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

AMENDMENT NO. 7
TO
FORM S-1
REGISTRATION STATEMENT

Under
The Securities Act of 1933

OPGEN, INC.

(Exact name of registrant as specified in its charter)

Delaware (State or other jurisdiction of incorporation or organization)	8071 (Primary Standard Industrial Classification Code Number)	06-1614015 (I.R.S. Employer Identification Number)
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**708 Quince Orchard Road, Suite 160
Gaithersburg, MD 20878
(240) 813-1260**

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Evan Jones
President and Chief Executive Officer
708 Quince Orchard Road, Suite 160
Gaithersburg, MD 20878
(301) 869-9683

(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Mary J. Mullany, Esq.
Ballard Spahr LLP
1735 Market Street
51st Floor
Philadelphia, PA 19103
(215) 665-8500

Richard Baumann, Esq.
Barry I. Grossman, Esq.
Ellenoff Grossman & Schole LLP
1345 Avenue of the Americas
New York, NY 10105
(212) 370-1300

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

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

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

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

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

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

Large Accelerated Filer

Accelerated Filer

Non-Accelerated Filer

Smaller Reporting Company

CALCULATION OF REGISTRATION FEE

Title of each Class of Securities

Amount to be

Proposed Maximum

Proposed Maximum

Amount of

to be Registered	Registered	Offering Price Per Security	Aggregate Offering Price(1)(2)	Registration Fee(3)
Units, each consisting of one share of common stock, par value \$0.01 per share and one warrant to purchase one share of common stock(4)(5)(7)	3,277,500	\$6.50	\$21,303,750.00	\$2,475.50
Common stock included in the units(4)(5)(7)	3,277,500			
Warrants included in the units(4)(5)(7)	3,277,500			
Shares of common stock underlying warrants included in units(4)(5)(7)	3,277,500	\$7.15	\$23,434,125.00	\$2,723.05
Underwriters' warrants(4)(5)(6)	213,038			
Shares of common stock underlying underwriters' warrants(4)(5)(6)	213,038	\$7.15	\$1,523,221.70	\$177.00
Total			\$46,261,096.70	\$5,375.55

- (1) Estimated solely for the purpose of computing the amount of the registration fee pursuant to Rule 457(a) under the Securities Act of 1933, as amended.
- (2) Includes the aggregate offering price of additional shares and/or underwriters' warrants which the underwriters have the option to purchase to cover over-allotments, if any.
- (3) The Registrant previously paid \$5,375.55 as a registration fee in connection with the initial filing of and previous amendments to this registration statement.
- (4) Pursuant to Rule 416 under the Securities Act, the securities being registered hereunder include such indeterminate number of additional shares of common stock as may be issued after the date hereof as a result of stock splits, stock dividends or similar transactions.
- (5) Assumes the underwriters' over-allotment option is fully exercised.
- (6) Represents warrants to purchase a number of shares of common stock equal to 6.5% of the shares to be sold in this offering, including those sold pursuant to the underwriters option to purchase to cover over-allotments, if any, and assuming a per share exercise price equal to 110% of the price per unit in this offering.
- (7) Includes up to 350,000 units to be issued in this offering upon tender of up to \$2.1 million of secured demand notes by existing stockholders.

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.

Explanatory Note

The sole purpose of the filing of this Amendment No. 7 to the Registration Statement on Form S-1 (the "Registration Statement") of OpGen, Inc. is to file with the Commission the form of Underwriting Agreement and form of Underwriters' Warrant to Purchase Common Stock of the Registrant.

PART II

Information Not Required in Prospectus

Item 16. Exhibits and Financial Statement Schedules.

(a) Exhibits:

The exhibits to the registration statement are listed in the Exhibit Index to this registration statement and are incorporated herein by reference.

(b) Financial Statements Schedules:

Schedules have been omitted because the information required to be set forth therein is not applicable or is shown in the financial statements or notes thereto included elsewhere in this registration statement.

EXHIBIT INDEX

<u>Exhibit Number</u>	<u>Description</u>
1.1	Form of Underwriting Agreement.
3.1**	Ninth Amended and Restated Certificate of Incorporation of the Registrant, currently in effect.
3.1.1**	Certificate of Amendment to Certificate of Incorporation, amending the Ninth Amended and Restated Certificate of Incorporation of the Registrant, currently in effect.
3.1.2**	Form of Amended and Restated Certificate of Incorporation, to be in effect immediately prior to the consummation of this offering.
3.2**	Amended and Restated Bylaws of the Registrant.
4.1**	Form of Common Stock Certificate of the Registrant.
4.2**	Third Amended and Restated Investors' Rights Agreement, dated as of December 18, 2013, among the Registrant and certain investors.
4.3**	Stockholders' Agreements Amendment, dated as of July 11, 2014, among the Registrant and certain investors.
4.4**	Second Stockholders' Agreements Amendment, dated as of February 7, 2015, among the Registrant and certain investors.
4.5**	Form of Warrant to Purchase Common Stock of the Registrant.
4.6**	Form of 2015 Warrant to Purchase Common Stock of the Registrant.
4.7	Form of Underwriters' Warrant to Purchase Common Stock of the Registrant (included in Exhibit 1.1, Annex I).
4.8**	Form of Offered 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.
10.1.5**	Fifth Amendment to Lease, dated as of March 20, 2015, 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.

Exhibit Number	Description
10.5.1**#	Amendment to Executive Change in Control and Severance Benefits Agreement, dated as of November 1, 2013, between the Registrant and C. Eric Winzer.
10.6**#	Executive Change in Control and Severance Benefits Agreement, dated January 27, 2012, between the Registrant and Vadim Sapiro.
10.6.1**#	Amendment to Executive Change in Control and Severance Benefits Agreement, dated as of November 1, 2013, between the Registrant and Vadim Sapiro.
10.7**±±	Technology Development Agreement, dated September 25, 2013, between the Registrant and Hitachi High-Technologies Corporation.
10.7.1**±	Amendment No. 1 to Technology Development Agreement, dated March 27, 2014, between the Registrant and Hitachi High-Technologies Corporation.
10.8**±	Supply Agreement, dated March 17, 2014, between the Registrant and Fluidigm Corporation.
10.9**	Notes Purchase Agreement, dated February 17, 2015, by and among the Registrant and the investors party thereto (including as Exhibit B the form of convertible note).
10.10**	Form of Amended and Restated Secured Convertible Promissory Note.
10.11**	Amended and Restated Intercreditor Agreement, dated as of February 17, 2015, by and among, the Registrant, Harris & Harris Group, Inc., as collateral agent, and each of the Secured Parties party thereto.
10.12**	Form of Security Agreement, by and among the Registrant, the Secured Parties party thereto and Harris & Harris Group, Inc., as collateral agent.
10.13**#	2015 Equity Incentive Plan
10.14**	Consulting Agreement, effective May 4, 2015, by and between the Registrant and C. Eric Winzer.
10.15**	Form of Secured Demand Note.
10.16**	Non-Employee Director Compensation Policy.
10.17**#	Executive Employment, Change in Control and Severance Agreements, dated April 17, 2015, by and between the Registrant and Kevin Krenitsky, M.D.
10.18**#	Employment Agreement, dated April 17, 2015, by and between the Registrant and Timothy C. Dec.
23.1	Consent of CohnReznick LLP
23.2**	Consent of Ballard Spahr LLP (included in Exhibit 5.1).
24.1**	Power of Attorney.
24.2**	Substitution of Attorney-in-Fact Under Power of Attorney.

** Previously filed.

± Confidential treatment has been requested for certain portions of this agreement pursuant to an application for confidential treatment filed with the Securities and Exchange Commission on March 3, 2015. Such provisions have been filed separately with the Commission.

±± Confidential treatment has been requested for certain portions of this agreement pursuant to a revised application for confidential treatment filed with the Securities and Exchange Commission on April 17, 2015. Such provisions have been filed separately with the Commission.

Management contract or compensatory arrangement.

QuickLinks

[PART II Information Not Required in Prospectus](#)

[Item 16. Exhibits and Financial Statement Schedules.](#)

[SIGNATURES](#)

[EXHIBIT INDEX](#)

OPGEN, INC.

UNDERWRITING AGREEMENT

April [-], 2015

MAXIM GROUP LLC
405 Lexington Avenue
New York, NY 10174

As Representative of the Underwriters
named on Schedule A hereto

Ladies and Gentlemen:

The undersigned, OpGen, Inc., a Delaware corporation (the “**Company**”), hereby confirms its agreement (this “**Agreement**”) with the several underwriters (such underwriters, for whom Maxim Group LLC is acting as representative (in such capacity, the “**Representative**”), the “**Underwriters**” and each an “**Underwriter**”) to issue and sell to the Underwriters an aggregate of up to 3,277,500 units (“**Units**”) of the Company’s securities. Each Unit consists of one share of common stock, par value \$0.01 per share, of the Company (“**Common Stock**”), and one warrant to purchase one share of Common Stock at an exercise price equal to \$[-] per share (each a “**Warrant**” and collectively, the “**Warrants**”). The offering and sale of securities contemplated by this Agreement is referred to herein as the “**Offering**.”

1. Units; Over-Allotment Option.

(a) Purchase of Firm Units. On the basis of the representations and warranties herein contained, but subject to the terms and conditions herein set forth, the Company agrees to issue and sell to the Underwriters, severally and not jointly, an aggregate of 2,850,000 Units (the “**Firm Units**”) at a purchase price (net of discount and commissions) of \$[-] for each Firm Unit. The Underwriters, severally and not jointly, agree to purchase from the Company the Firm Units set forth opposite their respective names on Schedule A attached hereto and made a part hereof. The purchase price (net of discount and commissions) for each Firm Unit shall be allocated as \$[-] per share of Common Stock underlying the Firm Unit and \$0.01 per warrant underlying the Firm Unit (each a “**Firm Warrant**” and collectively, the “**Firm Warrants**”). The Common Stock underlying the Firm Units, and the Firm Warrants, will be separately tradable and transferable immediately following the Effective Date (as hereinafter defined).

(b) Delivery of and Payment for Firm Units. Delivery of and payment for the Firm Units shall be made at 10:00 A.M., New York City time, on the third (3rd) Business Day following the effective date (the “**Effective Date**”) of the Registration Statement (or the fourth (4th) Business Day following the Effective Date, if the Registration Statement is declared effective after 4:30 P.M.) or at such earlier time as shall be agreed upon by the Representative and the Company, at the offices of the Representative or at such other place as shall be agreed upon by the Representative and the Company. The hour and date of delivery of and payment for the Firm Units is called the “**Closing Date**.” The closing of the payment of the purchase price for, and delivery of certificates representing, the Firm Units is referred to herein as the “**Closing**.” Payment for the Firm Units shall be made on the Closing Date by wire transfer in Federal (same day) funds upon delivery to the Representative of certificates (in form and substance satisfactory to the Representative) representing the Firm Units (or through the full fast transfer facilities of the

1

Depository Trust Company (the “**DTC**”) for the account of the Underwriters. The Firm Units shall be registered in such names and in such denominations as the Representative may request in writing at least two Business Days prior to the Closing Date. The Company will permit the Representative to examine and package the Firm Units for delivery at least one full Business Day prior to the Closing Date. The Company shall not be obligated to sell or deliver the Firm Units except upon tender of payment by the Representative for all the Firm Units.

(c) Option Securities.

(i) For the purposes of covering any over-allotments in connection with the distribution of the Firm Units, the Representative on behalf of the Underwriters is hereby granted an option to purchase from the Company (x) additional shares of Common Stock (the “**Option is**”) in a number equal to up to 15% of the number of shares of Common Stock underlying the Firm Units, or up to 427,500 Option Shares and (y) additional Warrants (the “**Option Warrants**” and collectively with the Option Shares, the “**Option Securities**”) in a number equal to up to 15% of the number of Firm Warrants, or up to 427,500 Option Warrants, which may be purchased in any combination of Option Shares and/or Option Warrants (the “**Over-allotment Option**”). The purchase price (net of discount and commissions) to be paid for each Option Share will be the same purchase price (net of discount and commissions) allocated to each share of Common Stock underlying the Firm Units. The purchase price (net of discount and commissions) to be paid for each Option Warrant will be the same purchase price (net of discount and commissions) allocated to each Firm Warrant.

(d) Exercise of Option. The Over-allotment Option may be exercised by the Representative as to all (at any time) or any part (from time to time) of the Option Securities within 45 days after the Effective Date. The Underwriters will not be under any obligation to purchase any Option Securities. The Over-allotment Option granted hereby may be exercised by the giving of oral notice to the Company from the Representative, which must be confirmed in writing by overnight mail or email or facsimile transmission setting forth the number of Option Shares and/or Option Warrants to be purchased and the date and time for delivery of and payment for such Option Securities, which will not be later than five (5) Business Days after the date of the notice or such other time as shall be agreed upon by the Company and the Representative, at the offices of the Representative or at such other place as shall be agreed upon by the Company and the Representative. If such delivery and payment for such Option Securities does not occur on the Closing Date, the date and time of the closing for such Option Securities will be as set forth in the notice (hereinafter the “**Option Closing Date**”). Upon exercise of the Over-allotment Option, the Company will become obligated to convey to the Underwriters, and, subject to the terms and conditions set forth herein, the Underwriters will become obligated to purchase, the number of Option Shares and/or Option Warrants specified in such notice. If any Option Shares are to be purchased, each Underwriter agrees, severally and not jointly, to purchase the number of Option Shares (subject to such adjustments to eliminate fractional securities as the Representative may determine) that bears the same proportion to the number of Firm Units to be purchased by it as set forth on Schedule A opposite such

Underwriter's name as the total number of Option Shares to be purchased bears to the total number of Firm Units. If any Option Warrants are to be purchased, each Underwriter agrees, severally and not jointly, to purchase the number of Option Warrants (subject to such adjustments to eliminate fractional securities as the Representative may determine) that bears the same proportion to the number of Firm Units to be purchased by it as set forth on Schedule A opposite such Underwriter's name as the total number of Option Warrants to be purchased bears to the total number of Firm Units.

(e) Payment for and Delivery of Option Securities. Payment for Option Securities shall be made on the Option Closing Date by wire transfer in Federal (same day) funds by deposit of the price for the Option Securities being purchased to the Company upon delivery to the Underwriters of certificates (in form and substance satisfactory to the Representative) representing the Option Securities (or through

2

the full fast transfer facilities of DTC) for the account of the Underwriters. The certificates representing the Option Securities to be delivered will be in such denominations and registered in such names as the Representative may request in writing at least two Business Days prior to the Closing Date or the Option Closing Date, as the case may be, and will be made available to the Representative for inspection and packaging at least one full Business Day prior to such Closing Date or Option Closing Date, as the case may be.

(f) Underwriters' Warrants. The Company hereby agrees to issue to the Underwriters (and/or their respective designees) on the Closing Date and each Option Closing Date, as the case may be, Warrants to purchase an aggregate of 6.5% of the shares of Common Stock issued at such closing (the "**Underwriters' Warrants**"). The Underwriters' Warrants shall be substantially in the form of Annex I hereto and shall be exercisable, in whole or in part, commencing 180 days after the Effective Date and expiring on the five-year anniversary of the Effective Date, at an initial exercise price of \$[·] per share, which is equal to one hundred and ten percent (110%) of the initial public offering price of the shares of Common Stock issued at such closing. The Underwriters' Warrants and the shares of Common Stock issuable upon exercise of the Underwriters' Warrants are hereinafter referred to collectively as the "**Underwriters' Securities**."

The Firm Units, the shares of Common Stock underlying the Firm Units, the Firm Warrants, the shares of Common Stock underlying the Firm Warrants, the Option Securities, the shares of Common Stock underlying the Option Warrants and the Underwriters' Securities are hereinafter referred to collectively as the "**Securities**."

2. Representations and Warranties of the Company. The Company represents, warrants and covenants to, and agrees with, each of the Underwriters that, as of the date hereof and as of the Closing Date and each Option Closing Date, if any:

(a) The Company has prepared and filed with the Securities and Exchange Commission (the "**Commission**") a registration statement on Form S-1 (Registration No. 333-202478), and amendments thereto, and related preliminary prospectuses, for the registration under the Securities Act of 1933, as amended (the "**Securities Act**"), of the Securities, which registration statement, as so amended (including post-effective amendments, if any) has been declared effective by the Commission and copies of which have heretofore been delivered to the Underwriters. The registration statement, as amended at the time it became effective, including the prospectus, financial statements, schedules, exhibits and other information (if any) deemed to be part of the registration statement at the time of effectiveness pursuant to Rule 430A under the Securities Act, is hereinafter referred to as the "**Registration Statement**." If the Company has filed or is required pursuant to the terms hereof to file a registration statement pursuant to Rule 462(b) under the Securities Act registering additional Securities (a "**Rule 462(b) Registration Statement**"), then, unless otherwise specified, any reference herein to the term "Registration Statement" shall be deemed to include such Rule 462(b) Registration Statement. Other than a Rule 462(b) Registration Statement, which, if filed, becomes effective upon filing, no other document with respect to the Registration Statement has heretofore been filed with the Commission. All of the Securities have been registered under the Securities Act pursuant to the Registration Statement or, if any Rule 462(b) Registration Statement is filed, will be duly registered under the Securities Act with the filing of such Rule 462(b) Registration Statement. The Company has responded to all requests of the Commission for additional or supplemental information. Based on communications from the Commission, no stop order suspending the effectiveness of either the Registration Statement or the Rule 462(b) Registration Statement, if any, has been issued and no proceeding for that purpose has been initiated or threatened by the Commission. The Company, if required by the Securities Act and the rules and regulations of the Commission (the "**Rules and Regulations**"), proposes to file the Prospectus with the Commission pursuant to Rule 424(b) under the Securities Act ("**Rule 424(b)**"). The prospectus, in the form in which it

3

is to be filed with the Commission pursuant to Rule 424(b), or, if the prospectus is not to be filed with the Commission pursuant to Rule 424(b), the prospectus in the form included as part of the Registration Statement at the time the Registration Statement became effective, is hereinafter referred to as the "**Prospectus**," except that if any revised prospectus or prospectus supplement shall be provided to the Underwriters by the Company for use in connection with the Offering which differs from the Prospectus (whether or not such revised prospectus or prospectus supplement is required to be filed by the Company pursuant to Rule 424(b)), the term "Prospectus" shall also refer to such revised prospectus or prospectus supplement, as the case may be, from and after the time it is first provided to the Underwriters for such use. Any preliminary prospectus or prospectus subject to completion included in the Registration Statement or filed with the Commission pursuant to Rule 424 under the Securities Act is hereafter called a "**Preliminary Prospectus**." Any reference herein to the Registration Statement, any Preliminary Prospectus or the Prospectus shall be deemed to refer to and include the exhibits incorporated by reference therein pursuant to the Rules and Regulations on or before the effective date of the Registration Statement, the date of such Preliminary Prospectus or the date of the Prospectus, as the case may be. Any reference herein to the terms "amend", "amendment" or "supplement" with respect to the Registration Statement, any Preliminary Prospectus or the Prospectus shall be deemed to refer to and include: (i) the filing of any document under the Securities Exchange Act of 1934, as amended, and together with the Rules and Regulations promulgated thereunder (the "**Exchange Act**") after the effective date of the Registration Statement, the date of such Preliminary Prospectus or the date of the Prospectus, as the case may be, which is incorporated therein by reference, and (ii) any such document so filed. All references in this Agreement to the Registration Statement, the Rule 462(b) Registration Statement, a Preliminary Prospectus and the Prospectus, and all amendments or supplements to any of the foregoing, shall be deemed to include any copy thereof filed with the Commission pursuant to its Electronic Data Gathering, Analysis and Retrieval System ("**EDGAR**"). The Prospectus delivered to the Underwriters for use in connection with the Offering was or will be identical to the electronically transmitted copies thereof filed with the Commission pursuant to EDGAR, except to the extent permitted by Regulation S-T promulgated by the Commission.

(b) At the time of the effectiveness of the Registration Statement or any Rule 462(b) Registration Statement or the effectiveness of any post-effective amendment to the Registration Statement, when the Prospectus is first filed with the Commission pursuant to Rule 424(b), when any supplement to or amendment of the Prospectus is filed with the Commission, when any document filed under the Exchange Act was or is filed, at all other subsequent times

until the completion of the public offer and sale of the Securities, at the Closing Date and at each Option Closing Date, if any, the Registration Statement and the Prospectus and any amendments thereof and supplements or exhibits thereto complied or will comply in all material respects with the applicable provisions of the Securities Act, the Exchange Act and the Rules and Regulations, and did not and will not contain an untrue statement of a material fact and did not and will not omit to state any material fact required to be stated therein or necessary in order to make the statements therein: (i) in the case of the Registration Statement, not misleading; and (ii) in the case of the Prospectus, in light of the circumstances under which they were made, not misleading. When any Preliminary Prospectus was first filed with the Commission (whether filed as part of the Registration Statement or any amendment thereto or pursuant to Rule 424(a) under the Securities Act) and when any amendment thereof or supplement thereto was first filed with the Commission, such Preliminary Prospectus and any amendments thereof and supplements thereto complied in all material respects with the applicable provisions of the Securities Act, the Exchange Act and the Rules and Regulations and did not contain an untrue statement of a material fact and did not omit to state any material fact required to be stated therein or necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading. No representation and warranty is made in this subsection (b), however, with respect to any information contained in or omitted from the Registration Statement or the Prospectus or any related Preliminary Prospectus or any amendment thereof or supplement thereto in reliance upon and in conformity with information furnished

4

in writing to the Company by or on behalf of any Underwriter through the Representative specifically for use therein. The parties acknowledge and agree that such information provided by or on behalf of any Underwriter consists solely of the “Price Stabilization, Short Positions and Penalty Bids” and “Electronic Distribution” subsections of the “Underwriting” section of the Prospectus, and the ultimate paragraph on the cover page of the Preliminary Prospectus (the “**Underwriters’ Information**”).

(c) Neither: (i) any Issuer-Represented General Free Writing Prospectus(es) (as defined below) issued at or prior to the Time of Sale (as defined below) and the Statutory Prospectus (as defined below), all considered together (collectively, the “**General Disclosure Package**”); nor (ii) any Issuer-Represented Limited-Use Free Writing Prospectus(es) (as defined below), when considered together with the General Disclosure Package, includes or included as of the Time of Sale any untrue statement of a material fact or omits or omitted as of the Time of Sale to state any material fact necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading. The preceding sentence does not apply to statements in or omissions from any Statutory Prospectus included in the Registration Statement, the General Disclosure Package or any Issuer-Represented Free Writing Prospectus (as defined below) based upon and in conformity with the Underwriters’ Information.

(d) Each Issuer-Represented Free Writing Prospectus, as of its issue date and at all subsequent times until the Closing Date and each Option Closing Date, if any, or until any earlier date that the Company notified or notifies the Representative as described in the next sentence, did not, does not and will not include any information that conflicted, conflicts or will conflict with the information contained in the then-current Registration Statement, Statutory Prospectus or Prospectus. If at any time following issuance of an Issuer-Represented Free Writing Prospectus there occurred or occurs an event or development as a result of which such Issuer-Represented Free Writing Prospectus conflicted or would conflict with the information contained in the then-current Registration Statement, Statutory Prospectus or Prospectus or included or would include an untrue statement of a material fact or omitted or would omit to state a material fact necessary in order to make the statements therein, in light of the circumstances prevailing at that subsequent time, not misleading, the Company has notified or will notify promptly the Representative so that any use of such Issuer-Represented Free Writing Prospectus may cease until it is promptly amended or supplemented by the Company, at its own expense, to eliminate or correct such conflict, untrue statement or omission. The foregoing two sentences do not apply to statements in or omissions from any Issuer-Represented Free Writing Prospectus based upon and in conformity with the Underwriters’ Information.

(e) The Company has not distributed and will not distribute any prospectus or other offering materials in connection with the offering and sale of the Securities other than the General Disclosure Package, any Issuer-Represented Free Writing Prospectus or the Prospectus or other materials permitted by the Securities Act to be distributed by the Company. Unless the Company obtains the prior consent of the Representative, the Company has not made and will not make any offer relating to the Securities that would constitute an “issuer free writing prospectus,” as defined in Rule 433 under the Securities Act, or that would otherwise constitute a “free writing prospectus,” as defined in Rule 405 under the Securities Act, required to be filed with the Commission; *provided* that the prior written consent of the Underwriters hereto shall be deemed to have been given in respect of any free writing prospectus referenced on Schedule C attached hereto. The Company has complied and will comply with the requirements of Rules 164 and 433 under the Securities Act applicable to any Issuer-Represented Free Writing Prospectus as of its issue date and at all subsequent times through the Closing Date, including timely filing with the Commission where required, legending and record keeping. To the extent an electronic road show is used, the Company has satisfied and will satisfy the conditions in Rule 433 under the Securities Act to avoid a requirement to file with the Commission any electronic road show.

5

(f) As used in this Agreement, the terms set forth below shall have the following meanings:

(i) “**Time of Sale**” means 4:30 p.m. (Eastern time) on the date of this Agreement.

(ii) “**Statutory Prospectus**” as of any time means the prospectus that is included in the Registration Statement immediately prior to that time. For purposes of this definition, information contained in a form of prospectus that is deemed retroactively to be a part of the Registration Statement pursuant to Rule 430A or 430B shall be considered to be included in the Statutory Prospectus as of the actual time that form of prospectus is filed with the Commission pursuant to Rule 424(b) under the Securities Act.

(iii) “**Issuer-Represented Free Writing Prospectus**” means any “issuer free writing prospectus,” as defined in Rule 433 under the Securities Act, relating to the Securities that (A) is required to be filed with the Commission by the Company, or (B) is exempt from filing pursuant to Rule 433(d)(5)(i) under the Securities Act because it contains a description of the Securities or of the Offering that does not reflect the final terms or pursuant to Rule 433(d)(8)(ii) because it is a “bona fide electronic road show,” as defined in Rule 433 under the Securities Act, in each case in the form filed or required to be filed with the Commission or, if not required to be filed, in the form retained in the Company’s records pursuant to Rule 433(g) under the Securities Act.

(iv) “**Issuer-Represented General Free Writing Prospectus**” means any Issuer-Represented Free Writing Prospectus that is intended for general distribution to prospective investors, as evidenced by its being specified in Schedule C to this Agreement.

(v) “**Issuer-Represented Limited-Use Free Writing Prospectus**” means any Issuer-Represented Free Writing Prospectus that is not an Issuer-Represented General Free Writing Prospectus. The term Issuer-Represented Limited-Use Free Writing Prospectus also includes any “bona fide electronic road show,” as defined in Rule 433 under the Securities Act, that is made available without restriction pursuant to Rule 433(d)(8)(ii), even though not required to be filed with the Commission.

(g) CohnReznick LLP (“**CohnReznick**”), whose reports relating to the Company are included in the Registration Statement, is an independent registered public accounting firm as required by the Securities Act, the Exchange Act and the Rules and Regulations and, to the Company’s knowledge, such accountants are not in violation of the auditor independence requirements of the Sarbanes-Oxley Act of 2002 (“**Sarbanes-Oxley**”).

(h) Subsequent to the respective dates as of which information is presented in the Registration Statement, the General Disclosure Package and the Prospectus, and except as disclosed in the Registration Statement, the General Disclosure Package and the Prospectus: (i) the Company has not declared, paid or made any dividends or other distributions of any kind on or in respect of its capital stock, and (ii) there has been no material adverse change (or, to the knowledge of the Company, any development which has a probability of involving a material adverse change in the future), whether or not arising from transactions in the ordinary course of business, in or affecting: (A) the business, condition (financial or otherwise), results of operations, shareholders’ equity, properties or prospects of the Company; (B) the long-term debt or capital stock of the Company; or (C) the Offering or consummation of any of the other transactions contemplated by this Agreement, the Registration Statement, the General Disclosure Package or the Prospectus (a “**Material Adverse Change**”). Since the date of the latest balance sheet presented in the Registration Statement, the General Disclosure Package and the Prospectus, the Company has not incurred or undertaken any liabilities or obligations, whether direct or indirect, liquidated or contingent, matured or unmatured, or entered into any transactions, including any acquisition or disposition of any business or asset, which are material to the Company, except for

6

liabilities, obligations and transactions which are disclosed in the Registration Statement, the General Disclosure Package and the Prospectus.

(i) As of the dates indicated in the Registration Statement, the General Disclosure Package and the Prospectus, the authorized, issued and outstanding shares of capital stock of the Company were as set forth in the Registration Statement, the General Disclosure Package and the Prospectus in the column headed “Actual” under the section thereof captioned “Capitalization” and, after giving effect to the Offering and the other transactions (excluding the sale of the Option Securities, if any) contemplated by this Agreement, the Registration Statement, the General Disclosure Package and the Prospectus, will be as set forth in the column headed “Pro Forma as Adjusted” in such section. All of the issued and outstanding shares of capital stock of the Company, including the outstanding shares of Common Stock of the Company, are fully paid and non-assessable and have been duly and validly authorized and issued, in compliance with all applicable state, federal and foreign securities laws and not in violation of or subject to any preemptive or similar right that entitles or will entitle any Person (as defined below), upon the issuance or sale of any security, to acquire from the Company any Relevant Security. As used herein, the term “**Relevant Security**” means any shares of Common Stock or other security of the Company that is convertible into, or exercisable or exchangeable for, shares of Common Stock or equity securities of the Company, or that holds the right to acquire any shares of Common Stock or equity securities of the Company or any other such Relevant Security, except for such rights as may have been fully satisfied or waived prior to the effectiveness of the Registration Statement. As used herein, the term “**Person**” means any foreign or domestic individual, corporation, trust, partnership, joint venture, limited liability company or other entity. Except as set forth in, or contemplated by, the Registration Statement, the General Disclosure Package and the Prospectus, on the Effective Date, on the Closing Date and on each Option Closing Date, if any, there will be no options, warrants, or other rights to purchase or otherwise acquire any authorized but unissued shares of Common Stock or any security convertible into shares of Common Stock, or any contracts or commitments to issue or sell shares of Common Stock or any such options, warrants, rights or convertible securities.

(j) The Securities have been duly authorized and reserved for issuance and, when issued and paid for in accordance with this Agreement upon the Closing Date or Option Closing Date, as applicable, will be duly and validly issued, fully paid and non-assessable, will have been issued in compliance with all applicable state, federal and foreign securities laws and will not have been issued in violation of or subject to any preemptive or similar right that does or will entitle any Person to acquire any Relevant Security from the Company upon issuance or sale of the Securities in the Offering. The Securities conform to the descriptions thereof contained in the Registration Statement, the General Disclosure Package and the Prospectus. Except as disclosed in the Registration Statement, the General Disclosure Package and the Prospectus, the Company has no outstanding warrants, options to purchase, or any preemptive rights or other rights to subscribe for or to purchase, or any contracts or commitments to issue or sell, any Relevant Security.

(k) The shares of Common Stock underlying the Firm Warrants, the Option Warrants and the Underwriters’ Warrants have been duly authorized, will conform to the description thereof in the Registration Statement and in the Prospectus and have been validly reserved for future issuance and will, upon exercise thereof and payment of the exercise price thereof, be duly and validly issued, fully paid and non-assessable and will not have been issued in violation of or subject to preemptive or similar rights to subscribe for or purchase securities of the Company. The issuance of such securities is not subject to any statutory preemptive rights under the laws of the State of Delaware and is not and will not be subject to any preemptive rights under the Company’s certificate of incorporation or bylaws, any rights of first refusal or any other similar rights of any security holder of the Company.

7

(l) The Company has no (and since the inception of the Company, other than OpGen B.V., the Company has not had any) “subsidiaries” within the meaning of Rule 405 under the Securities Act and holds no (and since the inception of the Company has never held any) ownership or other interest, nominal or beneficial, direct or indirect, in any corporation, partnership, joint venture or other business entity.

(m) The Company has been duly incorporated, formed or organized, and validly exists as a corporation, partnership or limited liability company in good standing under the laws of its jurisdiction of incorporation, formation or organization. The Company has all requisite power and authority to carry on its business as it is currently being conducted and as described in the Registration Statement, the General Disclosure Package and the Prospectus, and to own, lease and operate its properties. The Company is duly qualified to do business and is in good standing as a foreign corporation, partnership or limited liability company in each jurisdiction in which the character or location of its properties (owned, leased or licensed) or the nature or conduct of its business makes such qualification necessary, except, in each case, for those failures to be so qualified or in good standing which (individually and in the aggregate) would not reasonably be expected to have a material adverse effect on: (i) the business, condition (financial or otherwise), results of operations, shareholders’ equity, properties or prospects of the Company; (ii) the long-term debt or capital stock of the Company; or (iii) the Offering or consummation of any of the other

transactions contemplated by this Agreement, the Registration Statement, the General Disclosure Package or the Prospectus (any such effect being a “Material Adverse Effect”).

(n) The Company is not: (i) in violation of its certificate or articles of incorporation, memorandum and articles of association, bylaws, certificate of formation, limited liability company agreement, joint venture agreement, partnership agreement or other organizational documents; (ii) in default under, and no event has occurred which, with notice or lapse of time or both, would constitute a default under or result in the creation or imposition of any lien, charge, mortgage, pledge, security interest, claim, equity, trust or other encumbrance, preferential arrangement, defect or restriction of any kind whatsoever (any “Lien”) upon any of its property or assets pursuant to, any indenture, mortgage, deed of trust, loan agreement or other agreement, instrument, franchise, license or permit to which it is a party or by which it is bound or to which any of its property or assets is subject; or (iii) in violation in any respect of any law (including without limitation the Clinical Laboratories Improvement Act of 1967, as amended (the “CLIA”), rule, regulation, ordinance, directive, judgment, decree or order of any judicial, regulatory or other legal or governmental agency or body, foreign or domestic (including without limitation the United States Food and Drug Administration (the “FDA”)), except (solely with regard to (ii) and (iii) above) for such violations or defaults which (individually or in the aggregate) would not have or reasonably be expected to have a Material Adverse Effect.

(o) The Company has full right, power and authority to execute and deliver this Agreement, the Warrant Agreement (as hereinafter defined), the Firm Warrants, the Option Warrants, the Underwriters’ Warrants and all other agreements, documents, certificates and instruments required to be delivered pursuant to this Agreement. The Company has duly and validly authorized this Agreement, the Warrant Agreement, the Firm Warrants, the Option Warrants, the Underwriters’ Warrants and each of the transactions contemplated thereby. This Agreement, the Warrant Agreement, the Firm Warrants, the Option Warrants, and the Underwriters’ Warrants have been duly and validly executed and delivered by the Company. Each of this Agreement and the Warrant Agreement constitutes the legal, valid and binding obligation of the Company and is enforceable against the Company in accordance with its terms, except as enforceability may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors’ rights generally or subject to general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law), and except as enforceability of any indemnification or contribution provision may be limited under foreign, federal or state securities laws.

8

(p) When issued, the Firm Warrants, the Option Warrants and the Underwriters’ Warrants will constitute the legal, valid and binding obligations of the Company, including to issue and sell, upon exercise thereof and payment of the respective exercise prices therefor, the number and type of securities of the Company called for thereby in accordance with the terms thereof, and all such warrants are enforceable against the Company in accordance with their terms, except as enforceability may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors’ rights generally or subject to general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law), and except as enforceability of any indemnification or contribution provision may be limited under foreign, federal or state securities laws.

(q) The execution, delivery, and performance of this Agreement, the Warrant Agreement, the Firm Warrants, the Option Warrants, the Underwriters’ Warrants and all other agreements, documents, certificates and instruments required to be delivered pursuant to this Agreement and the Warrant Agreement, and consummation of the transactions contemplated by this Agreement, the Warrant Agreement, the Firm Warrants, the Option Warrants and the Underwriters’ Warrants do not and will not: (i) conflict with, require consent under or result in a breach of any of the terms and provisions of, or constitute a default (or an event which, with notice or lapse of time or both, would constitute a default) under, or result in the creation or imposition of any Lien upon any property or assets of the Company pursuant to, any indenture, mortgage, deed of trust, loan agreement or other agreement, instrument, franchise, license or permit to which the Company is a party or by which it is bound or to which any of its property or assets is subject; or (ii) violate or conflict with any provision of the Company’s certificate or articles of incorporation, memorandum and articles of association, bylaws, certificate of formation, limited liability company agreement, joint venture agreement, partnership agreement or other organizational documents; or (iii) violate or conflict with any law (including without limitation the CLIA), rule, regulation, ordinance, directive, judgment, decree or order of any judicial, regulatory or other legal or governmental agency or body, foreign or domestic (including without limitation the FDA); or (iv) trigger a reset or repricing of any outstanding securities of the Company, except (solely with regard to (i) and (iii) above) for any default, conflict or violation which (individually or in the aggregate) would not have or reasonably be expected to have a Material Adverse Effect.

(r) The Company has all consents, approvals, authorizations, orders, registrations, qualifications, licenses, filings and permits required under the CLIA and each other appropriate law, rule, regulation, ordinance, directive, judgment, decree or order, and as issued by the FDA and each other appropriate foreign, federal, state, or local judicial, regulatory or other legal or governmental agency or body, and all third parties, foreign and domestic, if any (collectively, the “Consents”), to own, lease and operate its properties and conduct its business as it is now being conducted and as disclosed in the Registration Statement, the General Disclosure Package and the Prospectus, and each such Consent is valid and in full force and effect. Neither the Company nor any of its affiliates within the meaning of Rule 144 under the Securities Act (“Affiliates”) has received any notice of any investigation or proceedings which, if decided adversely to the Company, could reasonably be expected to result in the revocation of, or the imposition of a materially burdensome restriction on, any Consent. No Consent contains a materially burdensome restriction not disclosed in the Registration Statement, the General Disclosure Package and the Prospectus.

(s) No Consent of, with or from any judicial, regulatory or other legal or governmental agency or body, or any third party, foreign or domestic is required for the execution, delivery and performance of this Agreement, the Warrant Agreement, the Firm Warrants, the Option Warrants, the Underwriters’ Warrants and all other agreements, documents, certificates and instruments required to be delivered pursuant to this Agreement and the Warrant Agreement, and consummation of the transactions contemplated by this Agreement, the Warrant Agreement, the Firm Warrants, the Option Warrants and

9

the Underwriters’ Warrants, including the issuance, sale and delivery of the Securities to be issued, sold and delivered hereunder, except the registration under the Securities Act of the Securities, which has become effective, and such Consents as may be required under state securities or blue sky laws or the bylaws and rules of the NASDAQ Stock Market, where the Common Stock and the Warrants have been approved for listing, or the Financial Industry Regulatory Authority, Inc. (“FINRA”) in connection with the purchase and distribution of the Securities by the Underwriters, each of which has been obtained and is in full force and effect.

(t) Except as disclosed in the Registration Statement, the General Disclosure Package and the Prospectus, there is no judicial, regulatory, arbitral or other legal or governmental proceeding or other litigation or arbitration, domestic or foreign, pending to which the Company is a party or of which

any property, operations or assets of the Company is a subject which, individually or in the aggregate, if determined adversely to the Company, would reasonably be expected to have a Material Adverse Effect, and to the Company's knowledge, no such proceeding, litigation or arbitration is threatened or contemplated.

(u) The financial statements, including the notes thereto and the supporting schedules, included in the Registration Statement, the General Disclosure Package and the Prospectus comply in all material respects with the requirements of the Securities Act and the Exchange Act, and present fairly the financial position as of the dates indicated and the cash flows and results of operations for the periods specified of the Company. Except as otherwise stated in the Registration Statement, the General Disclosure Package and the Prospectus, such financial statements have been prepared in conformity with United States generally accepted accounting principles ("GAAP") applied on a consistent basis throughout the periods involved. The supporting schedules included in the Registration Statement, the General Disclosure Package and the Prospectus present fairly as of the dates indicated and for the periods specified the information required to be stated therein. No other financial statements, notes thereto or supporting schedules are required to be included or incorporated by reference in the Registration Statement, the General Disclosure Package or the Prospectus. The other financial tables and data included in the Registration Statement, the General Disclosure Package and the Prospectus present fairly as of the dates indicated and for the periods specified the information included therein and have been prepared on a basis consistent with that of the financial statements included in the Registration Statement, the General Disclosure Package and the Prospectus and the books and records of the entities whose information is presented therein.

(v) There are no pro forma or as adjusted financial statements required to be included in the Registration Statement, the General Disclosure Package and the Prospectus in accordance with Regulation S-X that have not been included as so required. The pro forma and pro forma as adjusted financial information included in the Registration Statement, the General Disclosure Package and the Prospectus has been properly compiled and prepared in accordance with the applicable requirements of the Securities Act and the Rules and Regulations and include all adjustments necessary to present fairly in accordance with GAAP the pro forma and as adjusted financial position of the entities whose information is presented therein at the dates indicated and their cash flows and results of operations for the periods specified. The assumptions used in preparing the pro forma and pro forma as adjusted financial information included in the Registration Statement, the General Disclosure Package and the Prospectus provide a reasonable basis for presenting the significant effects directly attributable to the transactions or events described therein. The pro forma and pro forma as adjusted adjustments give appropriate effect to those assumptions and the pro forma and pro forma as adjusted financial information reflects the proper application of those adjustments to the corresponding historical financial amounts.

(w) The statistical, industry-related and market-related data included in the Registration Statement, the General Disclosure Package and the Prospectus are based on or derived from sources

10

which the Company reasonably and in good faith believes are reliable and accurate, and such data agree with the sources from which they are derived, and the Company has obtained the written consent to the use of such data from such sources, to the extent required.

(x) The Company has established and maintains disclosure controls and procedures (as defined in Rules 13a-14 and 15d-14 under the Exchange Act) and such controls and procedures are effective in ensuring that material information relating to the Company is made known to the principal executive officer and the principal financial officer. The Company has used such controls and procedures in preparing and evaluating the disclosures in the Registration Statement, the General Disclosure Package and the Prospectus.

(y) The Company maintains a system of internal accounting controls designed to provide reasonable assurances that (A) transactions are executed in accordance with management's general or specific authorizations; (B) transactions are recorded as necessary to permit the preparation of financial statements in conformity with GAAP and to maintain accountability for assets; (C) access to assets is permitted only in accordance with management's general or specific authorizations; and (D) the recorded accountability for assets is compared with existing assets at reasonable intervals and appropriate action is taken with respect to any differences. Since the date of the Company's most recent audited balance sheet included in the Registration Statement, the General Disclosure Package and the Prospectus, there has been no change in the Company's internal control over financial reporting that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

(z) The Company's board of directors has validly appointed an audit committee whose composition satisfies the requirements of the rules and regulations of the NASDAQ Stock Market and the board of directors and/or audit committee has adopted a charter that satisfies the requirements of the rules and regulations of the NASDAQ Stock Market. Neither the board of directors of the Company nor the audit committee has been informed, nor is any director or executive officer of the Company aware, of: (i) any significant deficiencies or material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the Company's ability to record, process, summarize and report financial information; or (ii) any fraud, whether or not material, that involves management or other employees who have a significant role in the Company's internal control over financial reporting.

(aa) Neither the Company nor any of its Affiliates has taken, directly or indirectly, any action which constitutes or is designed to cause or result in, or which could reasonably be expected to constitute, cause or result in, the stabilization or manipulation of the price of any security to facilitate the sale or resale of any Securities.

(bb) Neither the Company nor any of its Affiliates has, prior to the date hereof, directly or indirectly, made any offer or sale of any securities which are required to be "integrated" pursuant to the Securities Act or the Rules and Regulations with the offer and sale of the Securities pursuant to the Registration Statement. Except as disclosed in the Registration Statement, the General Disclosure Package and the Prospectus, neither the Company nor any of its Affiliates has sold or issued any Relevant Security during the six-month period preceding the date of the Prospectus, including but not limited to any sales pursuant to Rule 144A, Regulation D or Regulation S under the Securities Act, other than shares of Common Stock issued pursuant to employee benefit plans, qualified stock option plans or employee compensation plans or pursuant to outstanding options, rights or warrants as described in the Registration Statement, the General Disclosure Package and the Prospectus.

(cc) All information contained in the questionnaires completed by each of the Company's officers and directors and to the knowledge of the Company each of the Company's 5%-or-more holders

11

prior to the Offering and provided to the Representative, as well as all information contained in the biographies of such officers and directors in the Registration Statement, is true and correct in all material respects and the Company has not become aware of any information which would cause the information disclosed in such questionnaires or biographies to become inaccurate or misleading.

(dd) No director or officer of the Company is subject to any non-competition agreement or non-solicitation agreement with any employer or prior employer that could materially affect such person's ability to act in such person's respective capacity on behalf of the Company.

(ee) Except as disclosed in the Registration Statement, the General Disclosure Package and the Prospectus, no holder of any securities of the Company or any Relevant Security has any rights to require the Company to register any such securities under the Securities Act as part or on account of, or otherwise in connection with, the offer and sale of the Securities contemplated hereby, and any such rights so disclosed have either been fully complied with by the Company or effectively waived by the holders thereof, and any such waivers remain in full force and effect.

(ff) The conditions for use of Form S-1 to register the Offering under the Securities Act, as set forth in the General Instructions to such Form, have been satisfied.

(gg) The Company is not and, at all times up to and including consummation of the transactions contemplated by this Agreement, and after giving effect to the application of the net proceeds of the Offering, will not be, subject to registration as an "investment company" under the Investment Company Act of 1940, as amended.

(hh) No relationship, direct or indirect, exists between or among any of the Company and its Affiliates, on the one hand, and any director, officer, shareholder, customer or supplier of the Company or any Affiliate of the Company, on the other hand, that is required by the Securities Act, the Exchange Act or the Rules and Regulations to be described in the Registration Statement, the General Disclosure Package or the Prospectus which is not so described as required. There are no outstanding loans, advances (except normal advances for business expenses in the ordinary course of business) or guarantees of indebtedness extended by the Company to or for the benefit of any of the officers or directors of the Company or any of their respective family members, except as described in the Registration Statement, the General Disclosure Package and the Prospectus. The Company has not, in violation of Sarbanes-Oxley, directly or indirectly, extended or maintained credit, arranged for the extension of credit or renewed an extension of credit in the form of a personal loan to or for any director or executive officer of the Company.

(ii) The Common Stock and the Warrants have been duly authorized for listing on the NASDAQ Capital Market, subject to official notice of issuance. A registration statement in respect of the Common Stock and the Warrants has been filed on Form 8-A pursuant to Section 12(b) of the Exchange Act, which registration statement complies in all material respects with the Exchange Act. The Company is in material compliance with the provisions of the rules and regulations promulgated by the NASDAQ Stock Market (to the extent applicable to the Company as of the date hereof, the Closing Date and each Option Closing Date, if any, as applicable; and subject to all exemptions and exceptions from the requirements thereof as are set forth therein, to the extent applicable to the Company), except for such violations which, singly or in the aggregate, would not have a Material Adverse Effect. Without limiting the generality of the foregoing and subject to the qualifications above: (i) all members of the Company's board of directors who are required to be "independent" (as that term is defined under applicable laws, rules and regulations), including, without limitation, all members of the audit committee of the Company's board of directors, meet the qualifications of independence as set forth under such laws, rules and regulations and (ii) the audit committee of the Company's board of directors has at least one member

who is an "audit committee financial expert" (as that term is defined under such laws, rules and regulations).

(jj) The Company owns or leases all such properties as are necessary to the conduct of its business as currently operated and as proposed to be operated as described in the Registration Statement, the General Disclosure Package and the Prospectus. The Company has good and marketable title in fee simple to all real property and good and marketable title to all personal property owned by it, in each case free and clear of all Liens except such as are described in the Registration Statement, the General Disclosure Package and the Prospectus or such as do not (individually or in the aggregate) materially affect the business or prospects of the Company. Any real property or buildings held under lease or sublease by the Company are held by them under valid, subsisting and enforceable leases or subleases, as applicable, with such exceptions as are not material to, and do not interfere with, the use made and proposed to be made of such property and buildings by the Company. The Company has not received any notice of any claim adverse to its ownership of any real or personal property or of any claim against its continued possession of any real property, whether owned or held under lease or sublease.

(kk) The Company (i) owns or possesses adequate right to use all patents, patent applications, trademarks, service marks, trade names, trademark registrations, service mark registrations, copyrights, licenses, formulae, customer lists, know-how and other intellectual property (including trade secrets and other unpatented and/or unpatentable proprietary or confidential information, systems or procedures, "**Intellectual Property**") necessary for the conduct of its business as currently operated and as proposed to be operated as described in the Registration Statement, the General Disclosure and the Prospectus, and (ii) has no knowledge that such conduct of its business conflicts, will conflict or may reasonably be expected to conflict with, and it has not received any notice of any claim of conflict with, any such rights of others. Except as set forth in the Registration Statement, the General Disclosure Package and the Prospectus, the Company has not granted or assigned to any other Person any right to sell the current products and services of the Company or those products and services described in the Registration Statement, the General Disclosure Package or the Prospectus. To the Company's knowledge, there is no infringement by third parties of any of its Intellectual Property, there is no pending or threatened action, suit, proceeding or claim by others challenging the Company's rights in or to any of its Intellectual Property and the Company is unaware of any facts that would form a reasonable basis for any such claim. The Company has not received any claim for royalties or other compensation from individuals, including employees or former employees of the Company who have made or are alleged to have made inventive contributions to the Company's technology or products, that are pending or unsettled, and except as set forth in the Registration Statement, the General Disclosure and the Prospectus, the Company has no obligation to pay royalties or other compensation to any such individuals.

(ll) The agreements, instruments and other documents described in the Registration Statement, the General Disclosure Package and the Prospectus conform to the descriptions thereof contained therein, and there are no agreements, instruments or other documents required by the applicable provisions of the Securities Act or the Rules and Regulations to be described in the Registration Statement, the General Disclosure Package or the Prospectus or to be filed with the Commission as exhibits to the Registration Statement that have not been so described or filed. Each such agreement or instrument to which the Company is a party or by which its property or business is or may be bound or affected has been duly and validly executed by the Company, is in full force and effect in all material respects and is enforceable against the Company and, to the Company's knowledge, the other parties thereto, in accordance with its terms, except as enforceability may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors'

rights generally or subject to general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law), and except as enforceability of any indemnification or contribution provision may be limited under foreign, federal or state securities laws. None of such agreements and instruments has been

assigned by the Company, to the Company's knowledge, no party is in breach or default thereunder and, to the Company's knowledge, no event has occurred that, with the lapse of time or the giving of notice or both would constitute a breach or default by any party thereunder. To the Company's knowledge, the performance by the parties of the material provisions of such agreements and instruments will not result in a violation of any law, rule, regulation, ordinance, directive, judgment, decree or order of any judicial, regulatory or other legal or governmental agency or body, foreign or domestic, except for such violations or defaults which (individually or in the aggregate) would not have or reasonably be expected to have a Material Adverse Effect.

(mm) No securities of the Company have been sold by the Company or by or on behalf of, or for the benefit of, any person or persons controlling, controlled by, or under common control with the Company since the date of the Company's formation, except as disclosed in the Registration Statement, the General Disclosure Package and the Prospectus.

(nn) The disclosures in the Registration Statement, the General Disclosure Package and the Prospectus concerning the effects of foreign, federal, state and local regulation of the Company's business are correct in all material respects and do not omit to state a material fact necessary to make the statements therein, in light of the circumstances in which they were made, not misleading.

(oo) The Company has accurately prepared and timely filed all federal, state, local, foreign and other tax returns required to be filed by it and has paid or made provision for the payment of all taxes, assessments or similar charges, including without limitation all sales and use taxes and all taxes which the Company is obligated to withhold from amounts owing to employees, creditors and third parties, with respect to the periods covered by such tax returns (whether or not such amounts are shown as due on any tax return). No deficiency assessment with respect to a proposed adjustment of the Company's federal, state, local or foreign taxes is pending or, to the Company's knowledge, threatened. The accruals and reserves on the books and records of the Company in respect of tax liabilities for any taxable period not finally determined are adequate to meet any assessments and related liabilities for any such period and, since the date of the Company's most recent audited financial statements, the Company has not incurred any liability for taxes other than in the ordinary course of its business. There is no tax lien, whether imposed by any federal, state, local, foreign or other taxing authority, outstanding against the assets, properties or business of the Company.

(pp) No labor disturbances or disputes by or with the employees of the Company that, individually or in the aggregate, would reasonably be expected to have a Material Adverse Effect, currently exist or, to the Company's knowledge, are threatened.

(qq) Except as disclosed in the Registration Statement, the General Disclosure Package and the Prospectus, the Company has at all times operated its business in material compliance with all Environmental Laws, and no material expenditures are or will be required in order to comply therewith. The Company has not received any notice or communication that relates to or alleges any actual or potential violation or failure to comply with any Environmental Laws that could reasonably be expected to result in a Material Adverse Effect. As used herein, the term "**Environmental Laws**" means all applicable laws and regulations, including any licensing, permit or reporting requirements, and any action by any federal, state, local or foreign government entity pertaining to the protection of the environment, protection of public health, protection of worker health and safety or the handling of hazardous materials, including without limitation the Clean Air Act, the Comprehensive Environmental Response, Compensation and Liability Act, the Federal Water Pollution Control Act, the Hazardous Materials Transportation Act, the Resource Conservation and Recovery Act and the Toxic Substances Control Act.

(rr) Except as set forth in the Registration Statement, the General Disclosure Package and the Prospectus, the Company is not a party to or subject to any employment contract or arrangement providing any director with annual compensation, or the opportunity to earn annual compensation (whether through fixed salary, bonus, commission, options or otherwise), of more than \$120,000.

(ss) Except as set forth in the Registration Statement, the General Disclosure Package and the Prospectus, the Company is not a party to an "employee benefit plan," as defined in Section 3(3) of the Employee Retirement Income Security Act of 1974, as amended ("**ERISA**"), which: (i) is subject to any provision of ERISA and (ii) is or was at any time maintained, administered or contributed to by the Company or any of its ERISA Affiliates (as defined hereafter). These plans are referred to collectively herein as the "**Employee Plans**." An "**ERISA Affiliate**" of any person or entity means any other person or entity which, together with that person or entity, could be treated as a single employer under Section 414(b), (c), (m) or (o) of the Internal Revenue Code of 1986, as amended (the "**Code**"). Each Employee Plan has been maintained in material compliance with its terms and the requirements of applicable law. No Employee Plan is subject to Title IV of ERISA.

(tt) The Registration Statement, the General Disclosure Package and the Prospectus identify each employment, severance or other similar agreement, arrangement or policy and each material plan or arrangement providing for insurance coverage (including any self-insured arrangements), workers' compensation, disability benefits, severance benefits, supplemental unemployment benefits, vacation benefits or retirement benefits, or deferred compensation, profit-sharing, bonuses, stock options, stock appreciation rights or other forms of incentive compensation, or post-retirement insurance, compensation or benefits, which: (i) is not an Employee Plan; (ii) is entered into, maintained or contributed to, as the case may be, by the Company or any of its ERISA Affiliates; and (iii) covers any officer or director or former officer or director of the Company or any of its ERISA Affiliates. These agreements, arrangements, policies or plans are referred to collectively as "**Benefit Arrangements**." Each Benefit Arrangement has been maintained in material compliance with its terms and with the requirements of applicable law.

(uu) Except as disclosed in the Registration Statement, the General Disclosure Package and the Prospectus, there is no liability in respect of post-retirement health and medical benefits for retired employees of the Company or any of its ERISA Affiliates, other than medical benefits required to be continued under applicable law.

(vv) No "prohibited transaction" (as defined in either Section 406 of ERISA or Section 4975 of the Code) has occurred with respect to any Employee Plan; and each Employee Plan that is intended to be qualified under Section 401(a) of the Code is so qualified, and nothing has occurred, whether by action or by failure to act, which could cause the loss of such qualification.

(ww) None of the execution of this Agreement, the Warrant Agreement, the Firm Warrants, the Option Warrants, the Underwriters' Warrants and all other agreements, documents, certificates and instruments required to be delivered pursuant to this Agreement and the Warrant Agreement, and consummation of the transactions contemplated by this Agreement, the Warrant Agreement, the Firm Warrants, the Option Warrants and the Underwriters' Warrants, will constitute a triggering event under any Employee Plan or any other employment contract, whether or not legally enforceable, which (either alone or upon the occurrence of any additional or subsequent event) will or may result in any payment (of severance or otherwise), acceleration, increase in vesting or increase in benefits to any current or former participant, employee or director of the Company other than events that, either individually or taken as a whole, are not material to the financial condition or business of the Company.

15

(xx) Neither the Company nor, to the Company's knowledge, any of its employees or agents has at any time during the last five (5) years (i) made any unlawful contribution to any candidate for domestic or foreign office or failed to disclose fully any such contribution in violation of law, or (ii) made any payment to any federal, state or other governmental officer or official, or other Person charged with public or quasi-public duties, in the United States or otherwise, other than payments that are not prohibited by applicable law.

(yy) The Company has not offered, or sought to cause the Underwriters to offer, Securities to any Person or entity with the intention of unlawfully influencing (i) a customer or supplier of the Company to alter the customer's or supplier's level or type of business with the Company, (ii) a journalist or publication to write or publish favorable information about the Company or its products or services or (iii) a regulatory official or authority to alter the regulation of the Company or its business, products or services.

(zz) The operations of the Company are and have been conducted at all times in compliance with applicable financial record keeping and reporting requirements and money laundering statutes of the United States and, to the Company's knowledge, all other jurisdictions to which the Company is subject, including under: (i) the Bank Secrecy Act; (ii) the Uniting and Strengthening of America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001; (iii) the Foreign Corrupt Practices Act of 1977; (iv) the Currency and Foreign Transactions Reporting Act; (v) ERISA; (vi) the Money Laundering Control Act; (vii) the rules and regulations promulgated under any such law or any successor law, or any judgment, decree or order of any applicable administrative or judicial body relating to such law; and (viii) any corresponding law, rule, regulation, ordinance, judgment, decree or order of any state or territory of the United States or applicable foreign jurisdiction or any administrative or judicial body thereof (collectively, the "**Money Laundering Laws**"); and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company with respect to the Money Laundering Laws is pending or, to the best knowledge of the Company, threatened.

(aaa) None of the Company or, to the knowledge of the Company, any director, officer, agent, employee or Affiliate of the Company is currently subject to any sanctions administered by the Office of Foreign Assets Control of the U.S. Treasury Department ("**OFAC**"); and the Company will not directly or indirectly use the proceeds of the Offering, or lend, contribute or otherwise make available such proceeds to any joint venture partner or other person or entity, for the purpose of financing the activities of any person currently subject to any sanctions administered by OFAC.

(bbb) Except as described in the Registration Statement, the General Disclosure Statement and the Prospectus, there are no claims, arrangements, agreements or understandings of Company or any officer, director or stockholder of the Company relating to the payment of a broker's, finder's, consulting or origination fee or other similar payment in connection with the transactions contemplated by this Agreement or that otherwise may affect any Underwriter's compensation in respect of the Offering as determined by FINRA. Except as described in the Registration Statement, the General Disclosure Statement and the Prospectus, the Company has not made any direct or indirect payments (in cash, securities or otherwise) to (i) any person, as a finder's fee, consulting fee or otherwise, in consideration of such person raising capital for the Company or introducing to the Company persons who raised or provided capital to the Company; (ii) to any FINRA member; or (iii) to any person or entity that has any direct or indirect affiliation or association with any FINRA member, within the 180 days prior to the Effective Date, other than the prior payment of \$30,000 to the Underwriters as provided hereunder in connection with the Offering. None of the net proceeds of the Offering will be paid by the Company to any participating FINRA member or any affiliate thereof, except as specifically authorized herein. No officer, director or beneficial owner of the Company's securities (whether debt or equity, registered or

16

unregistered, regardless of the time acquired or the source from which derived) (any such individual or entity, for purposes of this section, a "**Company Affiliate**") has any direct or indirect affiliation or association with any FINRA member (as determined in accordance with the rules and regulations of FINRA); no Company Affiliate is an owner of stock or other securities of any member of FINRA (other than securities purchased on the open market); no Company Affiliate has made a subordinated loan to any member of FINRA; and no proceeds from the sale of the Securities (excluding underwriting compensation as disclosed in the Registration Statement, the General Disclosure Statement and the Prospectus) will be paid to any FINRA member, or any persons associated with or affiliated with any FINRA member. Except as disclosed in the Registration Statement, the General Disclosure Statement and the Prospectus, the Company has not issued any warrants or other securities or granted any options, directly or indirectly, to anyone who is a potential underwriter in the Offering or a related person (as defined by FINRA rules) of such an underwriter within the 180-day period prior to the initial filing date of the Registration Statement; no person to whom securities of the Company have been privately issued within the 180-day period prior to the initial filing date of the Registration Statement has any relationship or affiliation or association with any member of FINRA; and no FINRA member participating in the Offering has a conflict of interest with the Company. For this purpose, a "conflict of interest" exists when a member of FINRA or any of its associated persons, parent or affiliates in the aggregate beneficially own 10% or more of the Company's outstanding subordinated debt or common equity, or 10% or more of the Company's preferred equity. "FINRA member participating in the Offering" includes any associated person of a FINRA member that is participating in the Offering, any member of such associated person's immediate family and any affiliate of a FINRA member that is participating in the Offering.

(ccc) Any certificate signed by or on behalf of the Company and delivered to the Underwriters or to Ellenoff Grossman & Schole LLP ("**Underwriters' Counsel**") shall be deemed to be a representation and warranty of the Company, as if set forth herein, to each Underwriter listed on Schedule A hereto as to the matters covered thereby.

3. Offering. Upon authorization of the release of the Securities by the Representative, the Underwriters propose to offer the Securities for sale to the public upon the terms and conditions set forth in the Prospectus.

4. Covenants of the Company. The Company acknowledges, covenants and agrees with the Underwriters that:

(a) The Registration Statement and any amendments thereto have been declared effective, and if Rule 430A is used or the filing of the Prospectus is otherwise required under Rule 424(b), the Company will file the Prospectus (properly completed if Rule 430A has been used) pursuant to Rule 424(b) within the prescribed time period and will provide evidence satisfactory to the Representative of such timely filing.

(b) During the period beginning on the date hereof and ending on the later of the Closing Date or such date as, in the reasonable opinion of Underwriters' Counsel, the Prospectus is no longer required by law to be delivered (or in lieu thereof the notice referred to in Rule 173(a) under the Securities Act is no longer required to be provided) in connection with sales by an underwriter or dealer (the "**Prospectus Delivery Period**"), prior to amending or supplementing the Registration Statement, the General Disclosure Package or the Prospectus, the Company shall furnish to the Representative and Underwriters' Counsel for review a copy of each such proposed amendment or supplement, and the Company shall not file any such proposed amendment or supplement to which the Representative reasonably objects within 36 hours of delivery thereof to Underwriters' Counsel.

17

(c) After the date of this Agreement, the Company shall promptly advise the Representative in writing of: (i) the receipt of any comments of, or requests for additional or supplemental information from, the Commission; (ii) the time and date of any filing of any post-effective amendment to the Registration Statement or any amendment or supplement to any prospectus, the General Disclosure Package or the Prospectus; (iii) the time and date that any post-effective amendment to the Registration Statement becomes effective; and (iv) the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement or any post-effective amendment thereto or of any order preventing or suspending its use or the use of any prospectus, the General Disclosure Package, the Prospectus or any Issuer-Represented Free Writing Prospectus, or the initiation of any proceedings to remove, suspend or terminate from listing the Common Stock or the Warrants from any securities exchange upon which the Common Stock is listed for trading, or of the threatening of initiation of any proceedings for any of such purposes. If the Commission shall enter any such stop order at any time, the Company will use its reasonable efforts to obtain the lifting of such order at the earliest possible moment. Additionally, the Company agrees that it shall comply with the provisions of Rules 424(b), 430A and 430B, as applicable, under the Securities Act and will use its reasonable best efforts to confirm that any filings made by the Company under Rule 424(b) or Rule 433 were received in a timely manner by the Commission (without reliance on Rule 424(b)(8) or Rule 164(b)).

(d) (i) During the Prospectus Delivery Period, the Company will comply with all requirements imposed upon it by the Securities Act, as now and hereafter amended, and by the Rules and Regulations, as from time to time in force, and by the Exchange Act so far as necessary to permit the continuance of sales of or dealings in the Securities as contemplated by the provisions hereof, the General Disclosure Package, the Registration Statement and the Prospectus. If during such period any event or development occurs as a result of which the Prospectus (or if the Prospectus is not yet available to prospective purchasers, the General Disclosure Package) would include an untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances then existing, not misleading, or if during such period it is necessary or appropriate in the opinion of the Company or its counsel or the Representative or Underwriters' Counsel to amend the Registration Statement or supplement the Prospectus (or if the Prospectus is not yet available to prospective purchasers, the General Disclosure Package) to comply with the Securities Act or to file under the Exchange Act any document which would be deemed to be incorporated by reference in the Prospectus in order to comply with the Securities Act or the Exchange Act, the Company will promptly notify the Representative and will amend the Registration Statement or supplement the Prospectus (or if the Prospectus is not yet available to prospective purchasers, the General Disclosure Package) or file such document (at the expense of the Company) so as to correct such statement or omission or effect such compliance.

(ii) If at any time following issuance of an Issuer-Represented Free Writing Prospectus there occurs an event or development as a result of which such Issuer-Represented Free Writing Prospectus would conflict with the information contained in the Registration Statement, the Statutory Prospectus or the Prospectus or would include an untrue statement of a material fact or would omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances then existing, not misleading, the Company will promptly notify the Representative and will promptly amend or supplement, at its own expense, such Issuer-Represented Free Writing Prospectus to eliminate or correct such conflict, untrue statement or omission.

(e) The Company will promptly deliver to the Representative and Underwriters' Counsel a copy of the Registration Statement, as initially filed, and all amendments thereto, including all consents and exhibits filed therewith, and will maintain in the Company's files manually signed copies of such documents for at least five (5) years after the date of filing thereof. The Company will promptly deliver to each of the Underwriters such number of copies of any Preliminary Prospectus, the Prospectus, the

18

Registration Statement, and all amendments of and supplements to such documents, if any, and all documents which are exhibits to the Registration Statement and any Preliminary Prospectus or Prospectus or any amendment thereof or supplement thereto, as the Underwriters may reasonably request. Prior to 10:00 A.M., New York City time, on the Business Day next succeeding the date of this Agreement, and from time to time thereafter, the Company will furnish the Underwriters with copies of the Prospectus in New York City in such quantities as the Underwriters may reasonably request.

(f) The Company consents to the use and delivery of the Preliminary Prospectus by the Underwriters in accordance with Rule 430 and Section 5(b) of the Securities Act.

(g) If the Company elects to rely on Rule 462(b) under the Securities Act, the Company shall both file a Rule 462(b) Registration Statement with the Commission in compliance with Rule 462(b) and pay the applicable fees in accordance with Rule 111 of the Securities Act by the earlier of: (i) 10:00 P.M., New York City time, on the date of this Agreement, and (ii) the time that confirmations are given or sent, as specified by Rule 462(b)(2).

(h) The Company will use its reasonable best efforts, in cooperation with the Representative, at or prior to the time of effectiveness of the Registration Statement, to qualify the Securities for offering and sale under the securities laws relating to the offering or sale of the Securities of such jurisdictions, domestic or foreign, as the Representative may designate and to maintain such qualifications in effect for so long as required for the distribution thereof; except that in no event shall the Company be obligated in connection therewith to qualify as a foreign corporation or to execute a general consent to service of process or to subject itself to taxation if it is otherwise not so subject.

(i) The Company will make generally available (which includes filings pursuant to the Exchange Act made publicly through the EDGAR system) to its security holders as soon as practicable, but in any event not later than 15 months after the end of the Company's current fiscal quarter, an earnings statement (which need not be audited) covering a 12-month period that shall satisfy the provisions of Section 11(a) of the Securities Act and Rule 158 of the Rules and Regulations.

(j) Except with respect to (i) securities of the Company which may be issued in connection with an acquisition of another entity (or the assets thereof), (ii) the issuance of securities of the Company intended to provide the Company with proceeds to acquire another entity (or the assets thereof), or (iii) the issuance of securities under the Company's stock option plans with exercise or conversion prices at fair market value (as defined in such plans) in effect from time to time, during the six (6) months following the Closing Date, the Company or any successor to the Company shall not undertake any public or private offerings of any equity securities of the Company (including equity-linked securities) without the prior written consent of the Representative.

(k) Except with respect to (i) securities of the Company which may be issued in connection with an acquisition of another entity (or the assets thereof), or (ii) the issuance of securities of the Company intended to provide the Company with proceeds to acquire another entity (or the assets thereof), during the six (6) months following the Closing Date, the Company will not file any registration statement relating to the offer or sale of any of the Company's securities, except Form S-8 filed with the Commission in connection with a Company stock option plan.

(l) Following the Closing Date, the Company and any of the individuals listed on Schedule B hereto (the "**Lock-Up Parties**"), without the prior written consent of the Representative, shall not sell or otherwise dispose of any securities of the Company, whether publicly or in a private placement, during the period that their respective lock-up agreements are in effect. The Company will deliver to the

19

Representative the agreements of the Lock-Up Parties to the foregoing effect prior to the Closing Date, which agreements shall be substantially in the form attached hereto as Annex II.

(m) If the Company fails to maintain the listing of its Common Stock or Warrants, on a nationally recognized exchange, for a period of three (3) years from the Effective Date, the Company, at its expense, shall obtain and keep current a listing of such securities in the Standard & Poor's Corporation Records Services or the Moody's Industrial Manual; *provided* that Moody's OTC Industrial Manual is not sufficient for these purposes.

(n) During the period of three (3) years from the Effective Date, the Company will make available to the Underwriters copies of all reports or other communications (financial or otherwise) furnished to security holders or from time to time published or publicly disseminated by the Company, and will deliver to the Underwriters: (i) as soon as they are available, copies of any reports, financial statements and proxy or information statements furnished to or filed with the Commission or any national securities exchange on which any class of securities of the Company is listed; and (ii) such additional information concerning the business and financial condition of the Company as the Representative may from time to time reasonably request (such financial information to be on a consolidated basis to the extent the accounts of the Company are consolidated in reports furnished to its security holders generally or to the Commission); *provided* that any such item which is available on the EDGAR system (or successor thereto) need not be furnished in physical form.

(o) The Company will not issue press releases or engage in any other publicity without the Representative's prior written consent, for a period ending at 5:00 P.M. Eastern time on the first Business Day following the forty-fifth (45th) day following the Closing Date, other than normal and customary releases issued in the ordinary course of the Company's business, or as required by law.

(p) The Company shall use its reasonable best efforts to engage, by the Closing Date (and for no less than two (2) years following the Closing Date) a financial public relations firm mutually acceptable to the Company and the Representative, which firm may be changed after the first year. The terms and conditions of such engagement shall be reasonably determined by the Company. The Company further agrees to consult with the Representative as is customary within the securities industry prior to the distribution to third parties of any financial information, news releases, or other publicity regarding the Company, its business, or any terms of the Offering, it being agreed that the Company shall give the Representative no less than twelve (12) hours prior notice of any such distribution and a reasonable opportunity during or prior to such period to review the contents of the proposed distribution.

(q) The Company shall use its reasonable best efforts to engage, by the Closing Date (and for no less than three (3) years following the Closing Date) a transfer agent reasonably acceptable to the Representative.

(r) The Company will apply the net proceeds from the sale of the Securities as set forth under the caption "Use of Proceeds" in the Prospectus. Without the prior written consent of the Representative, except as disclosed in the Registration Statement, the General Disclosure Package and the Prospectus, no proceeds of the Offering will be used to pay outstanding loans from officers, directors or stockholders or to pay any accrued salaries or bonuses to any employees or former employees.

(s) The Company will use its reasonable best efforts to effect and maintain the listing of the Common Stock and the Warrants on the NASDAQ Capital Market for at least three (3) years after the Closing Date, unless such listing is terminated as a result of a transaction approved by the holders of a majority of the voting securities of the Company.

20

(t) During the period when the Prospectus is required to be delivered under the Securities Act or the Exchange Act, the Company will file all documents required to be filed with the Commission pursuant to the Securities Act, the Exchange Act and the Rules and Regulations within the time periods required thereby.

(u) The Company will use its reasonable best efforts to do and perform all things required to be done or performed under this Agreement by the Company prior to the Closing Date, and to satisfy all conditions precedent to the delivery of the Securities.

(v) The Company will not take, and will cause its Affiliates not to take, directly or indirectly, any action which constitutes or is designed to cause or result in, or which could reasonably be expected to constitute, cause or result in, the stabilization or manipulation of the price of any security to facilitate the sale or resale of any Securities.

(w) The Company shall cause to be prepared and delivered to the Representative, at its expense, within two (2) Business Days from the date of this Agreement, an Electronic Prospectus to be used by the Underwriters in connection with the Offering. As used herein, the term “**Electronic Prospectus**” means a form of prospectus, and any amendment or supplement thereto, that meets each of the following conditions: (i) it shall be encoded in an electronic format, satisfactory to the Representative, that may be transmitted electronically by the Underwriters to offerees and purchasers of the Securities for at least the period during which a Prospectus relating to the Securities is required to be delivered under the Securities Act or the Exchange Act; (ii) it shall disclose the same information as the paper prospectus and prospectus filed pursuant to EDGAR, except to the extent that graphic and image material cannot be disseminated electronically, in which case such graphic and image material shall be replaced in the electronic prospectus with a fair and accurate narrative description or tabular representation of such material, as appropriate; and (iii) it shall be in or convertible into a paper format or an electronic format, satisfactory to the Representative, that will allow recipients thereof to store and have continuously ready access to the prospectus at any future time, without charge to such recipients (other than any fee charged for subscription to the Internet as a whole and for online time).

(x) The Company represents and agrees that, unless it obtains the prior written consent of the Representative, and the Representative represents and agrees that, unless it obtains the prior written consent of the Company, it has not made and will not make any offer relating to the Securities that would constitute an “issuer free writing prospectus,” as defined in Rule 433 under the Securities Act, or that would otherwise constitute a “free writing prospectus,” as defined in Rule 405 under the Securities Act, required to be filed with the Commission; *provided* that the prior written consent of the parties hereto shall be deemed to have been given in respect of the free writing prospectuses included in Schedule C. Any such free writing prospectus consented to by the Company and the Representative is hereinafter referred to as a “Permitted Free Writing Prospectus.” Each of the Company and the Representative represents that it has treated or agrees that it will treat each Permitted Free Writing Prospectus as an “issuer free writing prospectus,” as defined in Rule 433, and has complied and will comply with the requirements of Rule 433 applicable to any Permitted Free Writing Prospectus, including timely Commission filing where required, legending and record keeping.

(y) The Company shall maintain, for a period of no less than three (3) years from the Closing Date, a liability insurance policy affording coverage for the acts of its officers and directors.

(z) The Company shall maintain key person life insurance with an insurer rated at least AA or better in the most recent addition of “Best’s Life Reports” on the life of Evan Jones in full force and effect for a period of no less than three (3) years from the Closing Date. The Company shall be the sole beneficiary of such policy.

21

(aa) The Company will retain Philadelphia Stock Transfer, Inc. as transfer agent for the Common Stock and as warrant agent for the Warrants for a period of no less than three (3) years from the Closing Date.

5. Consideration; Payment of Expenses.

(a) In consideration of the services to be provided hereunder, the Company shall pay to the Underwriters or their respective designees their pro rata portion (based on the Securities purchased) of the following compensation with respect to the Securities which they are offering:

(i) An underwriting discount equal to 8.0% of the aggregate gross proceeds raised in the Offering; provided, that in the event any of jVen Capital, LLC, entities affiliated with Versant Ventures, Harris & Harris Group, Inc., entities affiliated with CHL Medical Partners and entities affiliated with Cross Creek Capital, L.P. purchase more than \$6.6 million of Units in the Offering, the underwriting discount in respect of the aggregate gross proceeds raised in the Offering from new investors will be 10.0% and the underwriting discount in respect of the aggregate gross proceeds raised in the Offering from such current stockholders will be 5.0%, subject to a minimum aggregate discount of 7.0% and a maximum aggregate discount of 8.0%; and

(ii) The Underwriters’ Warrants.

(b) The Company grants the Representative the right of first refusal for a period of twelve (12) months from the Effective Date to act as lead managing underwriter and book runner for any and all future public and private equity, equity-linked or debt (excluding commercial bank debt and credit facility) offerings undertaken by the Company or any direct or indirect subsidiary of the Company. The Company shall provide written notice to the Representative with the terms of such offering and if the Representative fails to accept in writing any such proposal within ten (10) days after receipt of such written notice, then the Representative will have no claim or right with respect to any such offering.

(c) The Representative reserves the right to reduce any item of compensation or adjust the terms thereof as specified herein in the event that a determination shall be made by FINRA to the effect that the Underwriters’ aggregate compensation is in excess of FINRA Rules or that the terms thereof require adjustment.

(d) Whether or not the transactions contemplated by this Agreement, the Registration Statement and the Prospectus are consummated or this Agreement is terminated, the Company hereby agrees to pay all costs and expenses incident to the Offering, including the following:

(i) all expenses in connection with the preparation, printing, formatting for EDGAR and filing of the Registration Statement, any Preliminary Prospectus and the Prospectus and any and all amendments and supplements thereto and the mailing and delivering of copies thereof to the Underwriters and dealers;

(ii) all fees and expenses in connection with filings with FINRA’s Public Offering System;

(iii) all fees, disbursements and expenses of the Company’s counsel and accountants in connection with the registration of the Securities under the Securities Act and the Offering;

22

(iv) all reasonable expenses in connection with the qualifications of the Securities for offering and sale under state or foreign securities or blue sky laws, including an initial payment of \$10,000 for the fees of Underwriters’ Counsel in connection with such qualification and in connection with

any blue sky survey undertaken by such counsel, with the balance of such Underwriters' Counsel's fees to be due at the Closing subject to a maximum of \$75,000, including the initial \$10,000 payment;

- (v) all fees and expenses in connection with listing the Securities on a national securities exchange, including a one-time payment to Underwriter's counsel of \$5,000 at Closing in connection with such listing;
- (vi) all reasonable travel expenses of the Company's officers, directors and employees and any other expense of the Company or the Underwriters incurred in connection with attending or hosting meetings with prospective purchasers of the Securities ("**Road Show Expenses**");
- (vii) any stock transfer taxes or other taxes incurred in connection with this Agreement or the Offering;
- (viii) the costs associated with book building, prospectus tracking and compliance software and the cost of preparing certificates representing the Securities;
- (ix) the cost and charges of any transfer agent or registrar for the Securities;
- (x) any reasonable costs and expenses incurred in conducting background checks of the Company's officers and directors by a background search firm acceptable to the Representative;
- (xi) the cost of two (2) "tombstone" advertisements to be placed in appropriate daily or weekly periodicals of the Representative's choice (i.e., The Wall Street Journal and The New York Times);
- (xii) the cost of leather bound volumes of the Offering documents and Offering commemorative Lucite (or other reasonable form) memorabilia, both to be supplied to the Representative, in such quantities as Representative may reasonably request; and
- (xiii) all other costs, fees (including Underwriters' Counsel's fees and expenses) and expenses incident to the Offering that are not otherwise specifically provided for in this Section 5;

provided, however, that all such costs and expenses pursuant to this Section 5(d) and otherwise which are incurred by the Underwriters shall not to exceed \$125,000 in the aggregate, including the \$30,000 advance previously paid by the Company to the Representative (of which a maximum of \$75,000 can be allocated to legal expenses and \$50,000 to non-legal expenses).

(e) It is understood, however, that except as provided in this Section 5, and Sections 7, 8 and 11(d) hereof, the Underwriters will pay all of their own costs and expenses. Notwithstanding anything to the contrary in this Section 5, in the event that this Agreement is terminated pursuant to Section 11(b) hereof, or subsequent to a Material Adverse Change, the Company will pay, less any advances previously paid (the "**Advances**"), all out-of-pocket expenses of the Underwriters (including but not limited to fees and disbursements of Underwriters' Counsel and reasonable travel) incurred in connection herewith which shall be limited to expenses which are actually incurred as allowed under FINRA Rule 5110 and in any event, the aggregate amount of such expenses to be reimbursed by the Company shall not exceed \$125,000, including the Advances. To the extent that the Underwriters' out-of-pocket expenses are less than the Advances, the Underwriters will return to the Company that portion of the Advances not offset by actual expenses.

6. Conditions of Underwriters' Obligations. The obligations of the Underwriters to purchase and pay for the Firm Units or any Option Securities, as the case may be, as provided herein shall be subject to: (i) the accuracy of the representations and warranties of the Company herein contained, as of the date hereof and as of the Closing Date, (ii) the absence from any certificates, opinions, written statements or letters furnished to the Representative or to Underwriters' Counsel pursuant to this Section 6 of any misstatement or omission, (iii) the performance by the Company of its obligations hereunder, and (iv) each of the following additional conditions. For purposes of this Section 6, the terms "Closing Date" and "Closing" shall refer to the Closing Date for the Firm Units or Option Securities, as the case may be, and each of the foregoing and following conditions must be satisfied as of each Closing.

(a) The Registration Statement shall have become effective and all necessary regulatory and listing approvals shall have been received not later than 5:30 P.M., New York City time, on the date of this Agreement, or at such later time and date as shall have been consented to in writing by the Representative. If the Company shall have elected to rely upon Rule 430A under the Securities Act, the Prospectus shall have been filed with the Commission in a timely fashion in accordance with the terms thereof and a form of the Prospectus containing information relating to the description of the Securities and the method of distribution and similar matters shall have been filed with the Commission pursuant to Rule 424(b) within the applicable time period; and, at or prior to the Closing Date and the actual time of the Closing, no stop order suspending the effectiveness of the Registration Statement or any part thereof, or any amendment thereof, nor suspending or preventing the use of the General Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus shall have been issued; no proceedings for the issuance of such an order shall have been initiated or threatened; all requests of the Commission for additional information (to be included in the Registration Statement, the General Disclosure Package, the Prospectus, any Issuer Free Writing Prospectus or otherwise) shall have been complied with to the Representative's satisfaction; and FINRA shall have raised no objection to the fairness and reasonableness of the underwriting terms and arrangements.

(b) The Representative shall not have reasonably determined, and advised the Company, that the Registration Statement, the General Disclosure Package or the Prospectus, or any amendment thereof or supplement thereto, or any Issuer Free Writing Prospectus, contains an untrue statement of fact which, in the Representative's reasonable opinion, is material, or omits to state a fact which, in the Representative's reasonable opinion, is material and is required to be stated therein or necessary to make the statements therein not misleading.

(c) The Representative shall have received the favorable written opinions, in each case in form satisfactory to the Representative and Underwriters' counsel (and in the case of (i) and (ii), including customary negative assurance language), of (i) Ballard Spahr LLP, the securities legal counsel for the Company, dated as of the Closing Date and addressed to the Underwriters; (ii) Cooley LLP, intellectual property legal counsel to the Company, dated as of the Closing Date and addressed to the Underwriters; and (iii) Hogan Lovells LLP, special regulatory legal counsel for the Company, dated as of the Closing Date and addressed to the Underwriters.

(d) The Representative shall have received certificates of each of the Chief Executive Officer and Chief Financial Officer of the Company, dated as of the Closing Date, to the effect that: (i) the conditions set forth in subsection (a) of this Section 6 have been satisfied, (ii) as of the date hereof and

as of the Closing Date, the representations and warranties of the Company set forth in Section 2 hereof are accurate, (iii) as of the Closing Date, all agreements, conditions and obligations of the Company to be performed or complied with hereunder on or prior thereto have been duly performed or complied with, (iv) the Company has not sustained any material loss or interference with its businesses, whether or not covered by insurance, or from any labor dispute or any legal or governmental proceeding, (v) no stop

order suspending the effectiveness of the Registration Statement or any amendment thereof has been issued and no proceedings therefor have been initiated or threatened by the Commission, (vi) there are no pro forma or as adjusted financial statements that are required to be included in the Registration Statement and the Prospectus pursuant to the Rules and Regulations which are not so included, and (vii) subsequent to the respective dates as of which information is given in the Registration Statement and the Prospectus, there has not been any Material Adverse Change or any development involving a prospective Material Adverse Change, whether or not arising from transactions in the ordinary course of business.

(e) On the date of this Agreement and on the Closing Date, the Representative shall have received a “comfort” letter from CohnReznick as of each such date, addressed to the Underwriters and in form and substance satisfactory to the Representative and Underwriters’ Counsel, confirming that they are independent certified public accountants with respect to the Company within the meaning of the Securities Act and all applicable rules and regulations, and stating, as of such date (or, with respect to matters involving changes or developments since the respective dates as of which specified financial information is given in the Prospectus, as of a date not more than five (5) days prior to such date), the conclusions and findings of such firm with respect to the financial information and other matters relating to the Registration Statement covered by such letter.

(f) Subsequent to the execution and delivery of this Agreement or, if earlier, the dates as of which information is given in the Registration Statement (exclusive of any amendment thereof) and the Prospectus (exclusive of any supplement thereto), there shall not have been any change in the capital stock or long-term debt of the Company or any change or development involving a change, whether or not arising from transactions in the ordinary course of business, in the business, condition (financial or otherwise), results of operations, shareholders’ equity, properties or prospects of the Company, taken as a whole, including but not limited to the occurrence of any fire, flood, storm, explosion, accident, act of war or terrorism or other calamity, the effect of which, in any such case described above, is, in the sole judgment of the Representative, so material and adverse as to make it impracticable or inadvisable to proceed with the Offering on the terms and in the manner contemplated in the Prospectus (exclusive of any supplement).

(g) The Representative shall have received a lock-up agreement from each Lock-Up Party, duly executed by the applicable Lock-Up Party, in each case substantially in the form attached as Annex II.

(h) The Common Stock and the Warrants are registered under the Exchange Act and, as of the Closing Date, the Common Stock and the Warrants shall be listed and admitted and authorized for trading on the NASDAQ Capital Market and satisfactory evidence of such action shall have been provided to the Representative. The Company shall have taken no action designed to terminate, or likely to have the effect of terminating, the registration of the Common Stock or the Warrants under the Exchange Act or delisting or suspending the Common Stock or the Warrants from trading on the NASDAQ Capital Market, nor will the Company have received any information suggesting that the Commission or the NASDAQ Capital Market is contemplating terminating such registration or listing. The Securities shall be DTC eligible.

(i) FINRA shall have confirmed that it has not raised any objection with respect to the fairness and reasonableness of the underwriting terms and arrangements. In addition, the Company shall, if requested by the Representative, make or authorize the Underwriters’ Counsel to make on the Company’s behalf an Issuer Filing with the FINRA Corporate Financing Department pursuant to FINRA Rule 5110 with respect to the Registration Statement and pay all filing fees required in connection therewith.

(j) No action shall have been taken and no statute, rule, regulation or order shall have been enacted, adopted or issued by any federal, state or foreign governmental or regulatory authority that would, as of the Closing Date, prevent the issuance or sale of the Securities; and no injunction or order of any federal, state or foreign court shall have been issued that would, as of the Closing Date, prevent the issuance or sale of the Securities or materially and adversely affect or potentially materially and adversely affect the business or operations of the Company.

(k) The Company shall have furnished the Underwriters and Underwriters’ Counsel with such other certificates, opinions or documents as they may have reasonably requested.

(l) The Company shall have entered into a warrant agreement (the “**Warrant Agreement**”) with Philadelphia Stock Transfer, Inc., as warrant agent for the Warrants.

If any of the conditions specified in this Section 6 shall not have been fulfilled when and as required by this Agreement, or if any of the certificates, opinions, written statements or letters furnished to the Representative or to Underwriters’ Counsel pursuant to this Section 6 shall not be reasonably satisfactory in form and substance to the Representative and to Underwriters’ Counsel, all obligations of the Underwriters hereunder may be cancelled by the Representative at, or at any time prior to, the consummation of the Closing. Notice of such cancellation shall be given to the Company in writing or orally. Any such oral notice shall be confirmed promptly thereafter in writing.

7. Indemnification.

(a) The Company agrees to indemnify and hold harmless the Underwriters and each Person, if any, who controls each Underwriter within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, against any losses, liabilities, claims, damages and expenses whatsoever, as incurred (including but not limited to reasonable attorneys’ fees and any and all reasonable expenses whatsoever, incurred in investigating, preparing or defending against any litigation, commenced or threatened, or any claim whatsoever, and any and all amounts paid in settlement of any claim or litigation), joint or several, to which they or any of them may become subject under the Securities Act, the Exchange Act or otherwise (including in settlement of any litigation if such settlement is effected with the written consent of the Company), insofar as such losses, liabilities, claims, damages or expenses (or actions in respect thereof) arise out of or are based upon: (i) an untrue statement or alleged untrue statement of a material fact contained in (A) the Registration Statement, including the information deemed to be a part of the Registration Statement at the time of effectiveness and at any subsequent time pursuant to

Rules 430A and 430B of the Rules and Regulations, any Preliminary Prospectus, the General Disclosure Package, the Prospectus, or any amendment or supplement to any of them (including any documents filed under the Exchange Act and deemed to be incorporated by reference into the Prospectus), (B) any Issuer Free Writing Prospectus or any materials or information provided to investors by, or with the approval of, the Company in connection with the marketing of the offering of the Securities (“**Marketing Materials**”), including any road show or investor presentations made to investors by the Company (whether in person or electronically) or (C) any filings or reports filed by the Company under the Exchange Act, or arise out of or are based upon the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading, and will reimburse such indemnified party for any legal or other expenses reasonably incurred by it in connection with investigating or defending against such losses, liabilities, claims, damages or expenses (or actions in respect thereof); or (ii) in whole or in part upon any inaccuracy in the representations and warranties of the Company contained herein; or (iii) in whole or in part upon any failure of the Company to perform its obligations hereunder or under law; *provided, however*, that the Company shall not be liable in any such case to the extent that any such loss, liability, claim, damage or expense (or action in respect thereof) arises out of or is based upon an untrue statement or alleged untrue statement or omission

26

or alleged omission made in the Registration Statement, any Preliminary Prospectus, the General Disclosure Package, the Prospectus, or any such amendment or supplement to any of them, or any Issuer Free Writing Prospectus or any Marketing Materials in reliance upon and in conformity with the Underwriters’ Information.

(b) Each Underwriter, severally and not jointly, agrees to indemnify and hold harmless the Company, each of the directors of the Company, each of the officers of the Company who shall have signed the Registration Statement, and each other Person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, against any losses, liabilities, claims, damages and expenses whatsoever, as incurred (including but not limited to reasonable attorneys’ fees and any and all reasonable expenses whatsoever, incurred in investigating, preparing or defending against any litigation, commenced or threatened, or any claim whatsoever, and any and all amounts paid in settlement of any claim or litigation), joint or several, to which they or any of them may become subject under the Securities Act, the Exchange Act or otherwise, insofar as such losses, liabilities, claims, damages or expenses (or actions in respect thereof) arise out of or are based upon an untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, at the time of effectiveness and at any subsequent time pursuant to Rules 430A and 430B of the Rules and Regulations, any Preliminary Prospectus, the Prospectus, or any amendment or supplement to any of them, or arise out of or are based upon the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading, in each case to the extent, but only to the extent, that any such loss, liability, claim, damage or expense (or action in respect thereof) arises out of or is based upon any such untrue statement or alleged untrue statement or omission or alleged omission made therein in reliance upon and in conformity with the Underwriters’ Information; *provided, however*, that in no case shall any Underwriter be liable or responsible for any amount in excess of the underwriting discount and commissions applicable to the Securities purchased by such Underwriter hereunder. The parties agree that such information provided by or on behalf of any Underwriter through the Representative consists solely of the material referred to in the last sentence of Section 2(b) hereof.

(c) Promptly after receipt by an indemnified party under subsection (a) or (b) above of notice of any claim or the commencement of any action, such indemnified party shall, if a claim in respect thereof is to be made against the indemnifying party under such subsection, notify each party against whom indemnification is to be sought in writing thereof (but the failure so to notify an indemnifying party shall not relieve the indemnifying party from any liability which it may have under this Section 7 to the extent that it is not materially prejudiced as a result thereof and in any event shall not relieve it from any liability that such indemnifying party may have otherwise than on account of the indemnity agreement hereunder). In case any such claim or action is brought against any indemnified party, and it so notifies an indemnifying party thereof, the indemnifying party will be entitled to participate at its own expense in the defense of such action, and to the extent it may elect by written notice delivered to the indemnified party promptly after receiving the aforesaid notice from such indemnified party, to assume the defense thereof with counsel satisfactory to such indemnified party; *provided however*, that counsel to the indemnifying party shall not (except with the written consent of the indemnified party) also be counsel to the indemnified party. Notwithstanding the foregoing, the indemnified party or parties shall have the right to employ its or their own counsel in any such case, but the fees and expenses of such counsel shall be at the expense of such indemnified party or parties unless: (i) the employment of such counsel shall have been authorized in writing by one of the indemnifying parties in connection with the defense of such action; (ii) the indemnifying parties shall not have employed counsel to have charge of the defense of such action within a reasonable time after notice of the claim or the commencement of the action; (iii) the indemnifying party does not diligently defend the action after assumption of the defense; or (iv) such indemnified party or parties shall have reasonably concluded that a conflict may arise between the positions of the indemnifying party and the indemnified party, or any of them, in conducting the defense

27

of any such action or there may be legal defenses available to it or them which are different from or additional to those available to any of the indemnifying parties (in which case the indemnifying parties shall not have the right to direct the defense of such action on behalf of the indemnified party or parties), in any of which events such fees and expenses shall be borne by the indemnifying parties and shall be paid as incurred. No indemnifying party shall, without the prior written consent of the indemnified parties, effect any settlement or compromise of, or consent to the entry of judgment with respect to, any pending or threatened claim, investigation, action or proceeding in respect of which indemnity or contribution may be or could have been sought by an indemnified party under this Section 7 or Section 8 hereof (whether or not the indemnified party is an actual or potential party thereto), unless (x) such settlement, compromise or judgment (i) includes an unconditional release of the indemnified party from all liability arising out of such claim, investigation, action or proceeding and (ii) does not include a statement as to an admission of fault, culpability or any failure to act, by or on behalf of the indemnified party, and (y) the indemnifying party confirms in writing its indemnification obligations hereunder with respect to such settlement, compromise or judgment.

8. **Contribution.** In order to provide for contribution in circumstances in which the indemnification provided for in Section 7 is for any reason held to be unavailable from any indemnifying party or is insufficient to hold harmless a party indemnified thereunder, the Company and the Underwriters shall contribute to the aggregate losses, claims, damages, liabilities and expenses of the nature contemplated by such indemnification provision (including any investigation, legal and other expenses incurred in connection with, and any amount paid in settlement of, any action, suit or proceeding or any claims asserted, but after deducting in the case of losses, claims, damages, liabilities and expenses suffered by the Company, any contribution received by the Company from Persons, other than the Underwriters, who may also be liable for contribution, including Persons who control the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, officers of the Company who signed the Registration Statement and directors of the Company), as incurred, to which the Company and one or more of the Underwriters may be subject, in such proportions as is appropriate to reflect the relative benefits received by the Company and the Underwriters from the Offering or, if such allocation is not permitted by applicable law, in such proportions as are appropriate to reflect not only the relative benefits referred to above but also the relative fault of the Company and the Underwriters in connection with

the statements or omissions which resulted in such losses, claims, damages, liabilities or expenses, as well as any other relevant equitable considerations. The relative benefits received by the Company and the Underwriters shall be deemed to be in the same proportion as (x) the total proceeds from the Offering (net of underwriting discount and commissions but before deducting expenses) received by the Company bears to (y) the underwriting discount and commissions received by the Underwriters, in each case as set forth in the table on the cover page of the Prospectus. The relative fault of the Company and the Underwriters shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or the Underwriters and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission. The Company and the Underwriters agree that it would not be just and equitable if contribution pursuant to this Section 8 were determined by *pro rata* allocation (even if the Underwriters were treated as one entity for such purpose) or by any other method of allocation which does not take account of the equitable considerations referred to above in this Section 8. The aggregate amount of losses, liabilities, claims, damages and expenses incurred by an indemnified party and referred to above in this Section 8 shall be deemed to include any legal or other expenses reasonably incurred by such indemnified party in investigating, preparing or defending against any litigation, or any investigation or proceeding by any judicial, regulatory or other legal or governmental agency or body, commenced or threatened, or any claim whatsoever based upon any such untrue or alleged untrue statement or omission or alleged omission. Notwithstanding the provisions of this Section 8: (i) no Underwriter shall be required to contribute any amount in excess of the underwriting discount and commissions applicable to the Securities underwritten

28

by it and distributed to the public and (ii) no Person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any Person who was not guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act). For purposes of this Section 8, each Person, if any, who controls an Underwriter within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act shall have the same rights to contribution as such Underwriter, and each Person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, each officer of the Company who shall have signed the Registration Statement and each director of the Company shall have the same rights to contribution as the Company, subject in each case to clauses (i) and (ii) of the immediately preceding sentence. Any party entitled to contribution will, promptly after receipt of notice of commencement of any action, suit or proceeding against such party in respect of which a claim for contribution may be made against another party or parties, notify each party or parties from whom contribution may be sought, but the omission to so notify such party or parties shall not relieve the party or parties from whom contribution may be sought from any obligation it or they may have under this Section 8 or otherwise. The obligations of the Underwriters to contribute pursuant to this Section 8 are several in proportion to the respective number of Securities to be purchased by each of the Underwriters hereunder and not joint.

9. Underwriter Default.

(a) If any Underwriter or Underwriters shall default in its or their obligation to purchase Firm Units hereunder, and if the Securities with respect to which such default relates (the "**Default Securities**") do not (after giving effect to arrangements, if any, made by the Representative pursuant to subsection (b) below) exceed in the aggregate 10% of the number of Firm Units, each non-defaulting Underwriter, acting severally and not jointly, agrees to purchase from the Company that number of Default Securities that bears the same proportion to the total number of Default Securities then being purchased as the number of Firm Units set forth opposite the name of such Underwriter on Schedule A hereto bears to the aggregate number of Firm Units set forth opposite the names of the non-defaulting Underwriters; subject, however, to such adjustments to eliminate fractional shares as the Representative in its sole discretion shall make.

(b) In the event that the aggregate number of Default Securities exceeds 10% of the number of Firm Units, the Representative may in its discretion arrange for itself or for another party or parties (including any non-defaulting Underwriter or Underwriters who so agree) to purchase the Default Securities on the terms contained herein. In the event that within five (5) calendar days after such a default the Representative does not arrange for the purchase of the Default Securities as provided in this Section 9, this Agreement shall thereupon terminate, without liability on the part of the Company with respect thereto (except in each case as provided in Sections 5, 7, 8, 9 and 11(d)) or the Underwriters, but nothing in this Agreement shall relieve a defaulting Underwriter or Underwriters of its or their liability, if any, to the other Underwriters and the Company for damages occasioned by its or their default hereunder.

(c) In the event that any Default Securities are to be purchased by the non-defaulting Underwriters, or are to be purchased by another party or parties as aforesaid, the Representative or the Company shall have the right to postpone the Closing Date for a period, not exceeding five (5) Business Days, in order to effect whatever changes may thereby be necessary in the Registration Statement or the Prospectus or in any other documents and arrangements, and the Company agrees to file promptly any amendment or supplement to the Registration Statement or the Prospectus which, in the reasonable opinion of Underwriters' Counsel, may be necessary or advisable. The term "Underwriter" as used in this Agreement shall include any party substituted under this Section 9 with like effect as if it had originally been a party to this Agreement with respect to such Firm Units.

29

10. Survival of Representations and Agreements. All representations, warranties, covenants and agreements of the Company and the Underwriters contained in this Agreement or in certificates of officers of the Company submitted pursuant hereto, including, without limitation, the agreements contained in Sections 5, 10, 14 and 15, the indemnity agreements contained in Section 7 and the contribution agreements contained in Section 8, shall remain operative and in full force and effect regardless of any investigation made by or on behalf of any Underwriter or any controlling Person thereof or by or on behalf of the Company, any of its officers or directors or any controlling Person thereof, and shall survive delivery of and payment for the Securities to and by the Underwriters. The representations and warranties contained in Section 2 and the covenants and agreements contained in Sections 4, 5, 7, 8, 10, 14 and 15 shall survive any termination of this Agreement, including termination pursuant to Sections 9 or 11. For the avoidance of doubt, in the event of termination the Underwriters will receive only out-of-pocket accountable expenses actually incurred subject to the limit in Section 11(d) below as well as the right of first refusal in compliance with FINRA Rules 5110(f)(2)(D)(i), 5110(f)(2)(D)(ii)(a) and 5110(f)(2)(D)(ii)(b).

11. Effective Date of Agreement; Termination.

(a) This Agreement shall become effective upon the later of: (i) receipt by the Representative and the Company of notification of the effectiveness of the Registration Statement or (ii) the execution of this Agreement. Notwithstanding any termination of this Agreement, the provisions of this Section 11 and of Sections 1, 4, 5, 7, 8, 14 and 15 shall remain in full force and effect at all times after the execution hereof to the extent they are in compliance with FINRA Rule 5110(f)(2)(D).

(b) The Representative shall have the right to terminate this Agreement at any time prior to the consummation of the Closing if: (i) any domestic or international event or act or occurrence has materially disrupted, or in the opinion of the Representative will in the immediate future materially disrupt, the market for the Company's securities or securities in general; or (ii) trading on the NYSE Euronext or the NASDAQ Stock Market has been suspended or made subject to material limitations, or minimum or maximum prices for trading have been fixed, or maximum ranges for prices for securities have been required, on the NYSE Euronext or the NASDAQ Stock Market or by order of the Commission, FINRA or any other governmental authority having jurisdiction; or (iii) a banking moratorium has been declared by any state or federal authority or any material disruption in commercial banking or securities settlement or clearance services has occurred; or (iv) any downgrading has occurred in the Company's corporate credit rating or the rating accorded the Company's debt securities by any "nationally recognized statistical rating organization" (as defined for purposes of Rule 436(g) under the Securities Act) or if any such organization has publicly announced that it has under surveillance or review, with possible negative implications, its rating of any of the Company's debt securities; or (v) (A) there has occurred any outbreak or escalation of hostilities or acts of terrorism involving the United States or there is a declaration of a national emergency or war by the United States or (B) there has been any other calamity or crisis or any change in political, financial or economic conditions, if the effect of any such event in (A) or (B), in the judgment of the Representative, is so material and adverse that such event makes it impracticable or inadvisable to proceed with the offering, sale and delivery of the Firm Units on the terms and in the manner contemplated by the Prospectus.

(c) Any notice of termination pursuant to this Section 11 shall be in writing.

(d) If this Agreement shall be terminated pursuant to any of the provisions hereof (other than pursuant to Section 9(b) hereof), or if the sale of the Securities provided for herein is not consummated because any condition to the obligations of the Underwriters set forth herein is not satisfied or because of any refusal, inability or failure on the part of the Company to perform any agreement herein or comply with any provision hereof, the Company will, subject to demand by the Representative, reimburse the

30

Underwriters for only those out-of-pocket expenses (including the reasonable fees and expenses of their counsel), actually incurred by the Underwriters in connection herewith as allowed under FINRA Rule 5110, less any amounts previously paid by the Company; *provided, however*, that all such expenses, including the costs and expenses set forth in Section 5(d) which were actually paid, shall not to exceed \$125,000 in the aggregate, including the \$30,000 advance against Underwriters' Counsel's fees described in Section 5(d).

12. Notices. All communications hereunder, except as may be otherwise specifically provided herein, shall be in writing, and:

(a) if sent to the Representative or any Underwriter, shall be mailed, delivered, or faxed with confirmation of transmission, to:

Maxim Group LLC
405 Lexington Avenue
New York, NY 10174
Attention: Clifford A. Teller,
Executive Managing Director, Investment Banking
Fax: 212-895-3555

with a copy to Underwriters' Counsel at:

Ellenoff Grossman & Schole LLP
1345 Avenue of the Americas
New York, NY 10105
Attention: Barry I. Grossman, Esq.
Fax: 212-370-7889

(b) if sent to the Company, shall be mailed, delivered, or faxed with confirmation of transmission, to the Company with a copy to its counsel, at the addresses set forth in the Registration Statement;

provided, however, that any notice to any Underwriter pursuant to Section 7 shall be mailed, delivered, or faxed with confirmation of transmission, to such Underwriter at its address set forth in its acceptance facsimile to the Representative, which address will be supplied to any other party hereto by the Representative upon request. All such communications shall take effect at the time of receipt thereof.

13. Parties; Limitation of Relationship. This Agreement shall inure solely to the benefit of, and shall be binding upon, the Underwriters, the Company and the controlling Persons, directors, officers, employees and agents referred to in Sections 7 and 8 hereof, and their respective successors, representatives and assigns, and no other Person shall have or be construed to have any legal or equitable right, remedy or claim under or in respect of or by virtue of this Agreement or any provision herein contained. This Agreement and all conditions and provisions hereof are intended to be for the sole and exclusive benefit of the parties hereto and such Persons and their respective successors, representatives and assigns, and not for the benefit of any other Person. The term "successors, representatives and assigns" shall not include a purchaser, in its capacity as such, of Securities from any of the Underwriters.

14. Governing Law. This Agreement shall be deemed to have been executed and delivered in New York, New York and both this Agreement and the transactions contemplated hereby shall be governed as to validity, interpretation, construction, effect, and in all other respects by the laws of the State of New York applicable to agreements wholly performed within the borders of such state and without regard to

31

the conflicts of laws principles thereof (other than Section 5-1401 of The New York General Obligations Law). Each of the Underwriters and the Company: (a) agrees that any legal suit, action or proceeding arising out of or relating to this Agreement or the transactions contemplated hereby shall be instituted exclusively in the Supreme Court of the State of New York, New York County, or in the United States District Court for the Southern District of New York, (b) waives any objection which it may have now or hereafter to the venue of any such suit, action or proceeding, and (c) irrevocably consents to the jurisdiction of the Supreme Court of the State of New York, New York County, or the United States District Court for the Southern District of New York in

any such suit, action or proceeding. Each of the Underwriters and the Company further agrees to accept and acknowledge service of any and all process which may be served in any such suit, action or proceeding in the Supreme Court of the State of New York, New York County, or in the United States District Court for the Southern District of New York and agrees that service of process upon the Company mailed by certified mail or delivered by Federal Express via overnight delivery to the Company's address shall be deemed in every respect effective service of process upon the Company in any such suit, action or proceeding, and service of process upon an Underwriter mailed by certified mail or delivered by Federal Express via overnight delivery to the Underwriters' address shall be deemed in every respect effective service of process upon such Underwriter in any such suit, action or proceeding. THE COMPANY (ON BEHALF OF ITSELF AND, TO THE FULLEST EXTENT PERMITTED BY LAW, ITS EQUITY HOLDERS AND CREDITORS) HEREBY WAIVES ANY RIGHT THEY MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY CLAIM BASED UPON, ARISING OUT OF OR IN CONNECTION WITH THIS AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY, THE REGISTRATION STATEMENT OR THE PROSPECTUS.

15. Entire Agreement. This Agreement, together with the schedules and annexes attached hereto and as the same may be amended from time to time in accordance with the terms hereof, contains the entire agreement among the parties hereto relating to the subject matter hereof and there are no other or further agreements outstanding not specifically mentioned herein. This Agreement supersedes any prior agreements or understandings among or between the parties hereto, including the Letter of Engagement dated January 29, 2015, as amended on April 28, 2015 (except as specifically set forth therein).

16. Severability. If any term or provision of this Agreement or the performance thereof shall be invalid or unenforceable to any extent, such invalidity or unenforceability shall not affect or render invalid or unenforceable any other provision of this Agreement and this Agreement shall be valid and enforceable to the fullest extent permitted by law.

17. Amendment. This Agreement may only be amended by a written instrument executed by each of the parties hereto.

18. Waiver, etc. The failure of any of the parties hereto to at any time enforce any of the provisions of this Agreement shall not be deemed or construed to be a waiver of any such provision, nor to in any way affect the validity of this Agreement or any provision hereof or the right of any of the parties hereto to thereafter enforce each and every provision of this Agreement. No waiver of any breach, non-compliance or non-fulfillment of any of the provisions of this Agreement shall be effective unless set forth in a written instrument executed by the party or parties against whom or which enforcement of such waiver may be sought; and no waiver of any such breach, non-compliance or non-fulfillment shall be construed or deemed to be a waiver of any other or subsequent breach, non-compliance or non-fulfillment.

19. No Fiduciary Relationship. The Company hereby acknowledges that the Underwriters are acting solely as underwriters in connection with the offering of the Company's Securities. The Company further acknowledges that the Underwriters are acting pursuant to a contractual relationship created solely by this Agreement entered into on an arm's-length basis and in no event do the parties intend that the

Underwriters act or be responsible as a fiduciary to the Company, its management, shareholders, creditors or any other person in connection with any activity that the Underwriters may undertake or have undertaken in furtherance of the offering of the Company's Securities, either before or after the date hereof. The Underwriters hereby expressly disclaim any fiduciary or similar obligations to the Company, either in connection with the transactions contemplated by this Agreement or any matters leading up to such transactions, and the Company hereby confirms its understanding and agreement to that effect. The Company hereby further confirms its understanding that no Underwriter has assumed an advisory or fiduciary responsibility in favor of the Company with respect to the Offering contemplated hereby or the process leading thereto, including, without limitation, any negotiation related to the pricing of the Securities; and the Company has consulted its own legal and financial advisors to the extent it has deemed appropriate in connection with this Agreement and the Offering. The Company and the Underwriters agree that they are each responsible for making their own independent judgments with respect to any such transactions, and that any opinions or views expressed by the Underwriters to the Company regarding such transactions, including but not limited to any opinions or views with respect to the price or market for the Company's securities, do not constitute advice or recommendations to the Company. The Company hereby waives and releases, to the fullest extent permitted by law, any claims that the Company may have against the Underwriters with respect to any breach or alleged breach of any fiduciary or similar duty to the Company in connection with the transactions contemplated by this Agreement or any matters leading up to such transactions.

20. Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original, and all such counterparts shall together constitute one and the same instrument. Delivery of a signed counterpart of this Agreement by facsimile or other electronic transmission shall constitute valid and sufficient delivery thereof.

21. Headings. The headings herein are inserted for convenience of reference only and are not intended to be part of, or to affect the meaning or interpretation of, this Agreement.

22. Time is of the Essence. Time shall be of the essence of this Agreement. As used herein, the term "Business Day" shall mean any day other than a Saturday, Sunday or any day on which any of the major U.S. stock exchanges in are not open for business.

[Signature Pages Follow]

If the foregoing correctly sets forth your understanding, please so indicate in the space provided below for that purpose, whereupon this letter shall constitute a binding agreement among us.

Very truly yours,

OPGEN, INC.

By:

Name: Evan Jones
Title: Chief Executive Officer

Accepted by the Representative, acting for itself and as
Representative of the Underwriters named on Schedule A hereto,
as of the date first written above:

MAXIM GROUP LLC

By:

Name: Clifford A. Teller
Title: Executive Managing Director,
Investment Banking

34

SCHEDULE A

Name of Underwriter	Number of Firm Units Being Purchased
Maxim Group LLC	2,422,500
National Securities Corporation	427,500
Total	2,850,000

SCHEDULE B

Lock-Up Parties

	Name
Holder of more than 1% of capital stock:	
1.	CHL Medical Partners III, L.P.
2.	CHL Medical Partners III Side Fund, L.P.
3.	Cross Creek Capital, L.P.
4.	Cross Creek Capital Employees' Fund, L.P.
5.	Harris & Harris Group, Inc.
6.	jVen Capital, LLC
7.	Cynthia Jones
8.	Mason Wells OpGen Holdings Inc.
9.	Mason Wells Biomedical Fund I Limited Partnership
10.	Versant Venture Capital III, L.P.
11.	Versant Side Fund III, L.P.
Directors	
12.	Brian G. Atwood
13.	Timothy J.R. Harris, Ph.D., D.Sc.
14.	Timothy Howe
15.	Evan Jones
16.	Laurence R. McCarthy, Ph.D.
17.	Misti Ushio, Ph.D.
Officers	
18.	David Hoekzema
19.	Robert McG. Lilley
20.	Vadim Sapiro
21.	G. Terrance Walker, Ph.D.
22.	C. Eric Winzer
23.	Timothy C. Dec
24.	Kevin Krenitsky, M.D.

SCHEDULE C

Free Writing Prospectuses

1. Electronic roadshow for "OpGen, Inc. (IPO)" on www.retailroadshow.com.
 2. Issuer Free Writing Prospectus dated April 17, 2015, filed with the Securities and Exchange Commission pursuant to Rule 433 of the Securities Act of 1933 (Registration No. 333-202478).
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FORM OF UNDERWRITERS' WARRANTS

THIS WARRANT AND THE SECURITIES ISSUABLE UPON EXERCISE HEREOF MAY NOT BE SOLD, TRANSFERRED, ASSIGNED, PLEDGED, OR HYPOTHECATED, OR BE THE SUBJECT OF ANY HEDGING, SHORT SALE, DERIVATIVE, PUT, OR CALL TRANSACTION THAT WOULD RESULT IN THE EFFECTIVE ECONOMIC DISPOSITION OF SUCH SECURITIES BY ANY PERSON FOR A PERIOD OF ONE HUNDRED AND EIGHTY (180) DAYS IMMEDIATELY FOLLOWING THE DATE OF EFFECTIVENESS OF THE PUBLIC OFFERING OF THE COMPANY'S SECURITIES PURSUANT TO REGISTRATION STATEMENT NO. 333-202478 AS FILED WITH THE SECURITIES AND EXCHANGE COMMISSION, EXCEPT IN ACCORDANCE WITH FINRA RULE 5110(g)(2).

COMMON STOCK PURCHASE WARRANT

OPGEN, INC.

Warrant Shares:

Issuance Date: April , 2015

THIS COMMON STOCK PURCHASE WARRANT (the "Warrant") certifies that, for value received, or its assigns (the "Holder") is entitled, upon the terms and subject to the limitations on exercise and the conditions hereinafter set forth, at any time on or after the date that is 180 days from the effective date ("Effective Date") of the Registration Statement (the "Initial Exercise Date") and on or prior to the close of business on the five (5) year anniversary of the Effective Date (the "Termination Date") but not thereafter, to subscribe for and purchase from OpGen, Inc., a Delaware corporation (the "Company"), up to shares (as subject to adjustment hereunder, the "Warrant Shares") of Common Stock. The purchase price of one share of Common Stock under this Warrant shall be equal to the Exercise Price, as defined in Section 2(b).

Section 1. Definitions. Capitalized terms used and not otherwise defined herein shall have the meanings set forth in that certain Underwriting Agreement (the "Agreement"), April , 2015, between the Company and Maxim Group LLC on behalf of the Underwriters named on Schedule A thereto.

Section 2. Exercise.

(a) Exercise of the purchase rights represented by this Warrant may be made, in whole or in part, at any time or times on or after the Initial Exercise Date and on or before the Termination Date by delivery to the Company (or such other office or agency of the Company as the Company may designate by notice in writing to the registered Holder at the address of the Holder appearing on the books of the Company) of a duly executed facsimile copy of the Notice of Exercise form attached hereto. Within three (3) trading days following the date of exercise as aforesaid, the Holder shall deliver the aggregate Exercise Price for the shares specified in the applicable Notice of Exercise by wire transfer or cashier's check drawn on a United States bank unless the cashless exercise procedure specified in Section 2(c) below is available and specified in the applicable Notice of Exercise. Notwithstanding anything herein to the contrary, the Holder shall not be required to physically surrender this Warrant to the Company until the Holder has purchased all of the Warrant Shares available hereunder and the Warrant has been exercised in

1

full, in which case, the Holder shall surrender this Warrant to the Company for cancellation within three (3) trading days of the date the final Notice of Exercise is delivered to the Company. Partial exercises of this Warrant resulting in purchases of a portion of the total number of Warrant Shares available hereunder shall have the effect of lowering the outstanding number of Warrant Shares purchasable hereunder in an amount equal to the applicable number of Warrant Shares purchased. The Holder and the Company shall maintain records showing the number of Warrant Shares purchased and the date of such purchases; provided that the records of the Company, absent manifest error, will be conclusive with respect to the number of Warrant Shares purchasable from time to time hereunder. The Company shall deliver any objection to any Notice of Exercise form within one (1) business day of receipt of such notice. **The Holder and any assignee, by acceptance of this Warrant, acknowledge and agree that, by reason of the provisions of this paragraph, following the purchase of a portion of the Warrant Shares hereunder, the number of Warrant Shares available for purchase hereunder at any given time may be less than the amount stated on the face hereof.**

(b) Exercise Price. The exercise price per share of the Common Stock under this Warrant shall be \$[.], subject to adjustment hereunder (the "Exercise Price"). Except as where otherwise permitted in accordance with Section 2(c), this Warrant may only be exercised by means of payment by wire transfer or cashier's check drawn on a United States bank.

(c) Cashless Exercise. If, and only if, at the time of exercise hereof there is no effective registration statement registering, or the prospectus contained therein is not available for the issuance of, the Warrant Shares, then, and only then, this Warrant may, at the option of the Holder, be exercised, in whole or in part, at such time by means of a "cashless exercise" in which the Holder shall be entitled to receive a number of Warrant Shares equal to the quotient obtained by dividing [(A-B) * (X)] by (A), where:

(A) = the VWAP on the trading day immediately preceding the date on which the Holder elects to exercise this Warrant by means of a "cashless exercise," as set forth in the applicable Notice of Exercise;

(B) = the Exercise Price of this Warrant, as adjusted hereunder; and

(X) = the number of Warrant Shares that would be issuable upon exercise of this Warrant in accordance with the terms of this Warrant if such exercise were by means of a cash exercise rather than a cashless exercise.

"VWAP" means, for any date, the price determined by the first of the following clauses that applies: (a) if the Common Stock is then listed or quoted on a national securities exchange within the meaning of Section 6 of the Exchange Act (a "Trading Market"), the daily volume weighted average price of the Common Stock for such date (or the nearest preceding date) on the Trading Market on which the Common Stock is then listed or quoted as reported by Bloomberg L.P. ("Bloomberg") (based on a trading day from 9:30 a.m. (New York City time) to 4:02 p.m. (New York City time)), (b) if the OTC Bulletin Board (or its successor entity) is not a Trading Market, the volume weighted average price of the Common Stock for such date (or the nearest preceding date) on the OTC Bulletin Board, (c) if the Common Stock is not then listed or quoted for trading on the OTC Bulletin Board (or its successor entity) and if prices for the Common Stock are then listed or quoted for trading on the OTCQX or OTCQB marketplaces of the OTC Markets Group, Inc., the volume weighted average price of the Common Stock for such date (or the nearest preceding date) on such marketplace, (d) if the Common Stock is not then

listed or quoted for trading on the OTCQX or OTCQB marketplaces of the OTC Markets Group, Inc. and if prices for the Common Stock are then reported in the “Pink Sheets” published by the OTC Markets Group, Inc. (or a similar organization or agency succeeding to its functions of reporting prices), the most recent bid price per share of the Common Stock so reported, or (e) in all other cases, the fair market value of a share of Common Stock as determined by an independent appraiser selected in good faith by the Board of Directors of the Company and reasonably acceptable to the Holder, the fees and expenses of which shall be paid by the Company.

(d) Mechanics of Exercise.

(i) Delivery of Warrant Shares upon Exercise. The Company shall use best efforts to cause the Warrant Shares purchased hereunder to be transmitted by the Transfer Agent to the Holder by crediting the account of the Holder’s prime broker with The Depository Trust Company through its Deposit or Withdrawal at Custodian system (“DWAC”) if the Company is then a participant in such system and either (A) there is an effective registration statement permitting the issuance of the Warrant Shares or resale of the Warrant Shares or (B) this Warrant is being exercised via cashless exercise, and otherwise by physical delivery to the address specified by the Holder in the Notice of Exercise by the date that is five (5) trading days after the latest of (A) the delivery to the Company of the Notice of Exercise, (B) surrender of this Warrant (if required) and (C) payment of the aggregate Exercise Price as set forth above (including by cashless exercise, if permitted) (such date, the “Warrant Share Delivery Date”). The Warrant Shares shall be deemed to have been issued, and the Holder or any other person so designated to be named therein shall be deemed to have become a holder of record of such shares for all purposes, as of the date the Warrant has been exercised, with payment to the Company of the Exercise Price (or by cashless exercise, if permitted) and all taxes required to be paid by the Holder, if any, pursuant to Section 2(d)(vi) prior to the issuance of such shares, having been paid.

(ii) Delivery of New Warrants upon Exercise. If this Warrant shall have been exercised in part, the Company shall, at the request of a Holder and upon surrender of this Warrant certificate, at the time of delivery of the Warrant Shares, deliver to the Holder a new Warrant evidencing the rights of the Holder to purchase the unpurchased Warrant Shares called for by this Warrant, which new Warrant shall in all other respects be identical with this Warrant.

(iii) Rescission Rights. If the Company fails to cause its transfer agent to transmit to the Holder the Warrant Shares pursuant to Section 2(d)(i) by the Warrant Share Delivery Date, then the Holder will have the right to rescind such exercise.

(iv) Compensation for Buy-In on Failure to Timely Deliver Warrant Shares upon Exercise. In addition to any other rights available to the Holder, if the Company fails to cause the Transfer Agent to transmit to the Holder the Warrant Shares pursuant to an exercise on or before the Warrant Share Delivery Date, and if after such date the Holder is required by its broker to purchase (in an open market transaction or otherwise) or the Holder’s brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by the Holder of the Warrant Shares which the Holder anticipated receiving upon such exercise (a “Buy-In”), then the Company shall (A) pay in cash to the Holder the amount, if any, by which (x) the Holder’s total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased exceeds (y) the amount obtained by multiplying (1) the number of Warrant Shares that the Company was required to deliver to the Holder in connection with the exercise at issue times (2) the price at which the sell order giving rise to such purchase obligation was executed, and (B) at the option of the Holder, either reinstate the portion of the Warrant and equivalent number of Warrant Shares for which such exercise was not honored (in which case such exercise shall be deemed rescinded) or deliver to the Holder the number of shares of Common Stock that would have been issued had the Company timely complied with its exercise and delivery obligations hereunder. For example, if the Holder purchases Common Stock having a total purchase price of \$11,000 to cover a Buy-In with respect to an attempted exercise of shares of Common Stock with an aggregate sale price giving rise to such purchase obligation of \$10,000, under clause (A) of the immediately preceding sentence the Company shall be required to pay the Holder \$1,000. The Holder shall provide the Company written notice indicating the amounts payable to the Holder in respect of the Buy-In and, upon request of the Company, evidence of the amount of such loss. Nothing herein shall limit a Holder’s right to pursue any other remedies available to it hereunder, at law or in equity, including, without limitation, a decree of specific performance and/or injunctive relief with respect to the Company’s failure to timely deliver shares of Common Stock upon exercise of the Warrant as required pursuant to the terms hereof.

(v) No Fractional Shares or Scrip. No fractional shares or scrip representing fractional shares shall be issued upon the exercise of this Warrant. As to any fraction of a share which the Holder would otherwise be entitled to purchase upon such exercise, the Company shall, at its election, either pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the Exercise Price or round up to the next whole share.

(vi) Charges, Taxes and Expenses. Issuance of Warrant Shares shall be made without charge to the Holder for any issue or transfer tax or other incidental expense in respect of the issuance of such Warrant Shares, all of which taxes and expenses shall be paid by the Company, and such Warrant Shares shall be issued in the name of the Holder or in such name or names as may be directed by the Holder; provided, however, that, in the event Warrant Shares are to be issued in a name other than the name of the Holder, this Warrant when surrendered for exercise shall be accompanied by the Assignment Form attached hereto duly executed by the Holder, and the Company may require, as a condition thereto, the payment of a sum sufficient to reimburse it for any transfer tax incidental thereto. The Company shall pay all Transfer Agent fees required for same-day processing of any Notice of Exercise.

(vii) Closing of Books. The Company will not close its stockholder books or records in any manner which prevents the timely exercise of this Warrant pursuant to the terms hereof.

(e) Holder’s Exercise Limitations. The Company shall not effect any exercise of this Warrant, and a Holder shall not have the right to exercise any portion of this Warrant, pursuant to Section 2 or otherwise, to the extent that after giving effect to such issuance after exercise as set forth on the applicable Notice of Exercise, the Holder (together with the Holder’s Affiliates, and any other Persons acting as a group together with the Holder or any of the Holder’s Affiliates), would beneficially own in excess of the Beneficial Ownership Limitation (as defined below). For purposes of the foregoing sentence, the number of shares of Common Stock beneficially owned by the Holder and its Affiliates shall include the number of shares of Common Stock issuable upon exercise of this Warrant with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which would be issuable upon (i) exercise of the remaining, non-exercised portion of this Warrant beneficially owned by the Holder or any of its Affiliates and (ii) exercise or conversion of the unexercised or non-converted portion of any other securities of the Company (including, without limitation, any other security of the

Company or any other entity that is convertible into, or exercisable or exchangeable for, Common Stock, or any warrant or other right to purchase Common Stock or any other security of the Company or any other entity that is convertible into, or exercisable or exchangeable for, Common Stock (“Common Stock Equivalents”) subject to a limitation on conversion or exercise analogous to the limitation contained herein beneficially owned by the Holder or any of its Affiliates. Except as set forth in the preceding sentence, for purposes of this Section 2(e), beneficial ownership shall be calculated in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder, it being acknowledged by the Holder that the Company is not representing to the Holder that such calculation is in compliance with Section 13(d) of the Exchange Act and the Holder is solely responsible for any schedules required to be filed in accordance therewith. To the extent that the limitation contained in this Section 2(e) applies, the determination of whether this Warrant is exercisable (in relation to other securities owned by the Holder together with any Affiliates) and of which portion of this Warrant is exercisable shall be in the sole discretion of the Holder, and the submission of a Notice of Exercise, shall be deemed to be the Holder’s determination of whether, and representation and certification to the Company that, this Warrant is exercisable (in relation to other securities owned by the Holder together with any Affiliates) and of which portion of this Warrant is exercisable, in each case subject to the Beneficial Ownership Limitation, and the Company shall have no obligation to verify or confirm the accuracy of such determination. In addition, a determination as to any group status as contemplated above shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. For purposes of this Section 2(e), in determining the number of outstanding shares of Common Stock, a Holder may rely on the number of outstanding shares of Common Stock as reflected in (A) the Company’s most

4

recent periodic or annual report filed with the Commission, as the case may be, (B) a more recent public announcement by the Company or (C) a more recent written notice by the Company or the Transfer Agent setting forth the number of shares of Common Stock outstanding. Upon the written or oral request of a Holder, the Company shall within two (2) trading days confirm orally and in writing to the Holder the number of shares of Common Stock then outstanding. In any case, the number of outstanding shares of Common Stock shall be determined after giving effect to the conversion or exercise of securities of the Company, including this Warrant, by the Holder or its Affiliates since the date as of which such number of outstanding shares of Common Stock was reported. The “Beneficial Ownership Limitation” shall be 4.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon exercise of this Warrant. The Holder, upon not less than 61 days’ prior notice to the Company, may increase or decrease the Beneficial Ownership Limitation provisions of this Section 2(e), provided that the Beneficial Ownership Limitation in no event exceeds 9.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon exercise of this Warrant held by the Holder, and the provisions of this Section 2(e) shall continue to apply. Any such increase or decrease will not be effective until the 61st day after such notice is delivered to the Company. The provisions of this paragraph shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this Section 2(e) to correct this paragraph (or any portion hereof) which may be defective or inconsistent with the intended Beneficial Ownership Limitation herein contained or to make changes or supplements necessary or desirable to properly give effect to such limitation. The limitations contained in this paragraph shall apply to a successor holder of this Warrant.

Section 3. Certain Adjustments.

(a) Stock Dividends and Splits. If the Company, at any time while this Warrant is outstanding: (i) pays a stock dividend or otherwise makes a distribution or distributions on shares of its Common Stock or any other equity or equity equivalent securities payable in shares of Common Stock (which, for the avoidance of doubt, shall not include any shares of Common Stock issued by the Company upon exercise of this Warrant), (ii) subdivides outstanding shares of Common Stock into a larger number of shares, (iii) combines (including by way of reverse stock split) outstanding shares of Common Stock into a smaller number of shares, or (iv) issues by reclassification of shares of the Common Stock any shares of capital stock of the Company, then in each case the Exercise Price shall be multiplied by a fraction of which the numerator shall be the number of shares of Common Stock (excluding treasury shares, if any) outstanding immediately before such event and of which the denominator shall be the number of shares of Common Stock outstanding immediately after such event, and the number of shares issuable upon exercise of this Warrant shall be proportionately adjusted such that the aggregate Exercise Price of this Warrant shall remain unchanged. Any adjustment made pursuant to this Section 3(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution and shall become effective immediately after the effective date in the case of a subdivision, combination or re-classification.

(b) Subsequent Rights Offerings. In addition to any adjustments pursuant to Section 3(a) above, if at any time during which this Warrant is outstanding the Company grants, issues or sells any Common Stock Equivalents or other rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of shares of Common Stock (“Purchase Rights”), then the Holder will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the Holder could have acquired if the Holder had held the number of shares of Common Stock acquirable upon complete exercise of this Warrant (without regard to any limitations on exercise hereof, including without limitation, the Beneficial Ownership Limitation) immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the grant, issue or sale of such Purchase Rights (provided, however, to the extent that the Holder’s right to participate in any such Purchase Right would result in the Holder exceeding the Beneficial Ownership Limitation, then the Holder

5

shall not be entitled to participate in such Purchase Right to such extent (or beneficial ownership of such shares of Common Stock as a result of such Purchase Right to such extent) and such Purchase Right to such extent shall be held in abeyance for the Holder until such time, if ever, as its right thereto would not result in the Holder exceeding the Beneficial Ownership Limitation). The provisions of this Section 3(b) will not apply to any grant, issuance or sale of Common Stock Equivalents or other rights to purchase stock, warrants, securities or other property of the Company which is not made pro rata to the record holders of any class of shares of Common Stock.

(c) Pro Rata Distributions. During such time as this Warrant is outstanding, if the Company shall declare or make any dividend or other distribution of its assets (or rights to acquire its assets) to holders of shares of Common Stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property or options by way of a dividend, spinoff, reclassification, corporate rearrangement, scheme of arrangement or other similar transaction) (a “Distribution”), at any time after the issuance of this Warrant, then, in each such case and to the extent permitted by FINRA Rule 5110(f)(2)(G), the Holder shall be entitled to participate in such Distribution to the same extent that the Holder would have participated therein if the Holder had held the number of shares of Common Stock acquirable upon complete exercise of this Warrant (without regard to any limitations on exercise hereof, including, without limitation, the Beneficial Ownership Limitation) immediately before the date of which a record is taken for

such Distribution, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the participation in such Distribution (provided, however, to the extent that the Holder's right to participate in any such Distribution would result in the Holder exceeding the Beneficial Ownership Limitation, then the Holder shall not be entitled to participate in such Distribution to such extent (or in the beneficial ownership of such shares of Common Stock as a result of such Distribution to such extent) and the portion of such Distribution shall be held in abeyance for the benefit of the Holder until such time, if ever, as its right thereto would not result in the Holder exceeding the Beneficial Ownership Limitation).

(d) Fundamental Transaction. If, at any time while this Warrant is outstanding, (i) the Company, directly or indirectly, in one or more related transactions effects any merger or consolidation of the Company with or into another Person, (ii) the Company, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of its assets in one or more related transactions, (iii) any direct or indirect purchase offer, tender offer or exchange offer (whether by the Company or another Person) is completed pursuant to which holders of Common Stock are permitted to sell, tender or exchange their shares for other securities, cash or property and has been accepted by the holders of 50% or more of the outstanding Common Stock, (iv) the Company, directly or indirectly, in one or more related transactions effects any reclassification, reorganization or recapitalization of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property, or (v) the Company, directly or indirectly, in one or more related transactions consummates a stock or share purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spinoff or scheme of arrangement) with another Person or group of Persons whereby such other Person or group acquires more than 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the other Person or other Persons making or party to, or associated or affiliated with, the other Persons making or party to such stock or share purchase agreement or other business combination) (each a "Fundamental Transaction"), then, upon any subsequent exercise of this Warrant, the Holder shall have the right to receive, for each Warrant Share that would have been issuable upon such exercise immediately prior to the occurrence of such Fundamental Transaction (without regard to any limitation in Section 2(e) on the exercise of this Warrant), the number of shares of Common Stock of the successor or acquiring corporation or of the Company, if it is the surviving corporation, and any additional or alternative consideration (the "Alternative Consideration") receivable as a result of such Fundamental Transaction by a holder of the number of shares of Common Stock for which this Warrant is exercisable immediately prior to such Fundamental Transaction (without regard to any limitation in Section 2(e) on the exercise of this Warrant). For purposes of any such exercise, the determination of the Exercise Price shall be appropriately

6

adjusted to apply to such Alternative Consideration based on the amount of Alternative Consideration issuable in respect of one share of Common Stock in such Fundamental Transaction, and the Company shall apportion the Exercise Price among the Alternative Consideration in a reasonable manner reflecting the relative value of any different components of the Alternative Consideration. If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Fundamental Transaction, then the Holder shall be given the same choice as to the Alternative Consideration it receives upon any exercise of this Warrant following such Fundamental Transaction. Notwithstanding anything to the contrary, in the event of a Fundamental Transaction that is (1) an all cash transaction, (2) a "Rule 13e-3 transaction" as defined in Rule 13e-3 under the Exchange Act, or (3) a Fundamental Transaction involving a person or entity not traded on a Trading Market, including, but not limited to, the NYSE, the NYSE MKT, the Nasdaq Global Select Market, the Nasdaq Global Market, or the Nasdaq Capital Market, the Company or any Successor Entity (as defined below) shall, at the option of the Holder or the Company or any Successor Entity, exercisable at any time concurrently with, or within 30 days after, the consummation of the Fundamental Transaction, purchase this Warrant from the Holder by paying to the Holder an amount of cash equal to the Black Scholes Value of the remaining unexercised portion of this Warrant on the date of the consummation of such Fundamental Transaction. "Black Scholes Value" means the value of this Warrant based on the Black and Scholes Option Pricing Model obtained from the "OV" function on Bloomberg determined as of the day of consummation of the applicable Fundamental Transaction for pricing purposes and reflecting (A) a risk-free interest rate corresponding to the U.S. Treasury rate for a period equal to the time between the date of the public announcement of the applicable Fundamental Transaction and the Termination Date, (B) an expected volatility equal to the greater of 100% and the 100 day volatility obtained from the HVT function on Bloomberg as of the trading day immediately following the public announcement of the applicable Fundamental Transaction, (C) the underlying price per share used in such calculation being the sum of the price per share being offered in cash, if any, plus the value of any non-cash consideration, if any, being offered in such Fundamental Transaction and (D) a remaining option time equal to the time between the date of the public announcement of the applicable Fundamental Transaction and the Termination Date. The Company shall cause any successor entity in a Fundamental Transaction in which the Company is not the survivor (the "Successor Entity") to assume in writing all of the obligations of the Company under this Warrant in accordance with the provisions of this Section 3(e), and to deliver to the Holder in exchange for this Warrant a security of the Successor Entity evidenced by a written instrument substantially similar in form and substance to this Warrant which is exercisable for a corresponding number of shares of capital stock of such Successor Entity (or its parent entity) equivalent to the shares of Common Stock acquirable and receivable upon exercise of this Warrant (without regard to any limitations on the exercise of this Warrant) prior to such Fundamental Transaction, and with an exercise price which applies the Exercise Price hereunder to such shares of capital stock (but taking into account the relative value of the shares of Common Stock pursuant to such Fundamental Transaction and the value of such shares of capital stock, such number of shares of capital stock and such exercise price being for the purpose of protecting the economic value of this Warrant immediately prior to the consummation of such Fundamental Transaction). Upon the occurrence of any such Fundamental Transaction, the Successor Entity shall succeed to, and be substituted for (so that from and after the date of such Fundamental Transaction, the provisions of this Warrant and the other Transaction Documents referring to the "Company" shall refer instead to the Successor Entity), and may exercise every right and power of, the Company and shall assume all of the obligations of the Company, under this Warrant and the other Transaction Documents with the same effect as if such Successor Entity had been named as the Company herein.

(e) Calculations. All calculations under this Section 3 shall be made to the nearest cent or the nearest 1/100th of a share, as the case may be. For purposes of this Section 3, the number of shares of Common Stock deemed to be issued and outstanding as of a given date shall be the sum of the number of shares of Common Stock (excluding treasury shares, if any) issued and outstanding.

7

(f) Notice to Holder.

(i) Adjustment to Exercise Price. Whenever the Exercise Price is adjusted pursuant to any provision of this Section 3, the Company shall promptly mail to the Holder a notice setting forth the Exercise Price after such adjustment and any resulting adjustment to the number of Warrant Shares and setting forth a brief statement of the facts requiring such adjustment.

(ii) Notice to Allow Exercise by Holder. If (A) the Company shall declare a dividend (or any other distribution in whatever form) on the Common Stock, (B) the Company shall declare a special nonrecurring cash dividend on or a redemption of the Common Stock, (C) the Company shall

authorize the granting to all holders of the Common Stock rights or warrants to subscribe for or purchase any shares of capital stock of any class or any rights, (D) the approval of any stockholders of the Company shall be required in connection with any reclassification of the Common Stock, any consolidation or merger to which the Company is a party, any sale or transfer of all or substantially all of the assets of the Company, or any compulsory share exchange whereby the Common Stock is converted into other securities, cash or property, or (E) the Company shall authorize the voluntary or involuntary dissolution, liquidation or winding up of the affairs of the Company, then, in each case, the Company shall cause to be mailed to the Holder at its last address as it shall appear upon the Warrant Register of the Company, at least 10 business days prior to the applicable record or effective date hereinafter specified, a notice stating (x) the date on which a record is to be taken for the purpose of such dividend, distribution, redemption, rights or warrants, or if a record is not to be taken, the date as of which the holders of the Common Stock of record to be entitled to such dividend, distributions, redemption, rights or warrants are to be determined or (y) the date on which such reclassification, consolidation, merger, sale, transfer or share exchange is expected to become effective or close, and the date as of which it is expected that holders of the Common Stock of record shall be entitled to exchange their shares of the Common Stock for securities, cash or other property deliverable upon such reclassification, consolidation, merger, sale, transfer or share exchange; provided that the failure to mail such notice or any defect therein or in the mailing thereof shall not affect the validity of the corporate action required to be specified in such notice. To the extent that any notice provided hereunder constitutes, or contains, material, non-public information regarding the Company, the Company shall, simultaneously with the mailing of such notice, file such notice with the Commission pursuant to a Current Report on Form 8-K. The Holder shall remain entitled to exercise this Warrant during the period commencing on the date of such notice to the effective date of the event triggering such notice except as may otherwise be expressly set forth herein.

Section 4. Transfer of Warrant.

(a) Transferability. This Warrant and all rights hereunder (including, without limitation, any registration rights) are transferable, in whole or in part, upon surrender of this Warrant at the principal office of the Company or its designated agent, together with a written assignment of this Warrant substantially in the form attached hereto duly executed by the Holder or its agent or attorney and funds sufficient to pay any transfer taxes payable upon the making of such transfer. Upon such surrender and, if required, such payment, the Company shall execute and deliver a new Warrant or Warrants in the name of the assignee or assignees, as applicable, and in the denomination or denominations specified in such instrument of assignment, and shall issue to the assignor a new Warrant evidencing the portion of this Warrant not so assigned, and this Warrant shall promptly be cancelled. The Warrant, if properly assigned in accordance herewith, may be exercised by a new holder for the purchase of Warrant Shares without having a new Warrant issued. Neither this Warrant nor any Warrant Shares issued upon exercise of this Warrant shall be sold, transferred, assigned, pledged, or hypothecated, or be the subject of any hedging, short sale, derivative, put, or call transaction that would result in the effective economic disposition of the securities, by any person for a period of 180 days immediately following the date of effectiveness or commencement of sales of the offering pursuant to which this Warrant is being issued, except:

- (i) the transfer of any security by operation of law or by reason of reorganization of the Company;

8

(ii) the transfer of any security to any FINRA member firm participating in the offering and the officers or partners thereof, if all securities so transferred remain subject to the lock-up restriction in this Section 4(a) for the remainder of the time period; or

(iii) the exercise or conversion of any security, if all securities received remain subject to the lock-up restriction in this Section 4(a) for the remainder of the time period.

(b) New Warrants. This Warrant may be divided or combined with other Warrants upon presentation hereof at the aforesaid office of the Company, together with a written notice specifying the names and denominations in which new Warrants are to be issued, signed by the Holder or its agent or attorney. Subject to compliance with Section 4(a), as to any transfer which may be involved in such division or combination, the Company shall execute and deliver a new Warrant or Warrants in exchange for the Warrant or Warrants to be divided or combined in accordance with such notice. All Warrants issued on transfers or exchanges shall be dated the initial issuance date of this Warrant and shall be identical with this Warrant except as to the number of Warrant Shares issuable pursuant thereto.

(c) Warrant Register. The Company shall register this Warrant, upon records to be maintained by the Company for that purpose (the "Warrant Register"), in the name of the record Holder hereof from time to time. The Company may deem and treat the registered Holder of this Warrant as the absolute owner hereof for the purpose of any exercise hereof or any distribution to the Holder, and for all other purposes, absent actual notice to the contrary.

Section 5. Registration Rights.

(a) Registration of Common Stock. The Company shall use its best efforts to maintain the effectiveness of the Registration Statement and a current Prospectus relating thereto, until the Termination Date. During any period when the Company fails to have maintained an effective Registration Statement or a current Prospectus relating thereto and the Holder desires to exercise the Warrant and, in the opinion of counsel to the Holder, Rule 144 is not available as an exemption from registration for the resale of the Warrant Shares held by the Holder, the Company shall immediately file a registration statement registering the resale of the Warrant Shares and use its best efforts to have it declared effective by the Commission within 30 days.

(b) Demand Registration Rights. To the extent the Company does not maintain an effective registration statement for the Warrant Shares, then for a period commencing on the Initial Exercise Date and terminating on the Termination Date, the Holder is entitled to one "demand" registration right at the Company's expense, and additional "demand" registration rights at the Holder's expense. Upon receipt of a demand registration request from the registered Holder, the Company shall file a registration statement on Form S-3 ("Form S-3") or, if Form S-3 is not available, on any other appropriate form, including Form S-1, and cause such registration statement to become effective in an expeditious manner. A registration requested pursuant to this Section 5(b) shall not be deemed to have been effected: (i) unless a registration statement with respect thereto has become effective or (ii) if, after it has become effective, such registration is interfered with by any stop order, injunction or other order or requirement of the SEC or other governmental agency or court of competent jurisdiction for any reason, other than by reason of some act or omission by the Holder.

(c) Piggyback Registration Rights. To the extent the Company does not maintain an effective registration statement for the Warrant Shares and in the further event that the Company files a registration statement with the Securities and Exchange Commission covering the sale of its shares of Common Stock (other than a registration statement on Form S-4 or S-8, or on another form, or in another context, in which such "piggyback" registration would be inappropriate), then, for a period commencing on the Initial Exercise Date and terminating on the seventh (7th) anniversary of the Effective Date, the Company shall give written notice of such proposed filing to the holders of Warrant Shares as soon as practicable but in no event less than twenty (20) days before the anticipated

filing date, which notice shall describe the amount and type of securities to be included in such offering, the intended method(s) of distribution, and the name of the proposed managing underwriter or underwriters, if any, of the offering, and offer to the holders of Warrant Shares in such notice the opportunity to register the sale of such number of shares of Warrant Shares as such holders may request in writing within ten (10) days following receipt of such notice (a "Piggyback Registration"). The Company shall cause such Warrant Shares to be included in such registration and shall use its best efforts to cause the managing underwriter or underwriters of a proposed underwritten offering to permit the Warrant Shares requested to be included in a Piggyback Registration on the same terms and conditions as any similar securities of the Company and to permit the sale or other disposition of such Warrant Shares in accordance with the intended method(s) of distribution thereof. All holders of Warrant Shares proposing to distribute their securities through a Piggyback Registration that involves an underwriter or underwriters shall enter into an underwriting agreement in customary form with the underwriter or underwriters selected for such Piggyback Registration.

Section 6. Miscellaneous.

(a) No Rights as Stockholder until Exercise. This Warrant does not entitle the Holder to any voting rights, dividend rights or other rights as a stockholder of the Company prior to the exercise hereof as set forth in Section 2, except as expressly set forth in Section 3.

(b) Loss, Theft, Destruction or Mutilation of Warrant. The Company covenants that upon receipt by the Company of evidence reasonably satisfactory to it of the loss, theft, destruction or mutilation of this Warrant or any stock certificate relating to the Warrant Shares, and in case of loss, theft or destruction, of indemnity or security reasonably satisfactory to it (which, in the case of the Warrant, shall not include the posting of any bond), and upon surrender and cancellation of such Warrant or stock certificate, if mutilated, the Company will make and deliver a new Warrant or stock certificate of like tenor and dated as of such cancellation, in lieu of such Warrant or stock certificate.

(c) Saturdays, Sundays, Holidays, etc. If the last or appointed day for the taking of any action or the expiration of any right required or granted herein shall not be a business day, then, such action may be taken or such right may be exercised on the next succeeding business day.

(d) Authorized Shares.

The Company covenants that, during the period the Warrant is outstanding, it will reserve from its authorized and unissued Common Stock a sufficient number of shares to provide for the issuance of the Warrant Shares upon the exercise of any purchase rights under this Warrant. The Company further covenants that its issuance of this Warrant shall constitute full authority to its officers who are charged with the duty of executing stock certificates to execute and issue the necessary Warrant Shares upon the exercise of the purchase rights under this Warrant. The Company will take all such commercially reasonable action as may be necessary to assure that such Warrant Shares may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of the Trading Market upon which the Common Stock may be listed. The Company covenants that all Warrant Shares which may be issued upon the exercise of the purchase rights represented by this Warrant will, upon exercise of the purchase rights represented by this Warrant and payment for such Warrant Shares in accordance herewith, be duly authorized, validly issued, fully paid and nonassessable and free from all taxes, liens and charges in respect of the issue thereof (other than taxes in respect of any transfer occurring contemporaneously with such issue).

Except and to the extent as waived or consented to by the Holder, the Company shall not by any action, including, without limitation, amending its certificate of incorporation or through any reorganization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities or any other voluntary action, avoid or seek to

avoid the observance or performance of any of the terms of this Warrant, but will at all times in good faith assist in the carrying out of all such terms and in the taking of all such actions as may be necessary or appropriate to protect the rights of the Holder as set forth in this Warrant against impairment. Without limiting the generality of the foregoing, the Company will (i) not increase the par value of any Warrant Shares above the amount payable therefor upon the exercise of this Warrant, (ii) take all such action as may be necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable Warrant Shares upon the exercise of this Warrant and (iii) use commercially reasonable efforts to obtain all authorizations, exemptions or consents from any regulatory body having jurisdiction thereof, as may be necessary to enable the Company to perform its obligations under this Warrant.

Before taking any action which would result in an adjustment in the number of Warrant Shares for which this Warrant is exercisable or in the Exercise Price, the Company shall obtain all such authorizations therefor, exemptions thereof and consents thereto, as may be necessary from any regulatory body having jurisdiction thereof.

(e) Jurisdiction. All questions concerning the construction, validity, enforcement and interpretation of this Warrant shall be determined in accordance with the laws of the State of New York, without regard to conflict of laws principles, and federal or state courts sitting in the City of New York shall have exclusive jurisdiction over matters arising out of this Warrant.

(f) Restrictions. The Holder acknowledges that the Warrant Shares acquired upon the exercise of this Warrant, if not registered, and the Holder does not utilize cashless exercise, will have restrictions upon resale imposed by state and federal securities laws.

(g) Nonwaiver and Expenses. No course of dealing or any delay or failure to exercise any right hereunder on the part of Holder shall operate as a waiver of such right or otherwise prejudice the Holder's rights, powers or remedies. Without limiting any other provision of this Warrant or the Agreement, if the Company willfully and knowingly fails to comply with any provision of this Warrant, which results in any material damages to the Holder, the Company shall pay to the Holder such amounts as shall be sufficient to cover any costs and expenses including, but not limited to, reasonable attorneys' fees, including those of appellate proceedings, incurred by the Holder in collecting any amounts due pursuant hereto or in otherwise enforcing any of its rights, powers or remedies hereunder.

(h) Notices. Any notice, request or other document required or permitted to be given or delivered to the Holder by the Company shall be delivered in accordance with the notice provisions of the Agreement.

(i) Limitation of Liability. No provision hereof, in the absence of affirmative action by the Holder sufficient to exercise this Warrant to purchase Warrant Shares, and no enumeration herein of the rights or privileges of the Holder, shall give rise to any liability of the Holder for the purchase price of any Common Stock or as a stockholder of the Company, whether such liability is asserted by the Company or by creditors of the Company.

(j) Remedies. The Holder, in addition to being entitled to exercise all rights granted by law, including recovery of damages, will be entitled to specific performance of its rights under this Warrant. The Company agrees that monetary damages would not be adequate compensation for any loss incurred by reason of a breach by it of the provisions of this Warrant and hereby agrees to waive and not to assert the defense in any action for specific performance or other equitable remedy that a remedy at law would be adequate.

(k) Successors and Assigns. Subject to applicable securities laws, this Warrant and the rights and obligations evidenced hereby shall inure to the benefit of and be binding upon the successors and permitted assigns of the Company and the successors and permitted assigns of Holder. The provisions of this Warrant are intended to be for the benefit of any Holder from time to time of this Warrant and shall be enforceable by the Holder or holder of Warrant Shares.

11

(l) Amendment. This Warrant may be modified or amended or the provisions hereof waived with the written consent of the Company and the Holder.

(m) Severability. Wherever possible, each provision of this Warrant shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Warrant shall be prohibited by or invalid under applicable law, such provision shall be ineffective to the extent of such prohibition or invalidity, without invalidating the remainder of such provision or the remaining provisions of this Warrant.

(n) Headings. The headings used in this Warrant are for reference only and shall not, for any purpose, be deemed a part of this Warrant.

(Signature Page Follows)

12

IN WITNESS WHEREOF, the Company has caused this Warrant to be executed by its officer thereunto duly authorized as of the date first above indicated.

OPGEN, INC.

By: _____
Name: Evan Jones

Title: Chief Executive Officer

[Signature Page to Underwriters' Warrant]

NOTICE OF EXERCISE

TO: **OPGEN, INC.**

(1) The undersigned hereby elects to purchase _____ Warrant Shares of the Company pursuant to the terms of the attached Warrant, dated April _____, 2015, and tenders herewith payment of the exercise price in full, together with all applicable transfer taxes, if any.

(2) Payment shall take the form of (check applicable box):

lawful money of the United States by wire transfer or cashier's check drawn on a United States bank; or

if permitted by the terms of the Warrant, the cancellation of such number of Warrant Shares as is necessary, in accordance with the formula set forth in subsection 2(c) of the Warrant, to exercise the Warrant with respect to the maximum number of Warrant Shares purchasable pursuant to the cashless exercise procedure set forth in subsection 2(c) of the Warrant.

(3) Please issue said Warrant Shares in the name of the undersigned or in such other name or names as is specified below:

The Warrant Shares shall be delivered to the following DWAC Account Number:

[SIGNATURE OF HOLDER:]

Name of Holder:

Signature of Authorized Signatory: _____

Name of Authorized Signatory: _____
Title of Authorized Signatory: _____
Date: _____

ASSIGNMENT FORM

(To assign the foregoing Warrant, execute this form and supply the required information. Do not use this form to exercise the Warrant.)

FOR VALUE RECEIVED, all of or a [] portion of the foregoing Warrant and all rights evidenced thereby are hereby assigned to _____, whose address is _____

[SIGNATURE OF HOLDER:]

Name of Holder: _____
Signature of Authorized Signatory: _____
Name of Authorized Signatory: _____
Title of Authorized Signatory: _____
Date: _____

Signature Guaranteed: _____

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 whatsoever, and must be guaranteed by a bank or trust company. Officers of corporations and those acting in a fiduciary or other representative capacity should file proper evidence of authority to assign the foregoing Warrant.

ANNEX II

FORM OF LOCK-UP AGREEMENT

April , 2015

Maxim Group LLC
405 Lexington Avenue
New York, NY 10174

Re: Initial Public Offering of OpGen, Inc.

Ladies and Gentlemen:

The undersigned, a holder of common stock, par value \$0.01 (“**Common Stock**”), or rights to acquire Common Stock, of OpGen, Inc. (the “**Company**”), understands that you are the representative (the “**Representative**”) of the several underwriters (collectively, the “**Underwriters**”) named or to be named in the final form of **Schedule A** to the underwriting agreement (the “**Underwriting Agreement**”) to be entered into among the Underwriters and the Company, providing for the public offering (the “**Public Offering**”) of units, consisting of Common Stock and warrants to purchase Common Stock (the “**Securities**”) pursuant to a registration statement filed or to be filed with the U.S. Securities and Exchange Commission (the “**SEC**”). Capitalized terms used herein and not otherwise defined shall have the meanings set forth for them in the Underwriting Agreement.

In consideration of the Underwriters’ agreement to enter into the Underwriting Agreement and to proceed with the Public Offering of the Securities, and for other good and valuable consideration, receipt of which is hereby acknowledged, the undersigned hereby agrees, for the benefit of the Company, the Representative and the other Underwriters that, without the prior written consent of the Representative, the undersigned will not, during the period specified in the following paragraph (the “**Lock-Up Period**”), directly or indirectly, unless otherwise provided herein, (a) offer, sell, agree to offer or sell, solicit offers to purchase, grant any call option or purchase any put option with respect to, pledge, encumber, assign, borrow or otherwise dispose of or transfer (each a “**Transfer**”) any Relevant Security (as defined below) or otherwise publicly disclose the intention to do so, or (b) establish or increase any “put equivalent position” or liquidate or decrease any “call equivalent position” (in each case within the meaning of Section 16 of the Securities Exchange Act of 1934 and the rules and regulations thereunder) with respect to any Relevant Security or otherwise enter into any swap, derivative or other transaction or arrangement that Transfers to another, in whole or in part, any economic consequence of ownership of a Relevant Security, whether or not such transaction is to be settled by the delivery of Relevant Securities, other securities, cash or other consideration, or otherwise publicly disclose the intention to do so. As used herein, the term “**Relevant Security**” means any share of Common Stock, warrant to purchase Common Stock or any other security of the Company or any other entity that includes or is convertible into, or exercisable or exchangeable for, Common Stock or any other equity security of the Company, in each case owned beneficially or otherwise by the undersigned on the date set forth on the front cover of the final prospectus used in connection with the Public Offering of the Securities (the “**Effective Date**”) or acquired by the undersigned during the Lock-Up Period. The term “Relevant Security” does not include any Securities acquired by the undersigned in the Public Offering contemplated by this Lock-Up Agreement.

The Lock-Up Period will commence on the date of this Lock-Up Agreement and continue and include the date one hundred eighty (180) days after the Effective Date.

In addition, the undersigned further agrees that, without the prior written consent of the Representative, during the Lock-Up Period the undersigned will not: (i) file or participate in the filing with the SEC of any registration statement or circulate or participate in the circulation of any preliminary or final prospectus or other disclosure document, in each case with respect to any proposed offering or sale of a Relevant Security, or (ii) exercise any rights the undersigned may have to require registration with the SEC of any proposed offering or sale of a Relevant Security.

In furtherance of the undersigned's obligations hereunder, the undersigned hereby authorizes the Company during the Lock-Up Period to cause any transfer agent for the Relevant Securities to decline to transfer, and to note stop transfer restrictions on the stock register and other records relating to, Relevant Securities for which the undersigned is the record owner and the transfer of which would be a violation of this Lock-Up Agreement and, in the case of Relevant Securities for which the undersigned is the beneficial but not the record owner, agrees that during the Lock-Up Period it will cause the record owner to cause the relevant transfer agent to decline to transfer, and to note stop transfer restrictions on the stock register and other records relating to, such Relevant Securities to the extent such transfer would be a violation of this Lock-Up Agreement.

Notwithstanding the foregoing, the undersigned may transfer the undersigned's Relevant Securities:

- (i) as a *bona fide* gift or gifts,
- (ii) to any trust for the direct or indirect benefit of the undersigned or a member of members of the immediate family of the undersigned,
- (iii) if the undersigned is a corporation, partnership, limited liability company, trust or other business entity (1) to another corporation, partnership, limited liability company, trust or other business entity that is a direct or indirect affiliate (as defined in Rule 405 under the Securities Act of 1933) of the undersigned, (2) to limited partners, limited liability company members or stockholders of the undersigned, or (3) in connection with a sale, merger or transfer of all or substantially all of the assets of the undersigned or any other change of control of the undersigned, not undertaken for the purpose of avoiding the restrictions imposed by this Lock-Up Agreement,
- (iv) if the undersigned is a trust, to the beneficiary of such trust,
- (v) by testate or intestate succession,
- (vi) by operation of law, such as pursuant to a qualified domestic order or in connection with a divorce settlement,
- (vii) pursuant to the Underwriting Agreement,
- (viii) if acquired by the undersigned in open market transactions after the Offering, or
- (ix) if the undersigned is an entity and not an individual, pursuant to a pledge of the Relevant Securities made by the undersigned pursuant to a credit facility or other bank indebtedness;

2

provided, in the case of clauses (i)-(vi), that (A) such transfer shall not involve a disposition for value, (B) the transferee agrees in writing with the Underwriters and the Company to be bound by the terms of this Lock-Up Agreement, and (C) such transfer would not require any filing under Section 16(a) of the Exchange Act and no such filing is voluntarily made.

For purposes of this Lock-Up Agreement, "immediate family" shall mean any relationship by blood, marriage or adoption, not more remote than first cousin.

The undersigned hereby represents and warrants that the undersigned has full power and authority to enter into this Lock-Up Agreement and that this Lock-Up Agreement has been duly authorized (if the undersigned is not a natural person) and constitutes the legal, valid and binding obligation of the undersigned, enforceable in accordance with its terms. Upon request, the undersigned will execute any additional documents necessary in connection with the enforcement hereof. Any obligations of the undersigned shall be binding upon the successors and assigns of the undersigned from the date of this Lock-Up Agreement.

The undersigned understands that, if the Underwriting Agreement does not become effective, or if the Underwriting Agreement (other than the provisions thereof which survive termination) shall terminate or be terminated prior to payment for and delivery of the Securities to be sold thereunder, the undersigned shall be released from all obligations under this Lock-Up Agreement.

The undersigned, whether or not participating in the Public Offering, understands that the Underwriters are entering into the Underwriting Agreement and proceeding with the Public Offering in reliance upon this Lock-Up Agreement.

This Lock-Up Agreement shall be governed by and construed in accordance with the laws of the State of New York, without regard to the conflict of laws principles thereof. Delivery of a signed copy of this Lock-Up Agreement by facsimile or e-mail/pdf transmission shall be effective as the delivery of the original hereof.

Very truly yours,

Signature: _____

Name (printed):
Title (if applicable):
Entity (if applicable):

3

Consent of Independent Registered Public Accounting Firm

We consent to the inclusion in this Registration Statement on Form S-1 (333-202478) of OpGen, Inc. of our report, which includes an explanatory paragraph related to OpGen, Inc.'s ability to continue as a going concern, dated March 2, 2015, except for the effects of the matter discussed in the sixth paragraph of Note 15, which is as of March 20, 2015, and the matters discussed in the fourth, fifth, seventh, eighth and ninth paragraphs of Note 15, which are as of April 3, 2015, and the matters discussed in Note 2 and the tenth paragraph of Note 15, which are as of April 28, 2015, on our audits of the financial statements of OpGen, Inc. as of December 31, 2014 and 2013 and for the years then ended. We also consent to the reference to our firm under the caption "Experts."

/s/ CohnReznick LLP

Vienna, Virginia
April 28, 2015

QuickLinks

[Exhibit 23.1](#)

[Consent of Independent Registered Public Accounting Firm](#)