who rely on the certificate in good faith, be conclusive evidence of that action.

SECTION 7. Transactions with Interested Parties. No contract or transaction between the corporation and one or more of the directors or officers, or between the corporation and any other corporation, partnership, association, or other organization in which one or more of the directors or officers are directors or officers, or have a financial interest, shall be void or voidable solely for that reason, or solely because the director or officer is present at or participates in the meeting of the Board of Directors or a committee of the Board of Directors which authorizes the contract or transaction or solely because the vote of any such director is counted for such purpose, if:

(1) The material facts as to the relationship or interest and as to the contract or transaction are disclosed or are known to the Board of Directors or the committee, and the Board or committee in good faith authorizes the contract or transaction by the affirmative votes of a majority of the disinterested directors, even though the disinterested directors be less than a quorum; or

(2) The material facts as to the relationship or interest and as to the contract or transaction are disclosed or are known to the stockholders entitled to vote thereon, and the contract or transaction is specifically approved in good faith by vote of the stockholders; or

(3) The contract or transaction is fair as to the corporation as of the time it is authorized, approved or ratified by the Board of Directors, a committee of the Board of Directors, or the stockholders.

Common or interested directors may be counted in determining the presence of a quorum at a meeting of the Board of Directors or of a committee which authorizes the contract or transaction.

SECTION 8. Books and Records. The books and records of the corporation shall be kept at such places within or without the State of Delaware as the Board of Directors may from time to time determine.

ARTICLE VII

AMENDMENTS

SECTION 1. By the Board of Directors. These by-laws may be altered, amended or repealed or new by-laws may be adopted by the affirmative vote of a majority of the directors present at any regular or special meeting of the Board of Directors at which a quorum is present.

SECTION 2. By the Stockholders. These by-laws may be altered, amended or repealed or new by-laws may be adopted by the affirmative vote of the holders of a majority of the shares of the capital stock of the corporation issued and outstanding and entitled to vote at any regular meeting of stockholders, or at any special meeting of stockholders provided notice of such alteration, amendment, repeal or adoption of new by-laws shall have been stated in the notice of such special meeting.

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

[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:

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

[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.

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

[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:

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

[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:

____
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

[Signature Page to Third Amended and Restated Investors' Rights Agreement]

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
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Email: jcconsult@bellsouth.net

Janice King Ivey & William Martin Ivey JTWROS
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Neil D. Cohen
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Email: Neilco54@aol.com

Michael Diehl Smith
2520 Hampton Avenue
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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

Exhibit 4.3

THIRD AMENDED AND RESTATED RIGHT OF FIRST REFUSAL AND CO-SALE AGREEMENT

THIS THIRD AMENDED AND RESTATED RIGHT OF FIRST REFUSAL AND CO-SALE AGREEMENT is made as of December 18, 2013 by and among OpGen, Inc., a Delaware corporation (the "**Company**"), and the Stockholders listed on Schedule A (the "**Stockholders**").

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 stockholders (the "**Existing Stockholders**") previously entered into a Second Amended and Restated Right of First Refusal and Co-Sale Agreement, dated as of March 5, 2012, between the Company and the Existing Stockholders (the "**Prior Agreement**"), wherein the Company agreed to certain matters relating to rights and privileges of the Company and the Existing Stockholders in respect of, among other things, the right of first refusal and co-sale rights;

WHEREAS, certain of the Existing Stockholders and the Company have entered into a Notes Purchase Agreement dated as of the date hereof by and among the Company and certain of the Stockholders (the "**Purchase Agreement**"), under which the Stockholders purchased Convertible Notes of the Company (the "**Notes**"), which are convertible into Series A Convertible Preferred Stock, par value $0.01 per share, of the Company ("**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 Stockholders under this Agreement.

WHEREAS, in accordance with Section 6.7 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 Stockholders and all Key Holders (as defined in the Prior Agreement) party to the Prior Agreement (whether or not signing this Agreement) shall become bound by this Agreement.

NOW, THEREFORE, the Company and the Stockholders each hereby agree as follows:

1. Definitions.

"**Affiliate**" means, with respect to any specified Stockholder, any other Stockholder who directly or indirectly, controls, is controlled by or is under common control with such Stockholder, including without limitation any general partner, managing member, officer or director of such Stockholder, or any venture capital fund now or hereafter existing which is controlled by one or more general partners or managing members of, or shares the same management company with, such Stockholder.

"**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 and (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, 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.

"**Certificate of Incorporation**" means the Certificate of Incorporation of the Company, as amended from time to time.

"**Common Stock**" means shares of Common Stock of the Company, $0.01 par value per share.

"**Company Notice**" means written notice from the Company notifying the selling Stockholders that the Company intends to exercise its Right of First Refusal as to some or all of the Transfer Stock with respect to any Proposed Stockholder Transfer.

"**Preferred Stock**" means collectively, all shares of Series A Preferred Stock and any other series of preferred stock that the Company may issue after the date of this Agreement.

"**Proposed Stockholder Transfer**" means any assignment, sale, offer to sell, pledge, mortgage, hypothecation, encumbrance, disposition of or any other like transfer or encumbering of any Transfer Stock (or any interest therein) proposed by any of the Stockholders.

"**Proposed Transfer Notice**" means written notice from a Stockholder setting forth the terms and conditions of a Proposed Stockholder Transfer.

"**Prospective Transferee**" means any person to whom a Stockholder proposes to make a Proposed Stockholder Transfer.

"**Right of Co-Sale**" means the right, but not an obligation, of a Stockholder to participate in a Proposed Stockholder Transfer on the terms and conditions specified in the Proposed Transfer Notice.

"**Right of First Refusal**" means the right, but not an obligation, of the Company, or its permitted transferees or assigns, to purchase some or all of the Transfer Stock with respect to a Proposed Stockholder Transfer, on the terms and conditions specified in the Proposed Transfer Notice.

“**Secondary Notice**” means written notice from the Company notifying the Stockholders and the selling Stockholder that the Company does not intend to exercise its Right of First Refusal as to all shares of Transfer Stock with respect to any Proposed Stockholder Transfer.

“**Secondary Refusal Right**” means the right, but not an obligation, of each Stockholder to purchase up to its pro rata portion (based upon the total number of shares of Preferred Stock then held by all Stockholders) of any Transfer Stock not purchased pursuant to the Right of First Refusal, on the terms and conditions specified in the Proposed Transfer Notice.

“**Series A Preferred Stock**” means shares of the Series A Convertible Preferred Stock of the Company, $0.01 par value per share.

“**Stockholder Notice**” means written notice from a Stockholder notifying the Company and the selling Stockholders that such Stockholder intends to exercise its Secondary Refusal Right as to a portion of the Transfer Stock with respect to any Proposed Stockholder Transfer.

“**Stockholders**” means the persons named on Schedule A hereto, each person to whom the rights of a Stockholder are assigned pursuant to Section 6.8, each person who hereafter becomes a signatory to this Agreement pursuant to Section 6.10 and any one of them, as the context may require.

“**Transfer Stock**” means shares of Capital Stock owned by a Stockholder, or issued to a Stockholder after the date hereof (including, without limitation, in connection with any stock split, stock dividend, recapitalization, reorganization, or the like).

“**Undersubscription Notice**” means written notice from a Stockholder notifying the Company and the selling Stockholder that such Stockholder intends to exercise its option to purchase all or any portion of the Transfer Stock not purchased pursuant to the Right of First Refusal or the Secondary Refusal Right.

2. Agreement Among the Company and the Stockholders.

2.1 Prohibited Stock Sales. Except as consented to by the affirmative vote of not less than 70% of the then outstanding, or deemed outstanding, shares of Preferred Stock, the Stockholders shall not sell, assign, transfer, pledge, hypothecate, mortgage or dispose of, by gift or otherwise, or in any way encumber all or any of the shares in the Capital Stock, of any class or series, or any rights thereto, now owned or hereafter acquired; provided however, that a Stockholder shall be permitted to transfer Transfer Stock held by such Stockholder for bona fide estate planning purposes pursuant to Section 3 below, without giving effect to the provisions of Sections 2.2 and 2.3 below; provided further however, that a Stockholder may pledge shares of Capital Stock of the Company to a creditor of the Stockholder with the written consent of the Company and in accordance with such terms and conditions as the Company may reasonably request including but not limited to a joinder to this Agreement and other agreements relating to the Capital Stock of the Company and legal opinions.

2.2 Right of First Refusal.

(a) Grant. Subject to the terms of Section 3 below, and after the requisite consent is given pursuant to Section 2.1 above, each Stockholder hereby unconditionally and irrevocably grants to the Company a Right of First Refusal to purchase all or any portion of Transfer Stock that such Stockholder may propose to transfer in a Proposed Stockholder Transfer, at the same price and on the same terms and conditions as those offered to the Prospective Transferee.

(b) Notice. Each Stockholder proposing to make a Proposed Stockholder Transfer must deliver a Proposed Transfer Notice to the Company and each Stockholder not later than forty-five (45) days prior to the consummation of such Proposed Stockholder Transfer. Such Proposed Transfer Notice shall contain the material terms and conditions (including price and form of consideration) of the Proposed Stockholder Transfer and the identity of the Prospective Transferee. To exercise its Right of First Refusal under this Section 2, the Company must deliver a Company Notice to the selling Stockholder within fifteen (15) days after delivery of the Proposed Transfer Notice. In the event of a conflict between this Agreement and any other agreement that may have been entered into by a Stockholder with the Company that contains a preexisting right of first refusal, the Company and the Stockholder acknowledge and agree that the terms of this Agreement shall control and the preexisting right of first refusal shall be deemed satisfied by compliance with Section 2.2(a) and this Section 2.2(b). In the event of a conflict between this Agreement and the Company's Bylaws containing a preexisting right of first refusal, the terms of this Agreement will control.

(c) Grant of Secondary Refusal Right to Stockholders. Subject to the terms of Section 3 below, each Stockholder hereby unconditionally and irrevocably grants to the Stockholders a Secondary Refusal Right to purchase all or any portion of the Transfer Stock not purchased by the Company pursuant to the Right of First Refusal, as provided in this Section 2.2(c). If the Company does not intend to exercise its Right of First Refusal with respect to all Transfer Stock subject to a Proposed Stockholder Transfer, the Company must deliver a Secondary Notice to the selling Stockholder and to each Stockholder to that effect no later than fifteen (15) days after the selling Stockholder delivers the Proposed Transfer Notice to the Company. To exercise its Secondary Refusal Right, a Stockholder must deliver a Stockholder Notice to the selling Stockholder and the Company within ten (10) days after the Company's deadline for its delivery of the Secondary Notice as provided in the preceding sentence. If the total number of shares specified in the elections of Stockholders exceeds the number of shares of Transfer Stock available for purchase, then (unless the Stockholders agree otherwise in writing) each Stockholder electing to purchase will have the right to purchase that number of shares of Transfer Stock that such Stockholder may purchase pursuant to such Stockholders' Secondary Refusal Right.

(d) Undersubscription of Transfer Stock. If options to purchase have been exercised by the Company and the Stockholders with respect to some but not all of the Transfer Stock by the end of the 10-day period specified in the last sentence of Section 2.2(c)) (the "**Stockholder Notice Period**"), then the Company shall, immediately after the expiration of the Stockholder Notice Period, send written notice (the "**Company Undersubscription Notice**") to those Stockholders who fully exercised their Secondary Refusal Right within the Stockholder Notice Period (the "**Exercising Stockholders**"). Each Exercising Stockholder shall, subject to the provisions of this Section 2.2(d), have an additional option to purchase all or any part of the balance of any such remaining unsubscribed shares of Transfer Stock on the terms and conditions set forth in the Proposed Transfer Notice. To exercise such option, an Exercising Stockholder must deliver an Undersubscription Notice to the selling Stockholder and the Company within ten (10) days after the expiration of the Stockholder Notice Period. In the event there are two or more such Exercising Stockholders that choose to exercise the last-mentioned option for a total number of remaining shares in excess of the number available, the remaining shares available for purchase under this Section 2.2(d) shall be allocated to such Exercising Stockholders pro rata based on the number of shares of Transfer Stock such Exercising Stockholders have elected to purchase pursuant to the Secondary Refusal Right (without giving effect to any shares of Transfer Stock that any such Exercising Stockholder has elected to purchase pursuant to the Company Undersubscription Notice). If the options to purchase the remaining shares are exercised in full by the Exercising Stockholders, the Company shall immediately notify all of the Exercising Stockholders and the selling Stockholder of that fact.

(e) Consideration; Closing. If the consideration proposed to be paid for the Transfer Stock is in property, services or other non-cash consideration, the fair market value of the consideration shall be as determined in good faith by the Company's Board of Directors, including the affirmative vote of at least four Preferred Directors (as such term is defined in the Certificate of Incorporation), and as set forth in the Company Notice. If the Company or any Stockholder cannot for any reason pay for the Transfer Stock in the same form of non-cash consideration, the Company or such Stockholder may pay the cash value equivalent thereof, as determined in good faith by the Board of Directors and as set forth in the Company Notice. The closing of the purchase of Transfer Stock by the Company and the Stockholders shall take place, and all payments from the Company and the Stockholders shall have been delivered to the selling Stockholder, by the later of (i) the date specified in the Proposed Transfer Notice as the intended date of the Proposed Stockholder Transfer and (ii) forty-five (45) days after delivery of the Proposed Transfer Notice.

2.3 Right of Co-Sale.

(a) Exercise of Right. If any Transfer Stock subject to a Proposed Stockholder Transfer is not purchased pursuant to Section 2.2 above and thereafter is to be sold to a Prospective Transferee, each respective Stockholder may elect to exercise its Right of Co-Sale and participate on a pro rata basis in the Proposed Stockholder Transfer as set forth in Section 2.3(b) below and otherwise on the same terms and conditions specified in the Proposed Transfer Notice (provided that if a Stockholder wishes to sell Preferred Stock, the price set forth in the Proposed Transfer Notice shall be appropriately adjusted based on the conversion price of the Preferred Stock into Common Stock). Each Stockholder who desires to exercise its Right of Co-Sale must give the selling Stockholder written notice to that effect within fifteen (15) days after the deadline for delivery of the Secondary Notice described above, and upon giving such notice such Stockholder shall be deemed to have effectively exercised the Right of Co-Sale.

(b) Shares Includable. Each Stockholder who timely exercises such Stockholder's Right of Co-Sale by delivering the written notice provided for above in Section 2.3(a) may include in the Proposed Stockholder Transfer all or any part of such Stockholder's Capital Stock equal to the product obtained by multiplying (i) the aggregate number of shares of Transfer Stock subject to the Proposed Stockholder Transfer (excluding shares purchased by the Company or the Stockholders pursuant to the Right of First Refusal or the Secondary Refusal Right) by (ii) a fraction, the numerator of which is the number of shares of Preferred Stock owned by such Stockholder immediately before consummation of the Proposed Stockholder Transfer (including any shares that such Stockholder has agreed to purchase pursuant to the Secondary Refusal Right) and the denominator of which is the total number of shares of Preferred Stock owned, in the aggregate, by all Stockholders immediately prior to the consummation of the Proposed Stockholder Transfer (including any shares that all Stockholders have collectively agreed to purchase pursuant to the Secondary Refusal Right), plus the number of shares of Transfer Stock held by the selling Stockholder. To the extent one or more of the Stockholders exercise such right of participation in accordance with the terms and conditions set forth herein, the number of shares of Transfer Stock that the selling Stockholder may sell in the Proposed Stockholder Transfer shall be correspondingly reduced.

(c) Delivery of Certificates. Each Stockholder shall effect its participation in the Proposed Stockholder Transfer by delivering to the selling Stockholder, no later than fifteen (15) days after such Stockholder's exercise of the Right of Co-Sale, one or more stock certificates, properly endorsed for transfer to the Prospective Transferee, representing:

(i) the number of shares of Common Stock that such Stockholder elects to include in the Proposed Stockholder Transfer; or

(ii) the number of shares of Preferred Stock that is at such time convertible into the number of shares of Common Stock that such Stockholder elects to include in the Proposed Stockholder Transfer; provided, however, that if the Prospective Transferee objects to the delivery of convertible Preferred Stock in lieu of Common Stock, such Stockholder shall first convert the Preferred Stock into Common Stock and deliver Common Stock as provided above. The Company agrees to make any such conversion concurrent with and contingent upon the actual transfer of such shares to the Prospective Transferee.

(d) Purchase Agreement. The parties hereby agree that the terms and conditions of any sale pursuant to this Section 2.3 will be memorialized in, and governed by, a written purchase and sale agreement with customary terms and provisions for such a transaction and the parties further covenant and agree to enter into such an agreement as a condition precedent to any sale or other transfer pursuant to this Section 2.3.

(e) Deliveries. Each stock certificate a Stockholder delivers to the selling Stockholder pursuant to Section 2.3(c) above will be transferred to the Prospective Transferee against payment therefor in consummation of the sale of the Transfer Stock pursuant to the terms and conditions specified in the Proposed Transfer Notice and the purchase and sale agreement, and the selling Stockholder shall concurrently therewith remit or direct payment to each Stockholder the portion of the sale proceeds to which such Stockholder is entitled by reason of its participation in such sale. If any Prospective Transferee or Transferees refuse(s) to purchase securities subject to the Right of Co-Sale from any Stockholder exercising its Right of Co-Sale hereunder, no Stockholder may sell any Transfer Stock to such Prospective Transferee or Transferees unless and until, simultaneously with such sale, such Stockholder purchases all securities subject to the Right of Co-Sale from such Stockholder on the same terms and conditions (including the proposed purchase price) as set forth in the Proposed Transfer Notice.

(f) Additional Compliance. If any Proposed Stockholder Transfer is not consummated within forty-five (45) days after receipt of the Proposed Transfer Notice by the Company, the Stockholders proposing the Proposed Stockholder Transfer may not sell any Transfer Stock unless they first comply in full with each provision of this Section 2. The exercise or election not to exercise any right by any Stockholder hereunder shall not adversely affect its right to participate in any other sales of Transfer Stock subject to this Section 2.3.

2.4 Effect of Failure to Comply.

(a) Transfer Void; Equitable Relief. Any Proposed Stockholder Transfer not made in compliance with the requirements of this Agreement shall be null and void ab initio, shall not be recorded on the books of the Company or its transfer agent and shall not be recognized by the Company. Each party hereto acknowledges and agrees that any breach of this Agreement would result in substantial harm to the other parties hereto for which monetary damages alone could not adequately compensate. Therefore, the parties hereto unconditionally and irrevocably agree that any non-breaching party hereto shall be entitled to seek protective orders, injunctive relief and other remedies available at law or in equity (including, without limitation, seeking specific performance or the rescission of purchases, sales and other transfers of Transfer Stock not made in strict compliance with this Agreement).

(b) Violation of First Refusal Right. If any Stockholder becomes obligated to sell any Transfer Stock to the Company or any Stockholder under this Agreement and fails to deliver such Transfer Stock in accordance with the terms of this Agreement, the Company and/or such Stockholder may, at its option, in addition to all other remedies it may have, send to such Stockholder the purchase price for such Transfer Stock as is herein specified and transfer to the name of the Company or such Stockholder (or request that the Company effect such transfer in the name of a Stockholder) on the Company's books the certificate or certificates representing the Transfer Stock to be sold.

(c) Violation of Co-Sale Right. If any Stockholder purports to sell any Transfer Stock in contravention of the Right of Co-Sale (a "**Prohibited Transfer**"), each Stockholder who desires to exercise its Right of Co-Sale under Section 2.3 may, in addition to such remedies as may be available by law, in equity or hereunder, require such Stockholder to purchase from such Stockholder the type and number of shares of Capital Stock that such Stockholder would have been entitled to sell to the Prospective Transferee under Section 2.3 had the Prohibited Transfer been effected pursuant to and in compliance with the terms of Section 2.3. The sale will be made on the same terms and subject to the same conditions as would have applied had the Stockholder not made the Prohibited Transfer, except that the sale (including, without limitation, the delivery of the purchase price) must be made within ninety (90) days after the Stockholder learns of the Prohibited Transfer, as opposed to the timeframe proscribed in Section 2.3. Such Stockholder shall also reimburse each Stockholder for any and all reasonable and documented out-of-pocket fees and expenses, including reasonable legal fees and expenses, incurred pursuant to the exercise or the attempted exercise of the Stockholder's rights under Section 2.3.

3. Exempt Transfers.

3.1 Exempted Transfers. Notwithstanding the foregoing or anything to the contrary herein, the provisions of Sections 2.2 and 2.3 shall not apply, in the case of a Stockholder that is (a) a natural person, to a transfer of Transfer Stock held by such Stockholder made for bona fide estate planning purposes, either during his or her lifetime or on death by will or intestacy to his or her spouse, child (natural or adopted), or any other direct lineal descendant of such Stockholder (or his or her spouse), or any custodian or trustee of any trust, partnership or limited liability company for the benefit of, or the ownership interests of which are owned wholly by, such Stockholder or (b) an entity, upon a transfer by such Stockholder to its stockholders, members, partners or other equity holders; provided that, the Stockholder shall deliver prior written notice to the Stockholders of such transfer and such shares of Transfer Stock shall at all times remain subject to the terms and restrictions set forth in this Agreement and such transferee shall, as a condition to such issuance, deliver a counterpart signature page to this Agreement as confirmation that such transferee shall be bound by all the terms and conditions of this Agreement as a Stockholder (but only with respect to the securities so transferred to the transferee), including the obligations of a Stockholder with respect to Proposed Stockholder Transfers of such Transfer Stock pursuant to Section 2; and provided, further, that such transfer is made pursuant to a transaction in which there is no consideration actually paid for such transfer.

3.2 Exempted Offerings. Notwithstanding the foregoing or anything to the contrary herein, the provisions of Section 2 shall not apply to the sale of any Transfer Stock (a) in a QPO (as such term is defined in the Certificate of Incorporation) or (b) pursuant to a Deemed Liquidation Event (as such term is defined in the Certificate of Incorporation).

3.3 Prohibited Transferees. Notwithstanding the foregoing, no Stockholder shall transfer any Transfer Stock to (a) any entity which, in the determination of the Company's Board of Directors, directly or indirectly competes with the Company or (b) any customer, distributor or supplier of the Company, if the Company's Board of Directors should determine that such transfer would result in such customer, distributor or supplier receiving information that would place the Company at a competitive disadvantage with respect to such customer, distributor or supplier.

4. Legend. Each certificate representing shares of Transfer Stock held by the Stockholders or issued to any permitted transferee in connection with a transfer permitted by Section 3(a) hereof shall be endorsed with the following legend:

THE SALE, PLEDGE, HYPOTHECATION OR TRANSFER OF THE SECURITIES REPRESENTED BY THIS CERTIFICATE IS SUBJECT TO, AND IN CERTAIN CASES PROHIBITED BY, THE TERMS AND CONDITIONS OF A CERTAIN RIGHT OF FIRST REFUSAL AND CO-SALE AGREEMENT BY AND AMONG THE STOCKHOLDER, THE CORPORATION AND CERTAIN OTHER HOLDERS OF STOCK OF THE CORPORATION. COPIES OF SUCH AGREEMENT MAY BE OBTAINED UPON WRITTEN REQUEST TO THE SECRETARY OF THE CORPORATION.

Each Stockholder agrees that the Company may instruct its transfer agent to impose transfer restrictions on the shares represented by certificates bearing the legend referred to in this Section 4 to enforce the provisions of this Agreement, and the Company agrees to promptly do so. The legend shall be removed upon termination of this Agreement at the request of the holder.

5. Lock-Up.

5.1 Agreement to Lock-Up. Each Stockholder hereby agrees that it will not, without the prior written consent of the managing underwriter, during the period commencing on the date of the final prospectus relating to the Company's initial public offering (the "**IPO**") and ending on the date specified by the Company and the managing underwriter (such period not to exceed 180 days (a) 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 Capital Stock held immediately prior to the effectiveness of the registration statement for the IPO or (b) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of the Capital Stock, whether any such transaction described in clause (a) or (b) above is to be settled by delivery of Capital Stock or other securities, in cash or otherwise. The foregoing provisions of this Section 5 shall not apply to the sale of any shares to an underwriter pursuant to an underwriting agreement, and shall only be applicable to the Stockholders if all officers, directors and holders of more than one percent (1%) of the outstanding Common Stock (after giving effect to the conversion into Common Stock of all outstanding Preferred Stock) enter into similar agreements. The underwriters in connection with the IPO are intended third-party beneficiaries of this Section 5 and shall have the right, power and authority to enforce the provisions hereof as though they were a party hereto. Each Stockholder further agrees to execute such agreements as may be reasonably requested by the underwriters in the IPO that are consistent with this Section 5 or that are necessary to give further effect thereto.

5.2 Stop-Transfer Instructions. In order to enforce the foregoing covenant, the Company may impose stop-transfer instructions with respect to the shares of Capital Stock of each Stockholder (and transferees and assignees thereof) until the end of such restricted period.

6. Miscellaneous.

6.1 Term. This Agreement shall automatically terminate upon the earlier of (a) immediately prior to the consummation of a QPO (as such term is defined in the Certificate of Incorporation) and (b) the consummation of a Deemed Liquidation Event (as such term is defined in the Certificate of Incorporation).

6.2 Stock Split. All references to numbers of shares in this Agreement shall be appropriately adjusted to reflect any stock dividend, split, combination or other recapitalization affecting the Capital Stock occurring after the date of this Agreement.

6.3 Ownership. Each Stockholder represents and warrants that such Stockholder is the sole legal and beneficial owner of the shares of Transfer Stock subject to this Agreement and that no other person or entity has any interest in such shares (other than a community property interest as to which the holder thereof has acknowledged and agreed in writing to the restrictions and obligations hereunder).

6.4 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 Schedule A or Schedule B hereof, as the case may be, or to such email address, facsimile number or address as subsequently modified by written notice given in accordance with this Section 6.4.

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, copies shall also be sent to:

Goodwin Procter LLP
Exchange Place
53 State Street
Boston, MA 02109
Attn: Joseph C. Theis, Jr.

6.5 Entire Agreement. Upon the effectiveness of this Agreement, the Prior Agreement shall be deemed amended and restated to read in its entirety as set forth in this Agreement. This Agreement (including the Exhibits and Schedules hereto) constitutes 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.

6.6 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. 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. All remedies, either under this Agreement or by law or otherwise afforded to any party, shall be cumulative and not alternative.

6.7 Amendment; Waiver and Termination. This Agreement may be amended, modified or terminated (other than pursuant to Section 6.1 above) and the observance of any term hereof may be waived (either generally or in a particular instance and either retroactively or prospectively) only by a written instrument executed by (a) the Company and (b) the holders of at least 70% of the shares of Common Stock issued or issuable upon conversion of the then outstanding, or deemed outstanding, shares of Preferred Stock held by the Stockholders (voting as a single class and on an as-converted basis). This Agreement may not be amended or terminated and the observance of any term of this Agreement may not be waived with respect to any Stockholder without the written consent of such Stockholder unless such amendment, termination or waiver applies to all Stockholders in the same fashion. Any amendment, modification, termination or waiver so effected shall be binding upon the Company, the Stockholders and all of their respective successors and permitted assigns whether or not such party, assignee or other shareholder entered into or approved such amendment, modification, termination or waiver. The Company shall give prompt written notice of any amendment, modification or termination hereof or waiver hereunder to any party hereto that did not consent in writing to such amendment, modification, termination or waiver. 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.

6.8 Assignment of Rights.

(a) The terms and conditions of this Agreement shall inure to the benefit of and be binding upon the respective successors and permitted 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 permitted assigns any rights, remedies, obligations, or liabilities under or by reason of this Agreement, except as expressly provided in this Agreement.

(b) Any successor or permitted assignee of any Stockholder, including any Prospective Transferee who purchases shares of Transfer Stock in accordance with the terms hereof, shall deliver to the Company and the Stockholders, as a condition to any transfer or assignment, a counterpart signature page hereto pursuant to which such successor or permitted assignee shall confirm their agreement to be subject to and bound by all of the provisions set forth in this Agreement that were applicable to the predecessor or assignor of such successor or permitted assignee.

(c) The rights of the Stockholders hereunder are not assignable without the Company’s written consent (which shall not be unreasonably withheld, delayed or conditioned), except (i) by a Stockholder to any Affiliate or (ii) to an assignee or transferee who acquires at least 100,000 shares of Capital Stock (as adjusted for any stock combination, stock split, stock dividend, recapitalization or other similar transaction), it being acknowledged and agreed that any such assignment, including an assignment contemplated by the preceding clauses (i) or (ii) shall be subject to and conditioned upon any such assignee’s delivery to the Company and the other Stockholders of a counterpart signature page hereto pursuant to which such assignee shall confirm their agreement to be subject to and bound by all of the provisions set forth in this Agreement that were applicable to the assignor of such assignee.

(d) Except in connection with an assignment by the Company by operation of law to the acquirer of the Company, the rights and obligations of the Company hereunder may not be assigned under any circumstances.

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 Additional Stockholders. 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 "Stockholder" for all purposes hereunder.

6.11 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.

6.12 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.

6.13 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 or signatures delivered by electronic mail (including .pdf) 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.

6.14 Aggregation of Stock. All shares of Capital Stock held or acquired by Affiliated entities or persons 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.

6.15 Specific Performance. In addition to any and all other remedies that may be available at law in the event of any breach of this Agreement, each Stockholder shall be entitled to specific performance of the agreements and obligations of the Company and the Stockholders hereunder and to such other injunction or other equitable relief as may be granted by a court of competent jurisdiction.

6.16 Consent of Spouse. If any individual Stockholder is married on the date of this Agreement, such Stockholder's spouse shall execute and deliver to the Company a consent of spouse in the form of Exhibit A hereto ("**Consent of Spouse**"), effective on the date hereof. Notwithstanding the execution and delivery thereof, such consent shall not be deemed to confer or convey to the spouse any rights in such Stockholder's shares of Transfer Stock that do not otherwise exist by operation of law or the agreement of the parties. If any individual Stockholder should marry or remarry subsequent to the date of this Agreement, such Stockholder shall within thirty (30) days thereafter obtain his/her new spouse's acknowledgement of and consent to the existence and binding effect of all restrictions contained in this Agreement by causing such spouse to execute and deliver a Consent of Spouse acknowledging the restrictions and obligations contained in this Agreement and agreeing and consenting to the same.

[Remainder of Page Intentionally Left Blank]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale 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 A&R ROFR Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale 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

[Signature Page to Third A&R ROFR Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale 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 A&R ROFR Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale 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

[Signature Page to Third A&R ROFR Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale Agreement as of the date first written above.

INVESTORS:

HARRIS & HARRIS GROUP, INC.

By: /s/ Sandra M. Forman
Name: Sandra M. Forman
Title: General Counsel

[Signature Page to Third A&R ROFR Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale 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 A&R ROFR Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale 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 A&R ROFR Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale 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:

[Signature Page to Third A&R ROFR Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale 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

[Signature Page to Third A&R ROFR Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale 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

[Signature Page to Third A&R ROFR Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale 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 A&R ROFR Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Right of First Refusal and Co-Sale 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

[Signature Page to Third A&R ROFR Agreement]

SCHEDULE A

NAMES AND ADDRESSES OF 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
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) 582-0900 ext. 15
Fax: (212) 582-9563
Email: closings@hhvc.com

Mason Wells OpGen Holdings, Inc.
Mason Wells Biomedical Fund I Limited Partnership
411 East Wisconsin Avenue, Suite 1280
Milwaukee, WI 53202
Phone: (414) 727-6400
Fax: (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
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Phone:
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Ryland A. Winston, Jr.
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Ste. 700
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Phone:
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Virginia Collett
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J. Anthony Curcio & Suzanne M. Bond JTWROS
4321 Castlewood Road
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319 Greengate Lane
Charlotte, NC 28211
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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

EXHIBIT A
CONSENT OF SPOUSE

I, [_____________], spouse of [_____________], acknowledge that I have read the Third Amended and Restated Right of First Refusal and Co-Sale Agreement, dated as of December 18, 2013, to which this Consent is attached as Exhibit A (the "**Agreement**"), and that I know the contents of the Agreement. I am aware that the Agreement contains provisions regarding certain rights to certain other holders of Capital Stock of the Company upon a Proposed Stockholder Transfer of shares of Transfer Stock of the Company which my spouse may own including any interest I might have therein.

I hereby agree that my interest, if any, in any shares of Transfer Stock of the Company subject to the Agreement shall be irrevocably bound by the Agreement and further understand and agree that any community property interest I may have in such shares of Transfer Stock of the Company shall be similarly bound by the Agreement.

I am aware that the legal, financial and related matters contained in the Agreement are complex and that I am free to seek independent professional guidance or counsel with respect to this Consent. I have either sought such guidance or counsel or determined after reviewing the Agreement carefully that I will waive such right.

Dated as of the [____] day of [__________, __________].

____
Signature

____
Print Name

THIRD AMENDED AND RESTATED VOTING AGREEMENT

THIS THIRD AMENDED AND RESTATED VOTING AGREEMENT is made and entered into as of December 18, 2013 by and among OpGen, Inc., a Delaware corporation (the "**Company**"), and the investors listed on Schedule A hereto (together with any subsequent investors, or transferees, who become parties hereto pursuant to Sections 6.1(a) or 6.2 below, the "**Stockholders**").

RECITALS

A. Concurrently with the execution of this Agreement, the Company and certain of the Stockholders are entering into a Notes Purchase Agreement (the "**Purchase Agreement**") providing for the issuance of Convertible Notes (the "**Notes**"), convertible into the Series A Convertible Preferred Stock of the Company, $0.01 par value per share (the "**Series A Preferred Stock**"), and in connection with that agreement the parties desire to provide such Stockholders with the right, among other rights, to designate the election of a member of the board of directors of the Company (the "**Board**") in accordance with the terms of this Agreement.

B. The Purchase Agreement provides that the Notes are convertible into shares of Series A Preferred Stock.

C. The Seventh Amended and Restated Certificate of Incorporation of the Company (the "**Restated Certificate**") provides that (a) the holders of record of the shares of the Company's Series A Preferred Stock, exclusively and as a separate class, shall be entitled to elect directors of the Company as provided for herein; (b) the person then serving as Chief Executive Officer of the Company shall be elected as a director; (c) the holders of record of the shares of Common Stock and of the Series A Preferred Stock shall be entitled to elect the Common Stock Directors 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.

D. The Company and certain of its stockholders (the "**Existing Stockholders**") previously entered into a Second Amended and Restated Voting Agreement, dated as of March 5, 2012 (the "**Prior Agreement**"), wherein the Company agreed to certain matters relating to the voting of the Company's capital stock;

E. 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 Stockholders under this Agreement.

F. In accordance with Section 6.8 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 Stockholders (whether or not signing this Agreement) shall become bound by this Agreement.

NOW, THEREFORE, the parties agree as follows:

1. Voting Provisions Regarding Board of Directors.

1.1 Size of the Board. Each Stockholder agrees to vote, or cause to be voted, all Shares (as defined below) owned by such Stockholder, or over which such Stockholder has voting control, from time to time and at all times, in whatever manner as shall be necessary to ensure that the size of the Board shall be set and remain at six (6) directors. For purposes of this Agreement, the term "**Shares**" shall mean and include any securities of the Company the holders of which are entitled to vote for members of the Board, including without limitation, all shares of Common Stock and Series A Preferred Stock now owned, deemed owned through the ownership of the Notes prior to conversion, or subsequently acquired by a Stockholder, however acquired, whether through conversions, stock splits, stock dividends, reclassifications, recapitalizations, similar events or otherwise. Prior to the conversion of the Notes, any references in this Agreement to "then outstanding" shares of Series A Preferred Stock shall mean and include the shares of Series A Preferred Stock issuable upon the conversion of the Notes in accordance with their terms at the then-applicable conversion price.

1.2 Board Composition. Each Stockholder agrees to vote, or cause to be voted, all Shares owned by such Stockholder, or over which such Stockholder has voting control, from time to time and at all times, in whatever manner as shall be necessary to ensure that at each annual or special meeting of stockholders at which an election of directors is held or pursuant to any written consent of the stockholders, the following persons shall be elected to the Board:

(a) For as long as CHL Medical Partners III, L.P. and CHL Medical Partners III Side Fund, L.P. (collectively, "**CHL Medical Partners**") (i) collectively hold on an as-converted, fully diluted basis at least ten percent (10%) of the Company's capital stock, or (ii) if clause (i) is not applicable, if such Stockholders participated in the Notes offering made pursuant to the Purchase Agreement and continues to hold at least seven and one half percent (7.5%) of the Company's capital stock on an as-converted, fully diluted basis, one individual (the "**CHL Designee**") designated by CHL Medical Partners, which individual shall initially be Timothy Howe;

(b) For as long as Versant Venture Capital III, L.P. and Versant Side Fund III, L.P. (collectively, "**Versant Ventures**") (i) collectively hold on an as-converted, fully diluted basis at least ten percent (10%) of the Company's capital stock, or (ii) if clause (i) is not applicable, if such Stockholders participated fully in the Notes offering made pursuant to the Purchase Agreement and continues to hold at least seven and one half percent (7.5%) of the Company's capital stock on an as-converted, fully diluted basis, one individual (the "**Versant Designee**") designated by Versant Ventures, which individual shall initially be Brian Atwood;

(c) For so long as jVen Capital, LLC ("**jVen Capital**") and the John Whitehead Individual Retirement Account (the "**Whitehead IRA**") (i) collectively hold on an as-converted, fully diluted basis at least ten percent (10%) of the Company's capital stock, or (ii) if clause (i) is not applicable, if such Stockholders participated fully in the Notes offering made pursuant to the Purchase Agreement and continues to hold at least seven and one half percent (7.5%) of the Company's capital stock on an as-converted, fully diluted basis, one individual (the "**jVen Designee**") designated by jVen Capital and the Whitehead IRA, which individual shall initially be Evan Jones;

(d) For so long as Harris & Harris Group, Inc. ("**Harris & Harris**") (i) holds on an as-converted, fully diluted basis at least ten percent (10%) of the Company's capital stock, or (ii) if clause (i) is not applicable, if such Stockholder participated fully in the Notes offering made pursuant to the Purchase Agreement and continues to hold at least seven and one half percent (7.5%) of the Company's capital stock on an as-converted, fully diluted basis, one individual (the "**Harris & Harris Designee**"), which individual shall initially be Misti Ushio;

(e) The Company's Chief Executive Officer (the "**CEO Director**"); provided, that, if for any reason the CEO Director shall cease to serve as the Chief Executive Officer of the Company, each of the Stockholders shall promptly vote their respective Shares (i) to remove the former Chief Executive Officer from the Board if such person has not resigned as a member of the Board and (ii) to elect such person's replacement as Chief Executive Officer of the Company as the new CEO Director;

(f) One individual (the "**Common Stock Director**") elected by 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, provided that in the event that jVen Capital and the Whitehead IRA are no longer eligible to elect the jVen Designee, there shall be two Common Stock Directors who shall be appointed as set forth in this subparagraph (f); and

(g) For as long as Mason Wells Biomedical Fund I Limited Partnership or Mason Wells OpGen Holdings, Inc. (collectively, "**Mason Wells**") (i) holds on an as-converted, fully diluted basis at least ten percent (10%) of the Company's capital stock, or (ii) if clause (i) is not applicable, if such Stockholder participated fully in the Notes offering made pursuant to the Purchase Agreement and continues to hold at least seven and one half percent (7.5%) of the Company's capital stock on an as-converted, fully diluted basis, one individual (the "**Mason Wells Designee**") designated by Mason Wells, which individual shall initially be Trevor D'Souza.

The rights set forth in Section 1.2(a) through (d) and Section 1.2(g) will continue as long as such Stockholder maintains ownership of (1) at least 10% of the outstanding capital stock of the Company on an as-converted, fully diluted basis or (2) the Notes (or, if any of the Notes are converted into Series A Preferred Stock, the Series A Preferred Stock issued upon such conversion) and at least 7.5% of the outstanding capital stock of the Company on an as-converted, fully diluted basis. All percentages set forth in this Section 1.2 shall be subject to adjustment for stock splits, combinations or similar transactions. To the extent that any of clauses (a) through (g) above shall not be applicable, any member or observer of the Board who would otherwise have been designated in accordance with the terms thereof shall instead be voted upon by all the stockholders of the Company entitled to vote thereon in accordance with, and pursuant to, the Company's Restated Certificate.

1.3 Failure to Designate a Board Member. In the absence of any designation from the Persons or groups with the right to designate a director as specified above, the director previously designated by them and then serving shall be reelected if still eligible to serve as provided herein.

1.4 Removal of Board Members. Each Stockholder also agrees to vote, or cause to be voted, all Shares owned by such Stockholder, or over which such Stockholder has voting control, from time to time and at all times, in whatever manner as shall be necessary to ensure that:

(a) no director elected pursuant to Sections 1.2 or 1.3 of this Agreement may be removed from office unless (i) with respect to the CHL Designee, such removal is directed or approved by CHL Medical Partners, (ii) with respect to the Versant Designee, such removal is directed or approved by Versant Ventures, (iii) with respect to the jVen Designee, such removal is directed or approved by jVen Capital, (iv) with respect to the Harris & Harris Designee, such removal is directed or approved by Harris & Harris, (v) with respect to the Mason Wells Designee, such removal is directed or approved by Mason Wells, (vi) with respect to the directors not referenced in (i), (ii), (iii), (iv) or (v) above, such removal is directed or approved by the affirmative vote of the Person, or by the holders of at least a majority of the shares of stock, entitled under Section 1.2 to designate that director or (vii) if the Person(s) originally entitled to designate or approve such director or occupy such Board seat pursuant to Section 1.2 is(are) no longer so entitled to designate or approve such director or occupy such Board seat, by the holders of at least a majority of the shares of stock, then entitled under Section 1.2 to designate or approve such director or Board seat;

(b) any vacancies created by the resignation, removal or death of a director elected pursuant to Sections 1.2 or 1.3 shall be filled pursuant to the provisions of this Section 1; and

(c) upon the request of any party entitled to designate a director as provided in Section 1.2(a) or 1.2(b), 1.2(c), 1.2(d) or 1.2(g) to remove such director, such director shall be removed.

All Stockholders agree to execute any written consents required to perform the obligations of this Agreement, and the Company agrees at the request of any party entitled to designate directors to call a special meeting of stockholders for the purpose of electing directors.

1.5 No Liability for Election of Recommended Directors. No Stockholder, nor any Affiliate of any Stockholder, shall have any liability as a result of designating a person for election as a director for any act or omission by such designated person in his or her capacity as a director of the Company, nor shall any Stockholder have any liability as a result of voting for any such designee in accordance with the provisions of this Agreement.

2. Vote to Increase Common Stock.

2.1 Authorized In Charter. Each Stockholder agrees to vote or cause to be voted all Shares owned by such Stockholder, or over which such Stockholder has voting control, from time to time and at all times, in whatever manner as shall be necessary to increase the number of authorized shares of Common Stock from time to time to ensure that there will be sufficient shares of Common Stock available for conversion of all of the shares of Series A Preferred Stock outstanding at any given time.

2.2 Authorized in Stock Plan. Each Stockholder agrees to vote or cause to be voted all Shares owned by such Stockholder, or over which such Stockholder has voting control, at the time of the Closing (as defined in the Purchase Agreement), in whatever manner as shall be necessary to increase the number of authorized shares pursuant to the Stock Plan (as defined in the Purchase Agreement) to ensure that, at the Closing, the number of shares of Common Stock reserved for issuance under the Stock Plan, including for stock options granted but not yet exercised as of the Closing, shall have been increased to maintain a pool of ten percent (10.0%) of the fully diluted capital stock of the Company.

3. Drag-Along Right.

3.1 Definitions. A "**Sale of the Company**" shall mean either: (a) a transaction or series of related transactions in which a Person, or a group of related Persons, acquires from stockholders of the Company shares representing more than a majority of the outstanding voting power of the Company (a "**Stock Sale**"); or (b) a transaction that qualifies as a "**Deemed Liquidation Event**" as defined in the Restated Certificate.

3.2 Actions to be Taken. In the event that (i) the Board of Directors and (ii) the holders of at least 70% of the shares of Common Stock then issued or issuable upon conversion of the shares of Series A Preferred Stock (the "**Selling Investors**") approve a Sale of the Company in writing, specifying that this Section 3 shall apply to such transaction, then each Stockholder holding greater than one percent (1%) or more of the Company's then outstanding capital stock (treating for this purpose all shares of Common Stock issuable upon exercise of or conversion of outstanding options, warrants or convertible securities, as if exercised and/or converted or exchanged) hereby agrees:

(a) if such transaction requires stockholder approval, with respect to all Shares that such Stockholder owns or over which such Stockholder otherwise exercises voting power, to vote (in person, by proxy or by action by written consent, as applicable) all Shares in favor of, and adopt, such Sale of the Company (together with any related amendment to the Restated Certificate required in order to implement such Sale of the Company) and to vote in opposition to any and all other proposals that could reasonably be expected to delay or impair the ability of the Company to consummate such Sale of the Company;

(b) if such transaction is a Stock Sale, to sell the same proportion of shares of capital stock of the Company beneficially held by such Stockholder as is being sold by the Selling Investors to the Person to whom the Selling Investors propose to sell their Shares, and, except as permitted in Section 3.3 below, on the same terms and conditions as the Selling Investors;

(c) to execute and deliver all related documentation and take such other action in support of the Sale of the Company as shall reasonably be requested by the Company or the Selling Investors in order to carry out the terms and provision of this Section 3, including without limitation executing and delivering instruments of conveyance and transfer, and any purchase agreement, merger agreement, indemnity agreement, escrow agreement, consent, waiver, governmental filing, share certificates duly endorsed for transfer (free and clear of impermissible liens, claims and encumbrances) and any similar or related documents;

(d) not to deposit, and to cause their Affiliates not to deposit, except as provided in this Agreement, any Shares of the Company owned by such party or Affiliate in a voting trust or subject any Shares to any arrangement or agreement with respect to the voting of such Shares, unless specifically requested to do so by the acquiror in connection with the Sale of the Company;

(e) to refrain from exercising any dissenters' rights or rights of appraisal under applicable law at any time with respect to such Sale of the Company; and

(f) if the consideration to be paid in exchange for the Shares pursuant to this Section 3 includes any securities and due receipt thereof by any Stockholder would require under applicable law (x) the registration or qualification of such securities or of any person as a broker or dealer or agent with respect to such securities or (y) the provision to any Stockholder of any information other than such information as a prudent issuer would generally furnish in an offering made solely to "accredited investors" as defined in Regulation D promulgated under the Securities Act of 1933, as amended, the Company may cause to be paid to any such Stockholder in lieu thereof, against surrender of the Shares which would have otherwise been sold by such Stockholder, an amount in cash equal to the fair value (as determined in good faith by the Company) of the securities which such Stockholder would otherwise receive as of the date of the issuance of such securities in exchange for the Shares.

3.3 Exceptions. Notwithstanding the foregoing, a Stockholder will not be required to comply with Section 3.2 above in connection with any proposed Sale of the Company (the "**Proposed Sale**") unless:

(a) the Stockholder shall not be liable for the inaccuracy of any representation or warranty made by any other Person in connection with the Proposed Sale, other than the Company (except to the extent that funds may be paid out of an escrow established to cover breach of representations, warranties and covenants of the Company as well as breach by any stockholder of any of identical representations, warranties and covenants provided by all stockholders);

(b) the liability for indemnification, if any, of such Stockholder in the Proposed Sale and for the inaccuracy of any representations and warranties made by the Company in connection with such Proposed Sale, is several and not joint with any other Person (except to the extent that funds may be paid out of an escrow established to cover breach of representations, warranties and covenants of the Company as well as breach by any stockholder of any of identical representations, warranties and covenants provided by all stockholders), and is pro rata in proportion to the amount of consideration paid to such Stockholder in connection with such Proposed Sale (as determined in accordance with the provisions of the Restated Certificate); and

(c) liability shall be limited to such Stockholder's applicable share (determined based on the respective proceeds payable to each Stockholder in connection with such Proposed Sale in accordance with the provisions of the Restated Certificate) of a negotiated aggregate indemnification amount that in no event exceeds the amount of consideration otherwise payable to such Stockholder in connection with such Proposed Sale, except with respect to claims related to fraud by such Stockholder, the liability for which need not be limited as to such Stockholder.

3.4 Restrictions on Sales of Control of the Company. No Stockholder shall be a party to any Stock Sale unless all holders of Series A Preferred Stock are allowed to participate in such transaction and the consideration received pursuant to such transaction is allocated among the parties thereto in the manner specified in the Company's Certificate of Incorporation in effect immediately prior to the Stock Sale (as if such transaction were a Deemed Liquidation Event), unless the holders of at least 70% of the Series A Preferred Stock elect otherwise by written notice given to the Company at least twenty (20) days prior to the effective date of any such transaction or series of related transactions.

4. Remedies.

4.1 Covenants of the Company. The Company agrees to use its best efforts, within the requirements of applicable law, to ensure that the rights granted under this Agreement are effective and that the parties enjoy the benefits of this Agreement. Such actions include, without limitation, the use of the Company's best efforts to cause the nomination and election of the directors as provided in this Agreement.

4.2 Specific Enforcement. Each party acknowledges and agrees that each party hereto will be irreparably damaged in the event any of the provisions of this Agreement are not performed by the parties in accordance with their specific terms or are otherwise breached. Accordingly, it is agreed that each of the Company and the Stockholders shall be entitled to an injunction to prevent breaches of this Agreement, and to specific enforcement of this Agreement and its terms and provisions in any action instituted in any court of the United States or any state having subject matter jurisdiction.

4.3 Remedies Cumulative. All remedies, either under this Agreement or by law or otherwise afforded to any party, shall be cumulative and not alternative.

5. Term. This Agreement shall be effective as of the date hereof and shall continue in effect until and shall terminate and be of no further force or effect (a) immediately before the consummation of a QPO, as such term is defined in the Restated Certificate, as amended from time to time, (b) upon a Deemed Liquidation Event, as such term is defined in the Restated Certificate, as amended from time to time, or (c) termination of this Agreement in accordance with Section 6.8 below, whichever event occurs first.

6. "Bad Actor" Voting Restrictions. In the event the Company proposes an offering of its securities in reliance on Rule 506 of the Securities Act, the Company intends to conduct an inquiry of all Stockholders that beneficially own 20% or more of the Company's outstanding voting equity securities, calculated on the basis of voting power (each, a "**20% Holder**") as to whether any 20% Holder or any Rule 506(d) Related Party of such 20% Holder is a "bad actor" within the meaning of Rule 506(d) promulgated under the Securities Act (a "**Bad Actor**"). If (a) any 20% Holder fails to provide any requested information to the Company within ten (10) business days of the date of the request therefor or (b) any 20% Holder indicates that it or any Rule 506(d) Related Party of such 20% Holder is a Bad Actor, then, other than in connection with any vote arising under Section 242(b)(2) of the Delaware General Corporation Law, such 20% Holder agrees that it shall not cast any vote in respect of shares of the Company's capital stock beneficially owned by such 20% Holder that are equal to or in excess of 20% of the Company's outstanding voting equity securities, calculated on the basis of voting power. Notwithstanding the foregoing, the voting restrictions under this Section 5 shall cease as to a 20% Holder at such time as such 20% Holder certifies or recertifies to the Company that neither it nor any of its Rule 506(d) Related Parties is a Bad Actor. For purposes of this Agreement, "**Rule 506(d) Related Party**" shall mean a person or entity covered by the "Bad Actor disqualification" provision of Rule 506(d) of the Securities Act."

7. Miscellaneous.

7.1 Additional Parties.

(a) Notwithstanding anything to the contrary contained herein, if the Company issues additional shares of Series A Preferred Stock after the date hereof, as a condition to the issuance of such shares the Company shall require that any purchaser of shares of Series A Preferred Stock become a party to this Agreement by executing and delivering (i) the Adoption Agreement attached to this Agreement as Exhibit A, or (ii) a counterpart signature page hereto agreeing to be bound by and subject to the terms of this Agreement as an Investor and Stockholder hereunder. In either event, each such person thereafter shall be deemed an Investor and Stockholder for all purposes under this Agreement.

(b) In the event that after the date of this Agreement, the Company enters into an agreement with any Person to issue shares of capital stock to such Person (other than to a purchaser of Series A Preferred Stock described in Section 6.1(a) above), following which such Person shall hold Shares constituting one percent (1%) or more of the Company's then outstanding capital stock (treating for this purpose all shares of Common Stock issuable upon exercise of or conversion of outstanding options, warrants or convertible securities, as if exercised and/or converted or exchanged), then, the Company shall cause such Person, as a condition precedent to entering into such agreement, to become a party to this Agreement by executing an Adoption Agreement in the form attached hereto as Exhibit A, agreeing to be bound by and subject to the terms of this Agreement as a Stockholder and thereafter such person shall be deemed a Stockholder for all purposes under this Agreement.

7.2 Transfers. Each transferee or assignee of any Shares subject to this Agreement shall continue to be subject to the terms hereof, and, as a condition precedent to the Company's recognizing such transfer, each transferee or assignee shall agree in writing to be subject to each of the terms of this Agreement by executing and delivering an Adoption Agreement substantially in the form attached hereto as Exhibit A. Upon the execution and delivery of an Adoption Agreement by any transferee, such transferee shall be deemed to be a party hereto as if such transferee were the transferor and such transferee's signature appeared on the signature pages of this Agreement and shall be deemed to be an Investor and Stockholder, or Key Holder and Stockholder, as applicable. The Company shall not permit the transfer of the Shares subject to this Agreement on its books or issue a new certificate representing any such Shares unless and until such transferee shall have complied with the terms of this Section 6.2. Each certificate representing the Shares subject to this Agreement if issued on or after the date of this Agreement shall be endorsed by the Company with the legend set forth in Section 6.12.

7.3 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.

7.4 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.

7.5 Counterparts; Facsimile. This Agreement may be executed and delivered by facsimile signature or signatures delivered by electronic mail (including .pdf) 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.

7.6 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.

7.7 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 the business day of 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 Schedule A or Schedule B hereto, or to such email address, facsimile number or address as subsequently modified by written notice given in accordance with this Section 6.7.

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 Stockholders, copies shall also be sent to

Goodwin Procter LLP
Exchange Place
53 State Street
Boston, MA 02109
Attn: Joseph G. Theis, Jr.

7.8 Consent Required to Amend, Terminate or Waive. This Agreement may be amended or terminated and the observance of any term hereof may be waived (either generally or in a particular instance and either retroactively or prospectively) only by a written instrument executed by (a) the Company and (b) the holders of at least 70% of the shares of 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 and on an as-converted basis). Notwithstanding the foregoing:

(i) this Agreement may not be amended or terminated and the observance of any term of this Agreement may not be waived with respect to any Stockholder without the written consent of such Stockholder unless such amendment, termination or waiver applies to all Stockholders in the same fashion;

(ii) Schedule A hereto may be amended by the Company from time to time to add information regarding additional Stockholders added in compliance with this Agreement without the consent of the other parties hereto;

(iii) any provision hereof may be waived by the waiving party on such party's own behalf, without the consent of any other party; and

(iv) Section 1.2(a) of this Agreement shall not be amended or waived without the written consent of CHL Medical Partners, Section 1.2(b) shall not be amended or waived without the written consent of Versant Ventures, Section 1.2(c) shall not be amended or waived without the written consent of jVen Capital, Section 1.2(d) shall not be amended or waived without the written consent of Harris & Harris, and Section 1.2(g) shall not be amended or waived without the written consent of Mason Wells.

The Company shall give prompt written notice of any amendment, termination or waiver hereunder to any party that did not consent in writing thereto. Any amendment, termination or waiver effected in accordance with this Section 6.8 shall be binding on each party and all of such party's successors and permitted assigns, whether or not any such party, successor or assignee entered into or approved such amendment, termination or waiver.

7.9 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 previously or thereafter occurring. 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. All remedies, either under this Agreement or by law or otherwise afforded to any party, shall be cumulative and not alternative.

7.10 Severability. The invalidity or unenforceability of any provision hereof shall in no way affect the validity or enforceability of any other provision.

7.11 Entire Agreement, Upon the effectiveness of this Agreement, the Prior Agreement shall be deemed amended and restated to read in its entirety as set forth in this Agreement. This Agreement (including the Schedules and Exhibits hereto), the Restated Certificate, the other Transaction Agreements (as defined in the Purchase Agreement) 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 is expressly canceled.

7.12 Legend on Share Certificates. Each certificate representing any Shares issued after the date hereof shall be endorsed by the Company with a legend reading substantially as follows:

> "THE SHARES EVIDENCED HEREBY ARE SUBJECT TO A VOTING AGREEMENT, AS MAY BE AMENDED FROM TIME TO TIME, (A COPY OF WHICH MAY BE OBTAINED UPON WRITTEN REQUEST FROM THE COMPANY), AND BY ACCEPTING ANY INTEREST IN SUCH SHARES THE PERSON ACCEPTING SUCH INTEREST SHALL BE DEEMED TO AGREE TO AND SHALL BECOME BOUND BY ALL THE PROVISIONS OF THAT VOTING AGREEMENT, INCLUDING CERTAIN RESTRICTIONS ON TRANSFER AND OWNERSHIP SET FORTH THEREIN."

The Company, by its execution of this Agreement, agrees that it will cause the certificates evidencing the Shares issued after the date hereof to bear the legend required by this Section 6.12 of this Agreement, and it shall supply, free of charge, a copy of this Agreement to any holder of a certificate evidencing Shares upon written request from such holder to the Company at its principal office. The parties to this Agreement do hereby agree that the failure to cause the certificates evidencing the Shares to bear the legend required by this Section 6.12 and/or the failure of the Company to supply, free of charge, a copy of this Agreement as provided hereunder shall not affect the validity or enforcement of this Agreement.

7.13 Stock Splits, Stock Dividends, etc. In the event of any issuance of Shares of the Company's voting securities hereafter to any of the Stockholders (including, without limitation, in connection with any stock split, stock dividend, recapitalization, reorganization, or the like), such Shares shall become subject to this Agreement and shall be endorsed with the legend set forth in Section 6.12.

7.14 Manner of Voting. The voting of Shares pursuant to this Agreement may be effected in person, by proxy, by written consent or in any other manner permitted by applicable law.

7.15 Further Assurances. At any time or from time to time after the date hereof, the parties agree to cooperate with each other, and at the request of any other party, to execute and deliver any further instruments or documents and to take all such further action as the other party may reasonably request in order to evidence or effectuate the consummation of the transactions contemplated hereby and to otherwise carry out the intent of the parties hereunder.

7.16 Costs of Enforcement. If any party to this Agreement seeks to enforce its rights under this Agreement by legal proceedings, the non-prevailing party shall pay all costs and expenses incurred by the prevailing party, including, without limitation, all reasonable attorneys' fees.

7.17 Aggregation of Stock. All Shares held or acquired by a Stockholder and/or its 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.

7.18 Spousal Consent. If any individual Stockholder is married on the date of this Agreement, such Stockholder's spouse shall execute and deliver to the Company a consent of spouse in the form of Exhibit B hereto ("**Consent of Spouse**"), effective on the date hereof. Notwithstanding the execution and delivery thereof, such consent shall not be deemed to confer or convey to the spouse any rights in such Stockholder's Shares that do not otherwise exist by operation of law or the agreement of the parties. If any individual Stockholder should marry or remarry subsequent to the date of this Agreement, such Stockholder shall within thirty (30) days thereafter obtain his/her new spouse's acknowledgement of and consent to the existence and binding effect of all restrictions contained in this Agreement by causing such spouse to execute and deliver a Consent of Spouse acknowledging the restrictions and obligations contained in this Agreement and agreeing and consenting to the same.

[Signature Pages Follow]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Voting 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 Voting Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Voting 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

[Signature Page to Third Amended and Restated Voting Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Voting 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 Voting Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Voting 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

[Signature Page to Third Amended and Restated Voting Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Voting Agreement as of the date first written above.

INVESTORS:

HARRIS & HARRIS GROUP, INC.

By: /s/ Sandra M. Forman
Name: Sandra M. Forman
Title: General Counsel

[Signature Page to Third Amended and Restated Voting Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Voting 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 Voting Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Voting 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 Voting Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Voting 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:

[Signature Page to Third Amended and Restated Voting Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Voting 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 Voting 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 Voting 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 Voting Agreement]

IN WITNESS WHEREOF, the parties have executed this Third Amended and Restated Voting 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

[Signature Page to Third Amended and Restated Voting Agreement]

SCHEDULE A

INVESTORS

Name and Address

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

EXHIBIT A

ADOPTION AGREEMENT

This Adoption Agreement ("**Adoption Agreement**") is executed on _____________, 20__, by the undersigned (the "**Holder**") pursuant to the terms of that certain Third Amended and Restated Voting Agreement dated as of December 18, 2013 (the "**Agreement**"), by and among the Company and certain of its Stockholders, as such Agreement may be amended or amended and restated hereafter. Capitalized terms used but not defined in this Adoption Agreement shall have the respective meanings ascribed to such terms in the Agreement. By the execution of this Adoption Agreement, the Holder agrees as follows.

1.1 Acknowledgement. Holder acknowledges that Holder is acquiring certain shares of the capital stock of the Company (the "**Stock**")[or options, warrants or other rights to purchase such Stock (the "**Options**")], for one of the following reasons (Check the correct box):

as a transferee of Shares from a party in such party's capacity as an "Investor" bound by the Agreement, and after such transfer, Holder shall be considered an "Investor" and a "Stockholder" for all purposes of the Agreement.

as a transferee of Shares from a party in such party's capacity as a "Key Holder" bound by the Agreement, and after such transfer, Holder shall be considered a "Key Holder" and a "Stockholder" for all purposes of the Agreement.

as a new Investor in accordance with Section 6.1(a) of the Agreement, in which case Holder will be an "Investor" and a "Stockholder" for all purposes of the Agreement.

in accordance with Section 6.1(b) of the Agreement, as a new party who is not a new Investor, in which case Holder will be a "Stockholder" for all purposes of the Agreement.

1.2 Agreement. Holder hereby (a) agrees that the Stock [Options], and any other shares of capital stock or securities required by the Agreement to be bound thereby, shall be bound by and subject to the terms of the Agreement and (b) adopts the Agreement with the same force and effect as if Holder were originally a party thereto.

1.3 Notice. Any notice required or permitted by the Agreement shall be given to Holder at the address, facsimile number or email listed below Holder's signature hereto.

HOLDER:_____________________________	ACCEPTED AND AGREED:
By: ________________________	OPGEN, INC.
Name and Title of Signatory	
Address: ________________________	By:___________________________________
_________________________________	Title:__________________________________

_____
Email:_______________________________
Facsimile Number:_____________________

<u>EXHIBIT B</u>

CONSENT OF SPOUSE

I, [__________________________], spouse of [______________________], acknowledge that I have read the Third Amended and Restated Voting Agreement, dated as of December 18, 2013, to which this Consent is attached as Exhibit B (the "**Agreement**"), and that I know the contents of the Agreement. I am aware that the Agreement contains provisions regarding the voting and transfer of shares of capital stock of the Company that my spouse may own, including any interest I might have therein.

I hereby agree that my interest, if any, in any shares of capital stock of the Company subject to the Agreement shall be irrevocably bound by the Agreement and further understand and agree that any community property interest I may have in such shares of capital stock of the Company shall be similarly bound by the Agreement.

I am aware that the legal, financial and related matters contained in the Agreement are complex and that I am free to seek independent professional guidance or counsel with respect to this Consent. I have either sought such guidance or counsel or determined after reviewing the Agreement carefully that I will waive such right.

Dated:_________________________

____
[Name of Key Holder's Spouse, if any]

AMENDMENT NO. 1 TO THE
THIRD AMENDED AND RESTATED VOTING AGREEMENT

This Amendment No. 1 to the Third Amended and Restated Voting Agreement (this "Amendment"), dated as of February 19, 2014, amends the Third Amended and Restated Voting Agreement, dated as of December 18, 2013 (the "Voting Agreement"), by and among OpGen, Inc., a Delaware corporation (the "Company"), and the Stockholders listed therein (collectively, the "Stockholders"). All capitalized terms used but not specifically defined herein shall have the same meanings given such terms in the Voting Agreement.

WHEREAS, the undersigned Stockholders are 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 7.8 of the Voting Agreement allows for amendment of the Voting Agreement with the written consent of the Company and the holders of (a) 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) and (b) CHL Medical Partners, with respect to Section 1.2(a) of the Voting Agreement;

WHEREAS, the Company and the undersigned Stockholders desire to amend the Voting Agreement to reduce the ownership threshold under which CHL Medical Partners loses its right to designate a member of the Board of Directors for election by the Stockholders under the Voting Agreement; and

WHEREAS, the Company and the undersigned Stockholders desire to amend the Voting Agreement as provided herein.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereby agree as follows:

1. Amendment to Section 1.1 of the Voting Agreement.

(a) The first sentence of Section 1.1 of the Voting Agreement is hereby amended and restated in its entirety as follows:

"Each Stockholder agrees to vote, or cause to be voted, all Shares (as defined below) owned by such Stockholder, or over which such Stockholder has voting control, from time to time and at all times, in whatever manner as shall be necessary to ensure that the size of the Board shall not exceed seven (7) directors."

2. Amendment to Section 1.2 of the Voting Agreement.

(a) Section 1.2(a) of the Voting Agreement is hereby amended and restated in its entirety as follows:

"(a) For as long as CHL Medical Partners III, L.P. and CHL Medical Partners III Side Fund, L.P. (collectively, "**CHL Medical Partners**") (i) collectively hold on an as-converted, fully diluted basis at least ten percent (10%) of the Company's capital stock, or (ii) if clause (i) is not applicable, if such Stockholders participated in the Notes offering made pursuant to the Purchase Agreement and continue to hold at least five percent (5.0%) of the Company's capital stock on an as-converted, fully diluted basis, one individual (the "**CHL Designee**") designated by CHL Medical Partners, which individual shall initially be Timothy Howe;"

(b) The final paragraph of Section 1.2 of the Voting Agreement is hereby amended and restated in its entirety as follows:

"The rights set forth in Section 1.2(a) through (d) and Section 1.2(g) will continue as long as such Stockholder(s): (1) maintains ownership of at least 10% of the outstanding capital stock of the Company on an as-converted, fully diluted basis or (2) participated in the Notes offering under the Purchase Agreement and maintains ownership of at least 7.5% of the outstanding capital stock of the Company on an as-converted, fully diluted basis (except that 5.0% shall be substituted for 7.5% for CHL Medical Partners in Section 1.2(a)). All percentages set forth in this Section 1.2 shall be subject to adjustment for stock splits, combinations or similar transactions."

3. Correction of Internal Section References. Article 7 of the Voting Agreement is amended and restated in its entirety to correct internal Section references as follows:

"7. Miscellaneous.

7.1 Additional Parties.

(a) Notwithstanding anything to the contrary contained herein, if the Company issues additional shares of Series A Preferred Stock after the date hereof, as a condition to the issuance of such shares the Company shall require that any purchaser of shares of Series A Preferred Stock become a party to this Agreement by executing and delivering (i) the Adoption Agreement attached to this Agreement as Exhibit A, or (ii) a counterpart signature page hereto agreeing to be bound by and subject to the terms of this Agreement as an Investor and Stockholder hereunder. In either event, each such person thereafter shall be deemed an Investor and Stockholder for all purposes under this Agreement.

(b) In the event that after the date of this Agreement, the Company enters into an agreement with any Person to issue shares of capital stock to such Person (other than to a purchaser of Series A Preferred Stock described in Section 7.1(a) above), following which such Person shall hold Shares constituting one percent (1%) or more of the Company's then outstanding capital stock (treating for this purpose all shares of Common Stock issuable upon exercise of or conversion of outstanding options, warrants or convertible securities, as if exercised and/or converted or exchanged), then, the Company shall cause such Person, as a condition precedent to entering into such agreement, to become a party to this Agreement by executing an Adoption Agreement in the form attached hereto as Exhibit A, agreeing to be bound by and subject to the terms of this Agreement as a Stockholder and thereafter such person shall be deemed a Stockholder for all purposes under this Agreement.

7.2 Transfers. Each transferee or assignee of any Shares subject to this Agreement shall continue to be subject to the terms hereof, and, as a condition precedent to the Company's recognizing such transfer, each transferee or assignee shall agree in writing to be subject to each of the terms of this Agreement by executing and delivering an Adoption Agreement substantially in the form attached hereto as Exhibit A. Upon the execution and delivery of an Adoption Agreement by any transferee, such transferee shall be deemed to be a party hereto as if such transferee were the transferor and such transferee's signature appeared on the signature pages of this Agreement and shall be deemed to be an Investor and Stockholder, or Key Holder and Stockholder, as applicable. The Company shall not permit the transfer of the Shares subject to this Agreement on its books or issue a new certificate representing any such Shares unless and until such transferee shall have complied with the terms of this Section 7.2. Each certificate representing the Shares subject to this Agreement if issued on or after the date of this Agreement shall be endorsed by the Company with the legend set forth in Section 7.12.

7.3 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.

7.4 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.

7.5 Counterparts; Facsimile. This Agreement may be executed and delivered by facsimile signature or signatures delivered by electronic mail (including .pdf) 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.

7.6 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.

7.7 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 the business day of 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 Schedule A or Schedule B hereto, or to such email address, facsimile number or address as subsequently modified by written notice given in accordance with this Section 7.7.

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 Stockholders, copies shall also be sent to:

Goodwin Procter LLP
Exchange Place
53 State Street
Boston, MA 02109
Attn: Joseph G. Theis, Jr.

7.8 Consent Required to Amend, Terminate or Waive. This Agreement may be amended or terminated and the observance of any term hereof may be waived (either generally or in a particular instance and either retroactively or prospectively) only by a written instrument executed by (a) the Company and (b) the holders of at least 70% of the shares of 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 and on an as-converted basis). Notwithstanding the foregoing:

(i) this Agreement may not be amended or terminated and the observance of any term of this Agreement may not be waived with respect to any Stockholder without the written consent of such Stockholder unless such amendment, termination or waiver applies to all Stockholders in the same fashion;

(ii) Schedule A hereto may be amended by the Company from time to time to add information regarding additional Stockholders added in compliance with this Agreement without the consent of the other parties hereto;

(iii) any provision hereof may be waived by the waiving party on such party's own behalf, without the consent of any other party; and

(iv) Section 1.2(a) of this Agreement shall not be amended or waived without the written consent of CHL Medical Partners, Section 1.2(b) shall not be amended or waived without the written consent of Versant Ventures, Section 1.2(c) shall not be amended or waived without the written consent of jVen Capital, Section 1.2(d) shall not be amended or waived without the written consent of Harris & Harris, and Section 1.2(g) shall not be amended or waived without the written consent of Mason Wells.

The Company shall give prompt written notice of any amendment, termination or waiver hereunder to any party that did not consent in writing thereto. Any amendment, termination or waiver effected in accordance with this Section 7.8 shall be binding on each party and all of such party's successors and permitted assigns, whether or not any such party, successor or assignee entered into or approved such amendment, termination or waiver.

7.9 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 previously or thereafter occurring. 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. All remedies, either under this Agreement or by law or otherwise afforded to any party, shall be cumulative and not alternative.

7.10 Severability. The invalidity or unenforceability of any provision hereof shall in no way affect the validity or enforceability of any other provision.

7.11 Entire Agreement. Upon the effectiveness of this Agreement, the Prior Agreement shall be deemed amended and restated to read in its entirety as set forth in this Agreement. This Agreement (including the Schedules and Exhibits hereto), the Restated Certificate, the other Transaction Agreements (as defined in the Purchase Agreement) 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 is expressly canceled.

7.12 Legend on Share Certificates. Each certificate representing any Shares issued after the date hereof shall be endorsed by the Company with a legend reading substantially as follows:

> "THE SHARES EVIDENCED HEREBY ARE SUBJECT TO A VOTING AGREEMENT, AS MAY BE AMENDED FROM TIME TO TIME, (A COPY OF WHICH MAY BE OBTAINED UPON WRITTEN REQUEST FROM THE COMPANY), AND BY ACCEPTING ANY INTEREST IN SUCH SHARES THE PERSON ACCEPTING SUCH INTEREST SHALL BE DEEMED TO AGREE TO AND SHALL BECOME BOUND BY ALL THE PROVISIONS OF THAT VOTING AGREEMENT, INCLUD¬ING CERTAIN RESTRICTIONS ON TRANSFER AND OWNERSHIP SET FORTH THEREIN."

The Company, by its execution of this Agreement, agrees that it will cause the certificates evidencing the Shares issued after the date hereof to bear the legend required by this Section 7.12 of this Agreement, and it shall supply, free of charge, a copy of this Agreement to any holder of a certificate evidencing Shares upon written request from such holder to the Company at its principal office. The parties to this Agreement do hereby agree that the failure to cause the certificates evidencing the Shares to bear the legend required by this Section 7.12 and/or the failure of the Company to supply, free of charge, a copy of this Agreement as provided hereunder shall not affect the validity or enforcement of this Agreement.

7.13 Stock Splits, Stock Dividends, etc. In the event of any issuance of Shares of the Company's voting securities hereafter to any of the Stockholders (including, without limitation, in connection with any stock split, stock dividend, recapitalization, reorganization, or the like), such Shares shall become subject to this Agreement and shall be endorsed with the legend set forth in Section 7.12.

7.14 Manner of Voting. The voting of Shares pursuant to this Agreement may be effected in person, by proxy, by written consent or in any other manner permitted by applicable law.

7.15 Further Assurances. At any time or from time to time after the date hereof, the parties agree to cooperate with each other, and at the request of any other party, to execute and deliver any further instruments or documents and to take all such further action as the other party may reasonably request in order to evidence or effectuate the consummation of the transactions contemplated hereby and to otherwise carry out the intent of the parties hereunder.

7.16 Costs of Enforcement. If any party to this Agreement seeks to enforce its rights under this Agreement by legal proceedings, the non-prevailing party shall pay all costs and expenses incurred by the prevailing party, including, without limitation, all reasonable attorneys' fees.

7.17 Aggregation of Stock. All Shares held or acquired by a Stockholder and/or its 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.

7.18 Spousal Consent. If any individual Stockholder is married on the date of this Agreement, such Stockholder's spouse shall execute and deliver to the Company a consent of spouse in the form of Exhibit B hereto ("**Consent of Spouse**"), effective on the date hereof. Notwithstanding the execution and delivery thereof, such consent shall not be deemed to confer or convey to the spouse any rights in such Stockholder's Shares that do not otherwise exist by operation of law or the agreement of the parties. If any individual Stockholder should marry or remarry subsequent to the date of this Agreement, such Stockholder shall within thirty (30) days thereafter obtain his/her new spouse's acknowledgement of and consent to the existence and binding effect of all restrictions contained in this Agreement by causing such spouse to execute and deliver a Consent of Spouse acknowledging the restrictions and obligations contained in this Agreement and agreeing and consenting to the same."

4. Miscellaneous.

(a) Ratification of the Voting Agreement. Except as specifically amended hereby, the Voting Agreement shall remain in full force and effect and is hereby ratified and confirmed in all respects.

(b) Severability. The invalidity or unenforceability of any provision of this Amendment in any jurisdiction shall not affect the validity or enforceability of such provision in any other jurisdiction, or affect any other provision of this Amendment, which shall remain in full force and effect.

(c) 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.

(d) Governing Law. This Amendment shall be governed by and construed in accordance with the applicable provisions of the Voting 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 AMENDMENT NO. 1 TO THIRD AMENDED & RESTATED VOTING AGREEMENT]

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 AMENDMENT NO. 1 TO THIRD AMENDED & RESTATED VOTING AGREEMENT]

STOCKHOLDERS:

HARRIS & HARRIS GROUP, INC.

By: /s/ Sandra M. Forman
Name: Sandra M. Forman
Title: General Counsel

[SIGNATURE PAGE TO AMENDMENT NO. 1 TO THIRD AMENDED & RESTATED VOTING AGREEMENT]

STOCKHOLDERS:

jVEN CAPITAL, LLC

By: /s/ Evan Jones
Name: Evan Jones, Managing Member
Title: Authorized Signatory

/s/ Cynthia Jones
Cynthia Jones

[SIGNATURE PAGE TO AMENDMENT NO. 1 TO THIRD AMENDED & RESTATED VOTING AGREEMENT]

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 AMENDMENT NO. 1 TO THIRD AMENDED & RESTATED VOTING AGREEMENT]

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

[Signature Page to Stockholders' 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

November __, 2014

OpGen, Inc.
708 Quince Orchard Road
Gaithersburg, MD 20878
Re: 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 (File No. _________) (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"), and an additional _____ shares of Common Stock to cover an over-allotment option upon exercise, if applicable (the "Over-Allotment Shares" and together with the Over-Allotment 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, to be filed with an amendment to the Registration Statement, and (iii) the Amended and Restated Bylaws of the Company, to be filed with an amendment to 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; <u>provided</u>, <u>however</u>, 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**(v) . 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**(vi) . 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**(vii) . 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

Exhibit 10.2

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:

Exhibit 10.3

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) <u>Number of Shares</u>. 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