

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**
Washington, DC 20549

FORM 8-K

CURRENT REPORT

**Pursuant to Section 13 or 15(d) of the
Securities Exchange Act of 1934**

**May 31, 2017
Date of Report (date of earliest event reported)**

OpGen, Inc.
(Exact name of Registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

001-37367
(Commission
File Number)

06-1614015
(I.R.S. Employer
Identification Number)

**708 Quince Orchard Road, Suite 205
Gaithersburg, MD 20878**
(Address of principal executive offices)

(240) 813-1260
(Registrant's telephone number, including area code)

Not Applicable
(Former name or former address, if changed since last report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (see General Instruction A.2. below):

- Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)
- Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)
- Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))
- Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§240.12b-2 of this chapter).

Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Item 1.01 Entry into a Material Definitive Agreement.

On May 31, 2017, OpGen, Inc. (the "Company") entered into a Note Purchase Agreement with jVen Capital, LLC, a Delaware limited liability company ("jVen Capital"), under which jVen Capital agreed to lend bridge financing in an aggregate principal amount of up to \$1,500,000 to the Company in the form of three \$500,000 secured convertible promissory notes (the "Note Purchase Agreement"). The disclosure set forth below in Item 3.02 of this Current Report on Form 8-K relating to the Note Purchase Agreement and the transactions contemplated thereby is hereby incorporated into this item by reference.

jVen Capital is an affiliate of Evan Jones, the Company's Chairman of the Board and Chief Executive Officer. The transactions contemplated by the Note Purchase Agreement, and the entry into the Note Purchase Agreement and the related documents were approved by the independent members of the Company's Board of Directors, without Mr. Jones' present. In addition, David Rubin, Ph.D., a member of the Board of Directors of the Company and affiliated with Merck Global Health Innovation Fund, LLC, a Delaware limited liability company and a shareholder of the Company ("MGHIF") disclosed his affiliation with MGHIF to the independent members of the Board and recused himself from approval of any transactions with MGHIF contemplated under the Note Purchase Agreement.

Item 2.03 Creation of a Direct Financial Obligation or an Obligation under an Off-Balance Sheet Arrangement of a Registrant.

The descriptions of the Bridge Financing Notes and the A&R MGHIF Note in Section 3.02 of this Current Report on Form 8-K is incorporated by reference into this Item 2.03.

Item 3.02 Unregistered Sales of Equity Securities.

Note Purchase Agreement

On May 31, 2017, the Company entered into a Note Purchase Agreement with jVen Capital, under which jVen Capital agreed to lend bridge financing in an aggregate principal amount of up to \$1,500,000 to the Company in the form of three \$500,000 secured convertible promissory notes. The principal terms of the Bridge Financing Notes to be provided under the Note Purchase Agreement are:

- the Company may access the bridge financing facility by providing five business days' notice to jVen Capital to receive financing in up to three \$500,000 increments through the issuance of secured convertible promissory notes (each, a "Bridge Financing Note" and collectively, the "Bridge Financing Notes");
 - each Bridge Financing Note, when issued, will carry an interest rate of 10% per annum (increased to 15% in an event of default), provide for the issuance of warrants to purchase common stock equal to 10% of the principal balance of such Bridge Financing Note, and entitle the holder to convert the principal and interest of such Bridge Financing Note into shares of common stock and warrants to be sold in a "qualified financing" (offering of debt or equity securities with net proceeds of \$5 million or more to the Company) at a discount of 10% of the offering price in the qualified financing;
 - a maturity date of September 30, 2017, when all principal and interest will be due on any outstanding Bridge Financing Notes; provided, that if a qualified financing occurs prior to September 30, 2017, the maturity date will be accelerated to a date that is five business days after the qualified financing closes, and if the Company does not complete a qualified financing by September 30, 2017, but is working on a transaction, the maturity date can be extended at the option of jVen Capital, but not beyond December 31, 2017;
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- the Bridge Financing Notes are secured, pursuant to security agreements, by all of the Company's assets, but such liens are subordinate to the existing first priority security interest of MGHIF related to the July 2015 \$1,000,000 promissory note by the Company and payable to MGHIF (the "MGHIF Note"); and
- assuming that any Bridge Financing Notes are then outstanding, if the Company does not pay any outstanding Bridge Financing Notes on a timely basis, seeks to liquidate the Company or enters into a bankruptcy proceeding, the then-outstanding Bridge Financing Notes would acquire a two times liquidation preference for unpaid principal and interest. jVen Capital would then have the option to convert the Bridge Financing Notes to preferred stock at a ratio of one share of preferred stock per \$1.00 of principal and interest, which preferred stock would be convertible into 10 shares of voting common stock, otherwise no further preferences are provided to the preferred stock.

A condition to the issuance of any Bridge Financing Notes and the Company receiving the financing evidenced thereby, is an extension of the maturity date of the MGHIF Note from July 14, 2017 to July 14, 2018. To receive MGHIF's consent to such extension, on June 6, 2017, the Company amended and restated the terms of the MGHIF Note to: (i) increase the interest rate to 10%; (ii) issue warrants to purchase shares of common stock to MGHIF equal to ten percent of the principal and accrued interest of the MGHIF Note at the time the amended and restated senior secured convertible promissory note (the "A&R MGHIF Note") was issued; and (iii) provide for conversion of the A&R MGHIF Note upon maturity, at MGHIF's option, to common shares, at a discount of 10% of the then current market price of the Company's shares.

The Bridge Financing Notes are secured, pursuant to security agreements, by all of the Company's assets, but such liens are subordinate to the liens securing the A&R MGHIF Note unless the Company liquidates or enters a bankruptcy proceeding; in such events MGHIF and jVen Capital would have equal secured status and the maturity date on all then-outstanding Bridge Financing Notes and the A&R MGHIF Note will accelerate. The Company, its subsidiary AdvanDx, Inc., jVen Capital and MGHIF entered into an Intercreditor Agreement, dated June 6, 2017, to set forth these provisions.

Warrants

As part of the transactions contemplated by the Note Purchase Agreement and the A&R MGHIF Note, the Company will issue warrants to purchase shares of its common stock (the "Warrants") to jVen Capital and to MGHIF in private placement transactions. Each Warrant is immediately exercisable, has an exercise price equal to 1.10% of the closing stock price of the Company's common stock on the trading day immediately preceding this issuance date and has a five-year term.

Registration Rights Agreements

In connection with the entry into the Note Purchase Agreement and the issuance of the A&R MGHIF Note, the Company also entered into an Amended and Restated Registration Rights Agreement, dated as of June 6, 2017 (the "Registration Rights Agreement"), with jVen Capital and MGHIF, pursuant to which jVen Capital and MGHIF were granted certain demand and piggyback registration rights to participate in subsequent registered offerings of the Company's common stock.

The foregoing descriptions of the Note Purchase Agreement, the A&R MGHIF Note, the Warrants and the Registration Rights Agreement (collectively, the "Transaction Documents") are only a summary and are qualified in their entirety by reference to the complete text of each such Transaction Document, which are filed as exhibits to this Current Report on Form 8-K and incorporated by reference herein.

Item 9.01 Financial Statements and Exhibits.

(d) Exhibits

The following exhibits are filed herewith:

<u>Exhibit</u>	<u>Description</u>
4.1	Form of Warrant to Purchase Common Stock.
10.1	Note Purchase Agreement, dated as of May 31, 2017, by and between OpGen, Inc. and jVen Capital, LLC (incorporated by reference to Exhibit 10.21 of Form S-1, File No. 333-218392, filed May 31, 2017).
10.2	Form of Secured Convertible Promissory Note to be issued by OpGen, Inc. to jVen Capital, LLC under the Note Purchase Agreement (incorporated by reference to Exhibit 10.21 of Form S-1, File No. 333-218392, filed May 31, 2017).
10.3	Amended and Restated Senior Secured Convertible Promissory Note issued by OpGen, Inc. to Merck Global Health Innovation Fund, LLC on June 6, 2017
10.4	Amended and Restated Registration Rights Agreement, dated as of June 6, 2017, by and among OpGen, Inc., jVen Capital, LLC and Merck Global Health Innovation Fund, LLC.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

OpGen, Inc.

Date: June 6, 2017

By: /s/ Timothy C. Dec

Timothy C. Dec
Chief Financial Officer

NEITHER THIS SECURITY NOR THE SECURITIES FOR WHICH THIS SECURITY IS EXERCISABLE HAVE BEEN REGISTERED WITH THE SECURITIES AND EXCHANGE COMMISSION OR THE SECURITIES COMMISSION OF ANY STATE. THIS SECURITY HAS BEEN, AND THE SECURITIES FOR WHICH THIS SECURITY IS EXERCISED MAY BE, ISSUED IN RELIANCE UPON AN EXEMPTION OR EXEMPTIONS FROM REGISTRATION UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "SECURITIES ACT"), AND, IN EACH SUCH CASE, MAY NOT BE OFFERED OR SOLD EXCEPT PURSUANT TO AN EFFECTIVE REGISTRATION STATEMENT UNDER THE SECURITIES ACT OR PURSUANT TO AN AVAILABLE EXEMPTION FROM, OR IN A TRANSACTION NOT SUBJECT TO, THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT AND IN ACCORDANCE WITH APPLICABLE STATE SECURITIES LAWS. THIS SECURITY AND THE SECURITIES ISSUABLE UPON EXERCISE OF THIS SECURITY MAY BE PLEDGED IN CONNECTION WITH A BONA FIDE MARGIN ACCOUNT OR OTHER LOAN SECURED BY SUCH SECURITIES.

OPGEN, INC.

WARRANT TO PURCHASE COMMON STOCK

Warrant No.:
 Number of Shares of Common Stock
 Date of Issuance: _____ ("**Issuance Date**")

OpGen, Inc., a company organized under the laws of Delaware (the "**Company**"), hereby certifies that, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, _____, the registered holder hereof or its permitted assigns (the "**Holder**"), is entitled, subject to the terms set forth below, to purchase from the Company, at the Exercise Price (as defined below) then in effect, upon surrender of this Warrant to Purchase Common Stock (including any Warrants to Purchase Common Stock issued in exchange, transfer or replacement hereof, the "**Warrant**"), at any time or times on or after the Initial Exercisability Date (as defined below), but not after 11:59 p.m., New York time, on the Expiration Date (as defined below), _____ fully paid non-assessable shares of Common Stock, par value \$0.01 per share, subject to adjustment as provided herein (the "**Warrant Shares**"). Except as otherwise defined herein, capitalized terms in this Warrant shall have the meanings set forth in Section 20. [This Warrant is issued pursuant to that certain Note Purchase Agreement, dated May 31, 2017, by and among the Company and jVen Capital, a Delaware limited liability company (the "**Note Purchase Agreement**").] [This Warrant is issued pursuant to that certain Amended and Restated Senior Secured Convertible Promissory Note, dated as of June 6 2017, by and among the Company and Merck Global Health Innovation Fund, LLC, a Delaware limited liability company (the "**A&R Note**").]

1. EXERCISE OF WARRANT.

(a) Mechanics of Exercise. This Warrant may be exercised by the Holder at any time or times on or after the Initial Exercisability Date and on or before the Expiration Date, in whole or in part, by (i) delivery (whether via facsimile, electronic mail or otherwise) of a written notice, in the form attached hereto as Exhibit A (the "**Exercise Notice**"), of the Holder's election to exercise this Warrant and (ii) (A) payment to the Company of an amount equal to the applicable Exercise Price multiplied by the number of Warrant Shares as to which this Warrant is being exercised (the "**Aggregate Exercise Price**") in cash or by wire transfer of immediately available funds or (B) by notifying the Company that this Warrant is being exercised pursuant to a Cashless Exercise (as defined in Section 1(f)). The Holder shall not be required to deliver the original Warrant in order to effect an exercise hereunder nor shall any ink-original signature or medallion guarantee (or other type of guarantee or notarization) with respect to any Exercise Notice be required. Execution and delivery of the Exercise Notice with respect to less than all of the Warrant Shares shall have the same effect as cancellation of the original Warrant and issuance of a new Warrant evidencing the right to purchase the remaining number of Warrant Shares. On or before the first (1st) Trading Day following the date on which the Company has received the applicable Exercise Notice, the Company shall transmit by facsimile or electronic mail an acknowledgment of confirmation of receipt of the Exercise Notice, in the form attached to the Exercise Notice, to the Holder and the Company's transfer agent (the "**Transfer Agent**"). So long as the Holder delivers the Aggregate Exercise Price (or notice of a Cashless Exercise) on or prior to the second (2nd) Trading Day following the date on which the Exercise Notice has been delivered to the Company, then on or prior to the third (3rd) Trading Day following the date on which the Exercise Notice has been delivered to the Company, or, if the Holder does not deliver the Aggregate Exercise Price (or notice of a Cashless Exercise) on or prior to the second (2nd) Trading Day following the date on which the Exercise Notice has been delivered to the Company, then on or prior to the second (2nd) Trading Day following the date on which the Aggregate Exercise Price (or notice of a Cashless Exercise) is delivered (the "**Share Delivery Date**"), the Company shall (X) provided that the Transfer Agent is participating in The Depository Trust Company ("**DTC**") Fast Automated Securities Transfer Program, upon the request of the Holder, credit such aggregate number of Warrant Shares to which the Holder is entitled pursuant to such exercise to the Holder's or its designee's balance account with DTC through its Deposit/Withdrawal At Custodian system, or (Y) if (i) the Transfer Agent is not participating in the DTC Fast Automated Securities Transfer Program or (ii) the shares to be issued have not been registered under the Securities Act or are not freely transferable without restriction or limitation pursuant to Rule 144 under the Securities Act, issue and dispatch by overnight courier to the address as specified in the Exercise Notice, a certificate, registered in the Company's share register in the name of the Holder or its designee, for the number of shares of Common Stock to which the Holder is entitled pursuant to such exercise. The Company shall be responsible for all fees and expenses of the Transfer Agent and all fees and expenses with respect to the issuance of Warrant Shares via DTC, if any, including without limitation for same day processing. Upon delivery of the Exercise Notice, the Holder shall be deemed for all corporate purposes to have become the holder of record of the Warrant Shares with respect to which this Warrant has been exercised, irrespective of the date such Warrant Shares are credited to the Holder's DTC account or the date of delivery of the certificates evidencing such Warrant Shares, as the case may be; provided payment of the Aggregate Exercise Price (other than in the case of a Cashless Exercise) is received within three Trading Days of delivery of the Exercise Notice. If this Warrant is submitted in connection with any exercise pursuant to this Section 1(a) and the number of Warrant Shares represented by this Warrant submitted for exercise is greater than the number of Warrant Shares being acquired upon an exercise, then the Company shall as soon as practicable and in no event later than three (3) Trading Days after any exercise and at its own expense, issue a new Warrant (in accordance with Section 7(d)) representing the right to purchase the number of Warrant Shares issuable immediately prior to such exercise under this Warrant, less the number of Warrant Shares with respect to which this Warrant is exercised.

(b) No Fractional Shares. No fractional shares of Common Stock or scrip representing fractional shares are to be issued upon the exercise of this Warrant, but rather the number of shares of Common Stock to be issued shall be rounded up to the nearest whole number.

(c) 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 that 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 as Exhibit B 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 Exercise Notice and all fees to the Depository Trust Company (or another established clearing corporation performing similar functions) required for same-day electronic delivery of the Warrant Shares.

(d) Exercise Price. For purposes of this Warrant, "**Exercise Price**" means \$_____ per share, which shall be a price that is at a 10% premium to the Closing Bid Price per share on the trading date immediately preceding the Issuance Date, subject to adjustment as provided herein.

(e) Company's Failure to Timely Deliver Securities. In addition to any other rights available to Holder, if, within three (3) Trading Days after the Company's receipt of the Exercise Notice and the Aggregate Exercise Price (or notice of Cashless Exercise), the Company shall fail to issue and deliver a certificate without restrictive legend to the Holder and register such shares of Common Stock on the Company's share register or credit the Holder's balance account with DTC for the number of shares of Common Stock to which the Holder is entitled upon the Holder's exercise hereunder or pursuant to the Company's obligation pursuant to clause (ii) below, and if on or after such Trading Day the Holder purchases (in an open market transaction or otherwise) shares of Common Stock to deliver in satisfaction of a sale by the Holder of shares of Common Stock issuable upon such exercise that the Holder anticipated receiving from the Company (a "**Buy-In**"), then, in addition to all other remedies available to the Holder, the Company shall, within three (3) Trading Days after the Holder's request and in the Holder's discretion, either (i) pay cash to the Holder in an amount equal to the Holder's total purchase price (including brokerage commissions and other reasonable out-of-pocket expenses, if any) for the shares of Common Stock so purchased (the "**Buy-In Price**"), at which point the Company's obligation to deliver such certificate (and to issue such shares of Common Stock) or credit such Holder's balance account with DTC shall terminate, or (ii) promptly honor its obligation to deliver to the Holder a certificate or certificates representing such shares of Common Stock or credit such Holder's balance account with DTC and pay cash to the Holder in an amount equal to the excess (if any) of the Buy-In Price over the product of (A) such number of shares of Common Stock, times (B) any trading price of the Common Stock selected by the Holder in writing as in effect at any time during the period beginning on the applicable Exercise Date and ending on the applicable Share Delivery Date. In addition to the foregoing, if the Company fails for any reason to deliver to the Holder the Warrant Shares subject to an Exercise Notice by the Share Delivery Date, the Company shall pay to the Holder, in cash, as partial liquidated damages and not as a penalty, for each Trading Day that the Warrant Shares are not delivered until such delivery is made or the Holder rescinds the exercise, an amount equal to 1% of the product of (A) the aggregate number of shares of Common Stock not issued to the Holder on a timely basis and to which the Holder is entitled and (B) the Closing Sale Price on the Trading Day immediately preceding the Share Delivery Date, per Trading Day for each Trading Day after such Share Delivery Date until such shares of Common Stock are delivered to the Holder or the Holder rescinds such exercise at any time prior to the issuance of the Warrant Shares. The foregoing shall be without prejudice to any other rights and recourses of Holder in connection with the failure of the Company to deliver and register the shares as aforesaid.

(f) Cashless Exercise. Notwithstanding anything contained herein to the contrary, if a registration statement (as described in the Registration Rights Agreement) covering the resale of the Warrant Shares that are the subject of the Exercise Notice pursuant to the Securities Act (the "Unavailable Warrant Shares") is not available for the resale of such Unavailable Warrant Shares, the Holder may, in its sole discretion (and without limiting the Holder's rights and remedies contained herein or in [any of the other Transaction Documents (as defined in the Note Purchase Agreement)] [the A&R Note or the other agreements or instruments entered into or benefitting the Holder in connection therewith], exercise this Warrant in whole or in part and, in lieu of making the cash payment otherwise contemplated to be made to the Company upon such exercise in payment of the Aggregate Exercise Price, elect instead to receive upon such exercise the "Net Number" of shares of Common Stock determined according to the following formula (a "Cashless Exercise"):

$$\text{Net Number} = \frac{(A \times B) - (A \times C)}{B}$$

For purposes of the foregoing formula:

A= the total number of shares with respect to which this Warrant is then being exercised.

B= the last VWAP immediately preceding the time of delivery of the Notice of Exercise giving rise to the applicable "cashless exercise", as set forth in the applicable Exercise Notice (to clarify, the "last VWAP" will be the last VWAP as calculated over an entire Trading Day such that, in the event that this Warrant is exercised at a time that the Trading Market is open, the prior Trading Day's VWAP shall be used in this calculation).

C= the Exercise Price then in effect for the applicable Warrant Shares at the time of such 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 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. (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 OTCQB or OTCQX is not a Trading Market, the volume weighted average price of the Common Stock for such date (or the nearest preceding date) on OTCQB or OTCQX as applicable, (c) if the Common Stock is not then listed or quoted for trading on OTCQB or OTCQX and if prices for the Common Stock are then reported in the "Pink Sheets" published by 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 (d) 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 Holder and reasonably acceptable to the Company, the fees and expenses of which shall be paid by the Company.

If Warrant Shares are issued in such a cashless exercise, the parties acknowledge and agree that in accordance with Section 3(a)(9) of the Securities Act, the Warrant Shares shall take on the characteristics of the Warrants being exercised, and the holding period of the Warrant Shares being issued may be tacked on to the holding period of this Warrant. The Company agrees not to take any position contrary to this Section 1(f).

(g) Rescission Rights. If the Company fails to cause the Transfer Agent to transmit to the Holder the Warrant Shares pursuant to Section 1(a) by the Share Delivery Date, then the Holder will have the right to rescind such exercise provided that such rescission shall not affect the Company's obligations to make any payments pursuant to Section 1(e) which have accrued prior to the date of such rescission.

(h) Disputes. In the case of a dispute as to the determination of the Exercise Price or the arithmetic calculation of the Warrant Shares, the Company shall promptly issue to the Holder the number of Warrant Shares that are not disputed and resolve such dispute in accordance with Section 14.

(i) RESERVED.

(j) Reservation of Warrant Shares. The Company covenants that it will at all times reserve and keep available out of the aggregate of its authorized but unissued and otherwise unreserved Common Stock, solely for the purpose of enabling it to issue Warrant Shares upon exercise of this Warrant as herein provided, the number of Warrant Shares which are then issuable and deliverable upon the exercise of this entire Warrant, free from preemptive rights or any other contingent purchase rights of persons other than the Holder (after giving effect to the adjustments and restrictions of Section 2, if any). The Company covenants that all Warrant Shares so issuable and deliverable shall, upon issuance and the payment of the applicable Exercise Price in accordance with the terms hereof, be duly and validly authorized, issued and fully paid and non-assessable and free from all taxes, liens and charges created by the Company in respect of the issue thereof (other than taxes in respect of any transfer occurring contemporaneously with such issue). The Company will take all such action as may be necessary to assure that such shares of Common Stock may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of any securities exchange or automated quotation system upon which the Common Stock may be listed.

(k) Voluntary Adjustment By Company. The Company may at any time during the term of this Warrant reduce the then current Exercise Price to any amount and for any period of time deemed appropriate by the Board of Directors of the Company.

2. ADJUSTMENT OF EXERCISE PRICE AND NUMBER OF WARRANT SHARES UPON SUBDIVISION OR COMBINATION OF SHARES OF COMMON STOCK. If the Company at any time on or after the Issuance Date subdivides (by any stock split, stock dividend, recapitalization or otherwise) one or more classes of its outstanding shares of Common Stock into a greater number of shares, the Exercise Price in effect immediately prior to such subdivision will be proportionately reduced and the number of Warrant Shares will be proportionately increased. If the Company at any time on or after the Issuance Date combines (by combination, reverse stock split or otherwise) one or more classes of its outstanding shares of Common Stock into a smaller number of shares, the Exercise Price in effect immediately prior to such combination will be proportionately increased and the number of Warrant Shares will be proportionately decreased. Any adjustment under this Section 2 shall become effective at the close of business on the date the subdivision or combination becomes effective.

3. RIGHTS UPON DISTRIBUTION OF ASSETS. In addition to any adjustments pursuant to Section 2 above, if, on or after the Issuance Date and on or prior to the Expiration Date, 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, options, evidence of indebtedness or any other assets by way of a dividend, spin off, 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, 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 or restrictions on exercise of this Warrant, including without limitation, the Maximum Percentage) 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, that to the extent that the Holder's right to participate in any such Distribution would result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, then the Holder shall not be entitled to participate in such Distribution to such extent (and shall not be entitled to beneficial ownership of such shares of Common Stock as a result of such Distribution (and beneficial ownership) to such extent) and the portion of such Distribution shall be held in abeyance for the benefit of the Holder until such time or times as its right thereto would not result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, at which time or times the Holder shall be granted such Distribution (and any Distributions declared or made on such initial Distribution or on any subsequent Distribution held similarly in abeyance) to the same extent as if there had been no such limitation).

4. PURCHASE RIGHTS; FUNDAMENTAL TRANSACTIONS; CHANGE OF CONTROL.

(a) Purchase Rights. In addition to any adjustments pursuant to Section 2 above, if at any time on or after the Issuance Date and on or prior to the Expiration Date the Company grants, issues or sells any Options, Convertible Securities or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of Common Stock (the "**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 or restrictions on exercise of this Warrant, including without limitation, the Maximum Percentage) 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 Common Stock are to be determined for the grant, issuance or sale of such Purchase Rights (provided, however, that to the extent that the Holder's right to participate in any such Purchase Right would result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, then the Holder shall not be entitled to participate in such Purchase Right to such extent (and shall not be entitled to beneficial ownership of such Common Stock as a result of such Purchase Right (and beneficial ownership) to such extent) and such Purchase Right to such extent shall be held in abeyance for the benefit of the Holder until such time or times as its right thereto would not result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, at which time or times the Holder shall be granted such right (and any Purchase Right granted, issued or sold on such initial Purchase Right or on any subsequent Purchase Right to be held similarly in abeyance) to the same extent as if there had been no such limitation).

(b) Fundamental Transactions. The Company shall not enter into or be party to a Fundamental Transaction unless the Successor Entity assumes in writing all of the obligations of the Company under this Warrant and the other Transaction Documents (as defined in the Note Purchase Agreement) in accordance with the provisions of this Section 4(b), including agreements to deliver to each holder of the Warrants in exchange for such Warrants a security of the Successor Entity evidenced by a written instrument substantially similar in form and substance to this Warrant, including, without limitation, an adjusted exercise price equal to the value for the shares of Common Stock reflected by the terms of such Fundamental Transaction, and exercisable for a corresponding number of shares of capital stock 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. Upon the occurrence of any 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 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 with the same effect as if such Successor Entity had been named as the Company herein. Upon consummation of the Fundamental Transaction, the Successor Entity shall deliver to the Holder confirmation that there shall be issued upon exercise of this Warrant at any time after the consummation of the Fundamental Transaction, in lieu of the shares of Common Stock (or other securities, cash, assets or other property) issuable upon the exercise of the Warrant prior to such Fundamental Transaction, such shares of the publicly traded common stock or common shares (or its equivalent) of the Successor Entity (including its Parent Entity) which the Holder would have been entitled to receive upon the happening of such Fundamental Transaction had this Warrant been converted immediately prior to such Fundamental Transaction, as adjusted in accordance with the provisions of this Warrant. In addition to and not in substitution for any other rights hereunder, prior to the consummation of any Fundamental Transaction pursuant to which holders of shares of Common Stock are entitled to receive securities or other assets with respect to or in exchange for shares of Common Stock (a "**Corporate Event**"), the Company shall make appropriate provision to insure that the Holder will thereafter have the right to receive upon an exercise of this Warrant at any time after the consummation of the Corporate Event but prior to the Expiration Date, in lieu of shares of Common Stock (or other securities, cash, assets or other property) purchasable upon the exercise of this Warrant prior to such Corporate Event, such shares of stock, securities, cash, assets or any other property whatsoever (including warrants or other purchase or subscription rights) which the Holder would have been entitled to receive upon the happening of such Corporate Event had this Warrant been exercised immediately prior to such Corporate Event. The provisions of this Section shall apply similarly and equally to successive Fundamental Transactions and Corporate Events and shall be applied without regard to any limitations on the exercise of this Warrant. Notwithstanding anything to the contrary, in the event of a Fundamental Transaction, the Company or any Successor Entity shall, at the Holder's option, 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 effective date of the Fundamental Transaction. "**Black Scholes Value**" means the value of the unexercised portion of the Warrant remaining on the effective date of the Fundamental Transaction which value is calculated using the Black Scholes Option Pricing Model obtained from the "OV" function on Bloomberg, L.P. utilizing (i) an underlying price per share equal to the greater of (1) the Closing Sale Price on the Trading Day immediately following the public disclosure of the applicable Fundamental Transaction and (2) the sum of the price per share being offered in cash in the applicable Fundamental Transaction (if any) plus the value of the non-cash consideration being offered in the applicable Fundamental Transaction (if any), (ii) a strike price equal to the exercise price in effect on the effective date of the Fundamental Transaction, (iii) a risk-free interest rate corresponding to the U.S. Treasury rate for a period equal to the remaining term of the Warrant as of the Trading Day immediately following the public disclosure of the applicable Fundamental Transaction, (iv) a zero cost of borrow, (v) a remaining option time equal to the time between the Trading Day immediately following the public disclosure of the applicable Fundamental Transaction and the Expiration Date and (vi) an expected volatility equal to the greater of 60% and the 90 day volatility obtained from the "HVT" function on Bloomberg, L.P. (determined utilizing a 365 day annualization factor) as of the Trading Day immediately following the public disclosure of the applicable Fundamental Transaction.

(c) Change of Control. Notwithstanding the foregoing, in the event of a Change of Control other than one in which a Successor Entity that is a publicly traded corporation whose stock is quoted or listed for trading on an Eligible Market assumes this Warrant such that the Warrant shall be exercisable for the publicly traded common stock of such Successor Entity, at the request of the Holder delivered before the ninetieth (90th) day after the consummation of such Change of Control, the Company (or the Successor Entity) shall purchase this Warrant from the Holder by paying to the Holder, within five (5) Business Days after such request (or, if later, on the effective date of the Fundamental Transaction), cash in an amount equal to the Black Scholes Value of the remaining unexercised portion of this Warrant on the date of such Change of Control.

5. NONCIRCUMVENTION. The Company hereby covenants and agrees that the Company will not, by amendment of its governing documents, or through any reorganization, transfer of assets, consolidation, merger, scheme of arrangement, 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, and will at all times in good faith carry out all the provisions of this Warrant and take all action as may be required to protect the rights of the Holder. Without limiting the generality of the foregoing, the Company (i) shall not increase the par value of any shares of Common Stock receivable upon the exercise of this Warrant above the Exercise Price then in effect, (ii) shall take all such actions as may be necessary or appropriate in order that the Company may validly and legally issue fully paid and non-assessable shares of Common Stock upon the exercise of this Warrant, and (iii) shall, so long as any of the Warrants are outstanding, take all action necessary to reserve and keep available out of its authorized and unissued shares of Common Stock, solely for the purpose of effecting the exercise of the Warrants, the number of shares of Common Stock as shall from time to time be necessary to effect the exercise of the Warrants then outstanding (without regard to any limitations on exercise). 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.

6. WARRANT HOLDER NOT DEEMED A STOCKHOLDER. Except as otherwise specifically provided herein, the Holder, solely in such Person's capacity as a holder of this Warrant, shall not be entitled to vote or receive dividends or be deemed the holder of share capital of the Company for any purpose, nor shall anything contained in this Warrant be construed to confer upon the Holder, solely in such Person's capacity as the Holder of this Warrant, any of the rights of a stockholder of the Company or any right to vote, give or withhold consent to any corporate action (whether any reorganization, issue of stock, reclassification of stock, consolidation, merger, conveyance or otherwise), receive notice of meetings, receive dividends or subscription rights, or otherwise, prior to the issuance to the Holder of the Warrant Shares which such Person is then entitled to receive upon the due exercise of this Warrant. In addition, nothing contained in this Warrant shall be construed as imposing any liabilities on the Holder to purchase any securities (upon exercise of this Warrant or otherwise) or as a stockholder of the Company, whether such liabilities are asserted by the Company or by creditors of the Company. Notwithstanding this Section 6, the Company shall provide the Holder with copies of the same notices and other information given to the stockholders of the Company generally, contemporaneously with the giving thereof to the stockholders, unless such notices or other information is contained in the SEC Reports.

7. REISSUANCE OF WARRANTS.

(a) Transfer of Warrant. If this Warrant is to be transferred, the Holder shall surrender this Warrant to the Company, whereupon the Company will forthwith issue and deliver upon the order of the Holder a new Warrant (in accordance with Section 7(d)), registered as the Holder may request, representing the right to purchase the number of Warrant Shares being transferred by the Holder and, if less than the total number of Warrant Shares then underlying this Warrant is being transferred, a new Warrant (in accordance with Section 7(d)) to the Holder representing the right to purchase the number of Warrant Shares not being transferred.

(b) Lost, Stolen or Mutilated Warrant. Upon receipt by the Company of evidence reasonably satisfactory to the Company of the loss, theft, destruction or mutilation of this Warrant, and, in the case of loss, theft or destruction, of any indemnification undertaking by the Holder to the Company in customary form and, in the case of mutilation, upon surrender and cancellation of this Warrant, the Company shall execute and deliver to the Holder a new Warrant (in accordance with Section 7(d)) representing the right to purchase the Warrant Shares then underlying this Warrant.

(c) Exchangeable for Multiple Warrants. This Warrant is exchangeable, upon the surrender hereof by the Holder at the principal office of the Company, for a new Warrant or Warrants (in accordance with Section 7(d)) representing in the aggregate the right to purchase the number of Warrant Shares then underlying this Warrant, and each such new Warrant will represent the right to purchase such portion of such Warrant Shares as is designated by the Holder at the time of such surrender.

(d) Issuance of New Warrants. Whenever the Company is required to issue a new Warrant pursuant to the terms of this Warrant, such new Warrant (i) shall be of like tenor with this Warrant, (ii) shall represent, as indicated on the face of such new Warrant, the right to purchase the Warrant Shares then underlying this Warrant (or in the case of a new Warrant being issued pursuant to Section 7(a) or Section 7(c), the Warrant Shares designated by the Holder which, when added to the number of shares of Common Stock underlying the other new Warrants issued in connection with such issuance, does not exceed the number of Warrant Shares then underlying this Warrant), (iii) shall have an issuance date, as indicated on the face of such new Warrant which is the same as the Issuance Date, and (iv) shall have the same rights and conditions as this Warrant.

8. NOTICES. Whenever notice is required to be given under this Warrant, unless otherwise provided herein, such notice shall be given in accordance with [Section 6.6 of the Note Purchase Agreement] [the A&R Note]. The Company shall provide the Holder with prompt written notice of all actions taken pursuant to this Warrant, including in reasonable detail a description of such action and the reason therefor. Without limiting the generality of the foregoing, the Company will give written notice to the Holder (i) immediately upon any adjustment of the Exercise Price, setting forth in reasonable detail, and certifying, the calculation of such adjustment and (ii) at least fifteen (15) days prior to the date on which the Company closes its books or takes a record (A) with respect to any dividend or distribution upon the shares of Common Stock, (B) with respect to any grants, issuances or sales of Purchase Rights or (C) for determining rights to vote with respect to any Fundamental Transaction, dissolution or liquidation, provided in each case that such information shall be made known to the public prior to or in conjunction with such notice being provided to the Holder.

9. AMENDMENT AND WAIVER. Except as otherwise provided herein, the provisions of this Warrant may be amended and the Company may take any action herein prohibited, or omit to perform any act herein required to be performed by it, only if the Company has obtained the written consent of the Holder; provided that no such action may increase the exercise price of this Warrant or decrease the number of shares or class of stock obtainable upon exercise of this Warrant without the written consent of the Holder.

10. 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, notwithstanding the fact that all rights hereunder terminate on the Termination Date. 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.

11. LIMITATION OF LIABILITY. No provision hereof, in the absence of any affirmative action by the Holder 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.

12. GOVERNING LAW. This Warrant shall be governed by and construed and enforced in accordance with, and all questions concerning the construction, validity, interpretation and performance of this Warrant shall be governed by, the internal laws of the State of New York, without giving effect to any choice of law or conflict of law provision or rule (whether of the State of New York or any other jurisdictions) that would cause the application of the laws of any jurisdictions other than the State of New York. The Company hereby irrevocably submits to the exclusive jurisdiction of the state and federal courts sitting in The City of New York, Borough of Manhattan, for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein, and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of any such court, that such suit, action or proceeding is brought in an inconvenient forum or that the venue of such suit, action or proceeding is improper. The Company hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof to the Company at the address set forth in Section 8(i) above or such other address as the Company subsequently delivers to the Holder and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any manner permitted by law. Nothing contained herein shall be deemed or operate to preclude the Holder from bringing suit or taking other legal action against the Company in any other jurisdiction to collect on the Company's obligations to the Holder, to realize on any collateral or any other security for such obligations, or to enforce a judgment or other court ruling in favor of the Holder. **THE COMPANY HEREBY IRREVOCABLY WAIVES ANY RIGHT IT MAY HAVE, AND AGREES NOT TO REQUEST, A JURY TRIAL FOR THE ADJUDICATION OF ANY DISPUTE HEREUNDER OR IN CONNECTION WITH OR ARISING OUT OF THIS WARRANT OR ANY TRANSACTION CONTEMPLATED HEREBY.**

13. CONSTRUCTION; HEADINGS. This Warrant shall be deemed to be jointly drafted by the Company and the Holder and shall not be construed against any person as the drafter hereof. The headings of this Warrant are for convenience of reference and shall not form part of, or affect the interpretation of, this Warrant.

14. DISPUTE RESOLUTION. In the case of a dispute as to the determination of the Exercise Price or the arithmetic calculation of the Warrant Shares, the Company shall submit the disputed determinations or arithmetic calculations via facsimile or electronic mail within two (2) Business Days of receipt of the Exercise Notice giving rise to such dispute, as the case may be, to the Holder. If the Holder and the Company are unable to agree upon such determination or calculation of the Exercise Price or the Warrant Shares within three (3) Business Days of such disputed determination or arithmetic calculation being submitted to the Holder, then the Company shall, within two (2) Business Days submit via facsimile or electronic mail (a) the disputed determination of the Exercise Price to an independent, reputable investment bank selected by the Company and approved by the Holder or (b) the disputed arithmetic calculation of the Warrant Shares to the Company's independent, outside accountant. The Company shall cause at its expense the investment bank or the accountant, as the case may be, to perform the determinations or calculations and notify the Company and the Holder of the results no later than ten Business Days from the time it receives the disputed determinations or calculations. Such investment bank's or accountant's determination or calculation, as the case may be, shall be binding upon all parties absent demonstrable error.

15. REMEDIES, OTHER OBLIGATIONS, BREACHES AND INJUNCTIVE RELIEF. The remedies provided in this Warrant shall be cumulative and in addition to all other remedies available under this Warrant and the other Transaction Documents, at law or in equity (including a decree of specific performance and/or other injunctive relief), and nothing herein shall limit the right of the Holder to pursue actual damages for any failure by the Company to comply with the terms of this Warrant. The Company acknowledges that a breach by it of its obligations hereunder will cause irreparable harm to the Holder and that the remedy at law for any such breach may be inadequate. The Company therefore agrees that, in the event of any such breach or threatened breach, the holder of this Warrant shall be entitled, in addition to all other available remedies, to an injunction restraining any breach, without the necessity of showing economic loss and without any bond or other security being required.

16. TRANSFER. This Warrant may be offered for sale, sold, transferred or assigned without the consent of the Company.

17. 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.

18. SEVERABILITY. If any provision of this Warrant is prohibited by law or otherwise determined to be invalid or unenforceable by a court of competent jurisdiction, the provision that would otherwise be prohibited, invalid or unenforceable shall be deemed amended to apply to the broadest extent that it would be valid and enforceable, and the invalidity or unenforceability of such provision shall not affect the validity of the remaining provisions of this Warrant so long as this Warrant as so modified continues to express, without material change, the original intentions of the parties as to the subject matter hereof and the prohibited nature, invalidity or unenforceability of the provision(s) in question does not substantially impair the respective expectations or reciprocal obligations of the parties or the practical realization of the benefits that would otherwise be conferred upon the parties. The parties will endeavor in good faith negotiations to replace the prohibited, invalid or unenforceable provision(s) with a valid provision(s), the effect of which comes as close as possible to that of the prohibited, invalid or unenforceable provision(s).

19. HEADINGS. The headings used in this Warrant are for the convenience of reference only and shall not, for any purpose, be deemed a part of this Warrant

20. CERTAIN DEFINITIONS. Capitalized terms used and not otherwise defined herein shall have the meanings set forth in the [Note Purchase Agreement] [A&R Note]. For purposes of this Warrant, the following terms shall have the following meanings:

(a) "**Attribution Parties**" means, collectively, the following Persons and entities: (i) any investment vehicle, including, any funds, feeder funds or managed accounts, currently, or from time to time after the Issuance Date, directly or indirectly managed or advised by the Holder's investment manager or any of its Affiliates or principals, (ii) any direct or indirect Affiliates of the Holder or any of the foregoing, (iii) any Person acting or who could be deemed to be acting as a Group together with the Holder or any of the foregoing and (iv) any other Persons whose beneficial ownership of the Company's Common Stock would or could be aggregated with the Holder's and the other Attribution Parties for purposes of Section 13(d) of the 1934 Act. For clarity, the purpose of the foregoing is to subject collectively the Holder and all other Attribution Parties to the Maximum Percentage.

(b) "**Bloomberg**" means Bloomberg Financial Markets.

(c) "**Business Day**" means any day other than Saturday, Sunday or other day on which commercial banks in The City of New York are authorized or required by law to remain closed.

(d) "**Change of Control**" means any Fundamental Transaction other than (i) any reorganization, recapitalization or reclassification of the Common Stock in which holders of the Company's voting power immediately prior to such reorganization, recapitalization or reclassification continue after such reorganization, recapitalization or reclassification to hold publicly traded securities and, directly or indirectly, the voting power of the surviving entity or entities necessary to elect a majority of the members of the board of directors (or their equivalent if other than a corporation) of such entity or entities, or (ii) pursuant to a migratory merger effected solely for the purpose of changing the jurisdiction of incorporation of the Company.

(e) "**Closing Bid Price**" and "**Closing Sale Price**" means, for any security as of any date, the consolidated closing bid price and lowest closing trade price, respectively, for such security on the Principal Market, as reported by Bloomberg, or, if the Principal Market begins to operate on an extended hours basis and does not designate the closing bid price or the closing trade price, as the case may be, then the last bid price or the last trade price, respectively, of such security prior to 4:00:00 p.m., New York time, as reported by Bloomberg, or, if the Principal Market is not the principal securities exchange or trading market for such security, the consolidated closing bid price or last trade price, respectively, of such security on the principal securities exchange or trading market where such security is listed or traded as reported by Bloomberg, or if the foregoing do not apply, the consolidated closing bid price or last trade price, respectively, of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg, or, if no closing bid price or last trade price, respectively, is reported for such security by Bloomberg, the average of the bid prices, or the ask prices, respectively, of any market makers for such security as reported in the "pink sheets" by Pink Sheets LLC (formerly the National Quotation Bureau, Inc.). If the Closing Bid Price or the Closing Sale Price cannot be calculated for a security on a particular date on any of the foregoing bases, the Closing Bid Price or the Closing Sale Price, as the case may be, of such security on such date shall be the fair market value as mutually determined by the Company and the Holder. If the Company and the Holder are unable to agree upon the fair market value of such security, then such dispute shall be resolved pursuant to Section 12. All such determinations to be appropriately adjusted for any stock dividend, stock split, stock combination or other similar transaction during the applicable calculation period.

(f) "**Common Stock**" means (i) the Company's shares of Common Stock, par value \$0.01 per share, and (ii) any share capital into which such Common Stock shall have been changed or any share capital resulting from a reclassification of such Common Stock.

(g) "**Common Stock Equivalents**" means any securities of the Company which would entitle the holder thereof to acquire at any time Common Stock, including, without limitation, any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock.

(h) "**Convertible Securities**" means any stock or securities (other than Options) directly or indirectly convertible into or exercisable or exchangeable for shares of Common Stock.

(i) "**Eligible Market**" means the Principal Market, and any of the following markets or exchanges on which the Common Stock is listed or quoted for trading on the date in question: The New York Stock Exchange, Inc., The NYSE MKT, The NASDAQ Global Select Market, or The NASDAQ Global Market (or any successors to any of the foregoing).

(j) "**Expiration Date**" means the date five (5) years after the Issuance Date or, if such date falls on a day other than a Business Day or on which trading does not take place on the Principal Market (a "**Holiday**"), the next day that is not a Holiday.

(k) "**Fundamental Transaction**" means (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).

(l) "**Initial Exercisability Date**" means the Issuance Date.

(m) ["**Note Purchase Agreement**" means that certain Note Purchase Agreement, dated as of May 31, 2017, between the Company and jVen Capital, LLC, a Delaware limited liability company, as provided to the Holder.]

(n) "**Options**" means any rights, warrants or options to subscribe for or purchase shares of Common Stock or Convertible Securities.

(o) "**Parent Entity**" of a Person means an entity that, directly or indirectly, controls the applicable Person and whose common shares or common stock or equivalent equity security is quoted or listed on an Eligible Market, or, if there is more than one such Person or Parent Entity, the Person or Parent Entity with the largest public market capitalization as of the date of consummation of the Fundamental Transaction.

(p) "**Person**" means an individual, a limited liability company, a partnership, a joint venture, a corporation, a trust, an unincorporated organization, any other entity and a government or any department or agency thereof.

(q) "**Principal Market**" means NASDAQ Capital Market.

(r) "**Registration Rights Agreement**" means that certain Amended and Restated Registration Rights Agreement, dated as of June 6, 2017, among the Company, the Holder and other investors named therein.

(s) "**Successor Entity**" means the Person (or, if so elected by the Holders, the Parent Entity) formed by, resulting from or surviving any Fundamental Transaction or the Person (or, if so elected by the Holders, the Parent Entity) with which such Fundamental Transaction shall have been entered into.

(t) "**Trading Day**" means (a) any day on which the Common Stock is listed or quoted and traded on its primary Trading Market, or (b) if the Common Stock is not then listed or quoted and traded on its primary Trading Market, then a day on which trading of the Common Stock occurs on another Trading Market, or (c) if the Common Stock is not listed or quoted as set forth in clauses (a) or (b) hereof, any Business Day.

[Signature Page Follows]

IN WITNESS WHEREOF, the Company has caused this Warrant to Purchase Common Stock to be duly executed as of the Issuance Date set out above.

OPGEN, INC.

By: /s/ Timothy C. Dec
Name: Timothy C. Dec
Title: Chief Financial Officer

EXERCISE NOTICE
TO BE EXECUTED BY THE REGISTERED HOLDER TO EXERCISE THIS
WARRANT TO PURCHASE COMMON STOCK

OPGEN, INC.

The undersigned holder hereby exercises the right to purchase _____ of the Common Stock ("**Warrant Shares**") of OpGen, Inc., a company organized under the laws of Delaware (the "**Company**"), evidenced by the attached Warrant to Purchase Common Stock (the "**Warrant**"). Capitalized terms used herein and not otherwise defined shall have the respective meanings set forth in the Warrant.

1. Form of Exercise Price. The Holder intends that payment of the Exercise Price shall be made as:

_____ a "Cash Exercise" with respect to _____ Warrant Shares; and/or

_____ a "Cashless Exercise" with respect to _____ Warrant Shares.

2. Payment of Exercise Price. In the event that the holder has elected a Cash Exercise with respect to some or all of the Warrant Shares to be issued pursuant hereto, the holder shall pay the Aggregate Exercise Price in the sum of \$ _____ to the Company in accordance with the terms of the Warrant.

3. Delivery of Warrant Shares. The Company shall deliver to the holder _____ Warrant Shares in accordance with the terms of the Warrant.

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

 _____]

4. Accredited Investor. The undersigned is an "accredited investor" as defined in Regulation D promulgated under the Securities Act of 1933, as amended.

Date: _____, _____

Name of Registered Holder

By: _____

Name:

Title:

ASSIGNMENT FORM

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

FOR VALUE RECEIVED, the foregoing Warrant and all rights evidenced thereby are hereby assigned to

Name: _____
(Please Print)

Address: _____
(Please Print)

Phone Number: _____

Email Address: _____

Dated: _____

Holder's Signature: _____

Holder's Address: _____

ACKNOWLEDGMENT

The Company hereby acknowledges this Exercise Notice and hereby directs Philadelphia Stock Transfer, Inc. to issue the above indicated number of shares of Common Stock in accordance with the Transfer Agent Instructions dated [_____, 20[] from the Company and acknowledged and agreed to Philadelphia Stock Transfer, Inc..

OpGen, Inc.

By: _____
Name:
Title:

AMENDED AND RESTATED REGISTRATION RIGHTS AGREEMENT

THIS AMENDED AND RESTATED REGISTRATION RIGHTS AGREEMENT (this "**Agreement**") is made as of June 6, 2017, by and among OpGen, Inc., a Delaware corporation (the "**Company**"), and each of the investors listed on Schedule A hereto, each of which is referred to in this Agreement as an "**Investor**."

RECITALS

WHEREAS, on July 14, 2015, the Company and one of the Investors, Merck Global Health Innovation, LLC, a Delaware limited liability company ("**MGHIF**") entered into a certain Common Stock and Note Purchase Agreement pursuant to which the Investor purchased certain shares of Common Stock (as defined below) from the Company and a \$1,000,000 principal amount Senior Secured Promissory Note (the "**MGHIF Note**");

WHEREAS, MGHIF and certain other investors received shares of Common Stock in connection with the acquisition by the Company of AdvanDx and entered into a Registration Rights Agreement, dated as of July 14, 2015 (the "**Original Registration Rights Agreement**") with the Company in connection with the registration of such shares of Common Stock;

WHEREAS, the Company and the jVen Capital, LLC, a Delaware limited liability company ("**jVen Capital**") are parties to a certain Note Purchase Agreement, dated as of May 31, 2017 (the "**Note Purchase Agreement**"), pursuant to which jVen Capital has agreed to purchase from the Company up to three (3) Secured Convertible Promissory Notes, each with a principal amount of \$500,000.00 (as the same may be amended or restated from time to time, each a "**Note**" and collectively, the "**Notes**"), in the aggregate principal amount of \$1,500,000;

WHEREAS, pursuant to the terms of the Note Purchase Agreement and the Notes, upon the occurrence of an Event of Default (as defined in the Notes), jVen Capital shall have the option to convert the outstanding Notes into shares of the Company's Series B Convertible Preferred Stock, par value \$0.01 per share ("**Series B Preferred Stock**") having the rights, preferences, privileges and restrictions set forth in the certificate of designation to be filed by the Company with the Secretary of State of the State of Delaware in an amount equal to one (1) share of Series B Preferred Stock for each \$1.00 of outstanding principal and interest due on each such Note on the conversion date, with each share of Series B Preferred Stock convertible into ten (10) shares of Common Stock;

WHEREAS, upon issuance of each Note, the Company shall issue to jVen Capital a warrant to acquire shares of Common Stock (the "**jVen Capital Warrants**") in an amount equal to ten percent (10%) of the principal amount of such Note;

WHEREAS, in connection with the Company's entry into the Note Purchase Agreement, the Company and MGHIF agreed to modify the terms of the MGHIF Note in order to: (a) extend the Maturity Date from July 14, 2017 to July 14, 2018; (b) increase the interest rate from eight percent (8%) to ten percent (10%) per annum; (c) provide for the issuance of warrants to purchase Common Stock of the Company in an amount equal to ten percent (10%) of the outstanding principal sum of, plus accrued and unpaid interest on, the MGHIF Note (the "**MGHIF Warrants**" and, together with the jVen Capital Warrants, the "**Warrants**"); and (d) include a voluntary conversion right to the Holder as of the Maturity Date at a discount equal to ten percent (10%) the then-current market price of the Common Stock of the Company. (the "**Amended and Restated MGHIF Note**");

WHEREAS, the Company and the Investors have mutually agreed that, in connection with (i) jVen Capital's purchase of the Notes and jVen Capital Warrants and (ii) MGHIF's agreement to enter into the Amended and Restated MGHIF Note and be issued the MGHIF Warrants, the Investors would be granted certain registration rights with respect to the shares of Common Stock issuable upon conversion of the Series B Preferred Stock, the shares of Common Stock issuable upon the conversion of the Amended and Restated MGHIF Note and the shares of Common Stock issuable upon exercise of the Warrants; and

WHEREAS, the Company and the Investors have determined to amend and restate the terms of the Original Registration Rights Agreement in order to provide for the registration rights of the Investors.

NOW, THEREFORE, the parties to this Agreement further agree as follows:

1. **Definitions.** For purposes of this Agreement:

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

1.2 "**Common Stock**" means shares of the Company's common stock, par value \$0.01 per share.

1.3 "**Damages**" means any loss, damage, or liability (joint or several) to which a party hereto may become subject under the Securities Act, the Exchange Act, or other federal or state law, insofar as such loss, damage, or liability (or any action in respect thereof) arises out of or is based upon (i) any untrue statement or alleged untrue statement of a material fact contained in any registration statement of the Company, including any preliminary prospectus or final prospectus contained therein or any amendments or supplements thereto; (ii) an omission or alleged omission to state therein a material fact required to be stated therein, or necessary to make the statements therein not misleading; or (iii) any violation or alleged violation by the indemnifying party (or any of its agents or Affiliates) of the Securities Act, the Exchange Act, any state securities law, or any rule or regulation promulgated under the Securities Act, the Exchange Act, or any state securities law.

1.4 "**Exchange Act**" means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

1.5 "**Excluded Registration**" means (i) a registration relating to the sale of securities to employees of the Company or a subsidiary pursuant to a stock option, stock purchase, or similar plan or (ii) a registration relating to an SEC Rule 145 transaction.

1.6 "**Form S-1**" means such form under the Securities Act as in effect on the date hereof or any successor registration form under the Securities Act subsequently adopted by the SEC.

1.7 "**Form S-3**" means such form under the Securities Act as in effect on the date hereof or any registration form under the Securities Act subsequently adopted by the SEC that permits incorporation of substantial information by reference to other documents filed by the Company with the SEC.

1.8 "**GAAP**" means generally accepted accounting principles in the United States.

1.9 "**Holder**" means any holder of Registrable Securities who is a party to this Agreement.

1.10 "**Immediate Family Member**" means a child, stepchild, grandchild, parent, stepparent, grandparent, spouse, sibling, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, including adoptive relationships, of a natural person referred to herein.

1.11 "**Initiating Holders**" means, collectively, Holders who properly initiate a registration request under this Agreement.

1.12 "**New Securities**" means, collectively, equity securities of the Company, whether or not currently authorized, as well as rights, options, or warrants to purchase such equity securities, or securities of any type whatsoever that are, or may become, convertible or exchangeable into or exercisable for such equity securities.

1.13 "**Person**" means any individual, corporation, partnership, trust, limited liability company, association or other entity.

1.14 "**Registrable Securities**" means (i) the shares of Common Stock issued to MGHIF under the Original Registration Rights Agreement and still held by MGHIF; (ii) the shares of Common Stock underlying (A) the shares of Series B Preferred Stock held by jVen Capital, (B) issuable to MGHIF upon conversion of the Amended and Restated MGHIF Note, (C) the Warrants held by an Investor; and (iii) any Common Stock issued as (or issuable upon the conversion or exercise of any warrant, right, or other security that is issued as) a dividend or other distribution with respect to, or in exchange for or in replacement of, the securities referenced in clause (i) above; excluding in all cases, however, any Registrable Securities sold by a Person in a transaction in which the applicable rights under this Agreement are not assigned pursuant to Section 6.1, and excluding for purposes of Section 2 any shares for which registration rights have terminated pursuant to Section 2.12 of this Agreement.

1.15 "**Registrable Securities then outstanding**" means the number of shares determined by adding the number of shares of outstanding Common Stock that are Registrable Securities and the number of shares of Common Stock issuable (directly or indirectly) pursuant to then exercisable and/or convertible securities that are Registrable Securities.

1.16 "**Restricted Securities**" means the securities of the Company required to bear the legend set forth in Section 2.11(b) hereof.

1.17 "**SEC**" means the Securities and Exchange Commission.

1.18 "**SEC Rule 144**" means Rule 144 promulgated by the SEC under the Securities Act.

1.19 "**SEC Rule 145**" means Rule 145 promulgated by the SEC under the Securities Act.

1.20 "**Securities Act**" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

1.21 "**Selling Expenses**" means all underwriting discounts, selling commissions, and stock transfer taxes applicable to the sale of Registrable Securities, and fees and disbursements of counsel for any Holder, except for the fees and disbursements of the Selling Holder Counsel borne and paid by the Company as provided in Section 2.6.

2. Registration Rights. The Company covenants and agrees as follows:

2.1 Demand Registrations.

(a) If at any time the Company receives a request from Holders of fifty percent (50%) of the Registrable Securities then outstanding that the Company file a Form S-3 (or, if Form S-3 is not available for use by the Company, then a Form S-1) registration statement with respect to all or at least fifty percent (50%) of the Registrable Securities (or such lesser amount as may be agreed to by the Company and the Holders), then the Company shall (i) within ten (10) days after the date such request is given, give notice thereof (the "**Demand Notice**") to all Holders other than the Initiating Holders; and (ii) as soon as practicable, and in any event within sixty (60) days after the date such request is given by the Initiating Holders, file a Form S-3 registration statement under the Securities Act covering all Registrable Securities that the Initiating Holders requested to be registered and any additional Registrable Securities requested to be included in such registration by any other Holders, as specified by notice given by each such Holder to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Section 2.1(c) and Section 2.3.

(b) If at any time when it is eligible to use a Form S-3 registration statement, the Company receives a request from Holders of at least twenty percent (20%) of the Registrable Securities then outstanding that the Company file a Form S-3 registration statement with respect to outstanding Registrable Securities of such Holders having an anticipated aggregate offering price, net of Selling Expenses, of at least \$1 million (or such lesser amount as may be agreed to by the Company and the Holders), then the Company shall (i) within ten (10) days after the date such request is given, give a Demand Notice to all Holders other than the Initiating Holders; and (ii) as soon as practicable, and in any event within forty-five (45) days after the date such request is given by the Initiating Holders, file a Form S-3 registration statement under the Securities Act covering all Registrable Securities requested to be included in such registration by any other Holders, as specified by notice given by each such Holder to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Section 2.1(c) and Section 2.3.

(c) Notwithstanding the foregoing obligations, if the Company furnishes to Holders requesting a registration pursuant to this Section 2.1 a certificate signed by the Company's chief executive officer stating that in the good faith judgment of the Company's Board of Directors it would be materially detrimental to the Company and its stockholders for such registration statement to either become effective or remain effective for as long as such registration statement otherwise would be required to remain effective, because such action would (i) materially interfere with a significant acquisition, corporate reorganization, or other similar transaction involving the Company; (ii) require premature disclosure of material information that the Company has a bona fide business purpose for preserving as confidential; or (iii) render the Company unable to comply with requirements under the Securities Act or Exchange Act, then the Company shall have the right to defer taking action with respect to such filing, for a period of not more than sixty (60) days after the request of the Initiating Holders is given; provided, however, that the Company may not invoke this right more than once in any twelve (12) month period; and provided further that the Company shall not register any securities for its own account or that of any other stockholder during such sixty (60) day period other than an Excluded Registration.

(d) The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Section 2.1(a) (i) during the period that is ninety (90) days after the effective date of a Company-initiated registration, provided, that the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; (ii) after the Company has effected two (2) registrations pursuant to Section 2.1(a); or (iii) if the Initiating Holders propose to dispose of shares of Registrable Securities that may be immediately registered on Form S-3 pursuant to a request made pursuant to Section 2.1(b). The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Section 2.1(b) (i) during the period that is ninety (90) days after the effective date of, a Company-initiated registration, provided, that the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; or (ii) if the Company has effected two (2) registrations pursuant to Section 2.1(b) within the twelve (12) month period immediately preceding the date of such request. A registration shall not be counted as "effected" for purposes of this Section 2.1(d), until such time as (i) all Registrable Securities requested to be registered are so registered and (ii) the applicable registration statement has been declared effective by the SEC, unless the Initiating Holders withdraw their request for such registration (for any reason other than as a result of a material adverse change to the Company) and forfeit their right to one demand registration statement pursuant to Section 2.6, in which case such withdrawn registration statement shall be counted as "effected" for purposes of this Section 2.1(d).

2.2 Company Registration. If the Company proposes to register (including, for this purpose, a registration effected by the Company for stockholders other than the Holders) any of its securities under the Securities Act in connection with the public offering of such securities solely for cash (other than in an Excluded Registration), the Company shall, at such time, promptly give each Holder notice of such registration. Upon the request of each Holder given within twenty (20) days after such notice is given by the Company, the Company shall, subject to the provisions of Section 2.3, cause to be registered all of the Registrable Securities that each such Holder has requested to be included in such registration. The Company shall have the right to terminate or withdraw any registration initiated by it under this Section 2.2 before the effective date of such registration, whether or not any Holder has elected to include Registrable Securities in such registration. The expenses (other than Selling Expenses) of such withdrawn registration shall be borne by the Company in accordance with Section 2.6.

2.3 Underwriting Requirements.

(a) If, pursuant to Section 2.1(a), the Initiating Holders intend to distribute the Registrable Securities covered by their request by means of an underwriting, they shall so advise the Company as a part of their request made pursuant to Section 2.1(a), and the Company shall include such information in the Demand Notice. In this instance, the underwriter will be selected by the Holders, subject to the approval of the Company, which approval shall not be unreasonably withheld or delayed. In such event, the right of any Holder to include such Holder's Registrable Securities in such registration shall be conditioned upon such Holder's participation in such underwriting and the inclusion of such Holder's Registrable Securities in the underwriting to the extent provided herein. All Holders proposing to distribute their securities through such underwriting shall (together with the Company as provided in Section 2.4(e)) enter into an underwriting agreement in customary form with the underwriters selected for such underwriting. Notwithstanding any other provision of this Section 2.3, if the Company and underwriters together advise the Initiating Holders in writing that marketing factors require a limitation on the number of shares to be underwritten, then the Initiating Holders shall so advise all Holders of Registrable Securities that otherwise would be underwritten pursuant hereto, and the number of Registrable Securities that may be included in the underwriting shall be allocated among such Holders of Registrable Securities, including the Initiating Holders, in proportion (as nearly as practicable) to the number of Registrable Securities owned by each Holder, or in such other proportion as shall mutually be agreed to by all such selling Holders; provided, however, that the number of Registrable Securities held by the Holders to be included in such underwriting shall not be reduced unless all other securities are first entirely excluded from the underwriting.

(b) In connection with any offering involving an underwriting of shares of the Company's capital stock pursuant to Section 2.2, the Company shall not be required to include any of the Holders' Registrable Securities in such underwriting unless the Holders accept the terms of the underwriting as agreed upon between the Company and its underwriters, and then only in such quantity as the underwriters in their sole discretion determine will not jeopardize the success of the offering by the Company. If the total number of securities, including Registrable Securities, requested by stockholders to be included in such offering exceeds the number of securities to be sold (other than by the Company) that the underwriters in their reasonable discretion determine is compatible with the success of the offering, then the Company shall be required to include in the offering only that number of such securities, including Registrable Securities, which the underwriters and the Company in their sole discretion determine will not jeopardize the success of the offering. If the underwriters determine that less than all of the Registrable Securities requested to be registered can be included in such offering, then the Registrable Securities that are included in such offering shall be allocated among the selling Holders in proportion (as nearly as practicable to) the number of Registrable Securities owned by each selling Holder or in such other proportions as shall mutually be agreed to by all such selling Holders. Notwithstanding the foregoing, in no event shall (i) the number of Registrable Securities included in the offering be reduced unless all other securities (other than securities to be sold by the Company) are first entirely excluded from the offering, or (ii) the number of Registrable Securities included in the offering be reduced below thirty percent (30%) of the total number of securities included in such offering, in which case the selling Holders may be excluded further if the underwriters make the determination described above and no other stockholder's securities are included in such offering. For purposes of the provision in this Section 2.3(b) concerning apportionment, for any selling Holder that is a partnership, limited liability company, or corporation, the partners, members, retired partners, retired members, stockholders, and Affiliates of such Holder, or the estates and Immediate Family Members of any such partners, retired partners, members, and retired members and any trusts for the benefit of any of the foregoing Persons, shall be deemed to be a single "selling Holder," and any pro rata reduction with respect to such "selling Holder" shall be based upon the aggregate number of Registrable Securities owned by all Persons included in such "selling Holder," as defined in this sentence.

2.4 Obligations of the Company. Whenever required under this Section 2 to effect the registration of any Registrable Securities, the Company shall, as expeditiously as reasonably possible:

(a) prepare and file with the SEC a registration statement with respect to such Registrable Securities and use its commercially reasonable efforts to cause such registration statement to become effective and, upon the request of the Holders of a majority of the Registrable Securities registered thereunder, keep such registration statement effective for a period of up to one hundred twenty (120) days or, if earlier, until the distribution contemplated in the registration statement has been completed; provided, however, that such one hundred twenty (120) day period shall be extended for a period of time equal to the period the Holder refrains, at the request of an underwriter of Common Stock (or other securities) of the Company, from selling any securities included in such registration;

(b) prepare and file with the SEC such amendments and supplements to such registration statement, and the prospectus used in connection with such registration statement, as may be necessary to comply with the Securities Act in order to enable the disposition of all securities covered by such registration statement;

(c) furnish to the selling Holders such numbers of copies of a prospectus, including a preliminary prospectus, as required by the Securities Act, and such other documents as the Holders may reasonably request in order to facilitate their disposition of their Registrable Securities;

(d) use its commercially reasonable efforts to register and qualify the securities covered by such registration statement under such other securities or blue-sky laws of such jurisdictions as shall be reasonably requested by the selling Holders; provided that the Company shall not be required to qualify to do business or to file a general consent to service of process in any such states or jurisdictions, unless the Company is already subject to service in such jurisdiction and except as may be required by the Securities Act;

(e) in the event of any underwritten public offering, enter into and perform its obligations under an underwriting agreement, in usual and customary form, with the underwriter(s) of such offering;

(f) use its commercially reasonable efforts to cause all such Registrable Securities covered by such registration statement to be listed on a national securities exchange or trading system and each securities exchange and trading system (if any) on which similar securities issued by the Company are then listed;

(g) provide a transfer agent and registrar for all Registrable Securities registered pursuant to this Agreement and provide a CUSIP number for all such Registrable Securities, in each case not later than the effective date of such registration;

(h) promptly make available for inspection by the selling Holders, any underwriters participating in any disposition pursuant to such registration statement, and any attorney or accountant or other agent retained by any such underwriter or selected by the selling Holders, all financial and other records, pertinent corporate documents, and properties of the Company, and cause the Company's officers, directors, employees, and independent accountants to supply all information reasonably requested by any such seller, underwriter, attorney, accountant, or agent, in each case, as necessary or advisable to verify the accuracy of the information in such registration statement and to conduct appropriate due diligence in connection therewith;

(i) notify each selling Holder, promptly after the Company receives notice thereof, of the time when such registration statement has been declared effective or a supplement to any prospectus forming a part of such registration statement has been filed; and

(j) after such registration statement becomes effective, notify each selling Holder of any request by the SEC that the Company amend or supplement such registration statement or prospectus.

2.5 Furnish Information. It shall be a condition precedent to the obligations of the Company to take any action pursuant to this Section 2 with respect to the Registrable Securities of any selling Holder that such Holder shall furnish to the Company such information regarding itself, the Registrable Securities held by it, and the intended method of disposition of such securities as is reasonably required to effect the registration of such Holder's Registrable Securities.

2.6 Expenses of Registration. All expenses (other than Selling Expenses) incurred in connection with registrations, filings, or qualifications pursuant to Section 2, including all registration, filing, and qualification fees; printers' and accounting fees; and fees and disbursements of counsel for the Company, and one counsel for the Holders in an amount not to exceed \$5,000; shall be borne and paid by the Company; provided, however, that the Company shall not be required to pay for any expenses of any registration proceeding begun pursuant to Section 2.1 if the registration request is subsequently withdrawn at the request of the Holders of a majority of the Registrable Securities to be registered (in which case all selling Holders shall bear such expenses pro rata based upon the number of Registrable Securities that were to be included in the withdrawn registration), unless the Holders of a majority of the Registrable Securities agree to forfeit their right to one registration pursuant to Section 2.1(a) or Section 2.1(b), as the case may be; provided further that if, at the time of such withdrawal, the Holders shall have learned of a material adverse change in the condition, business, or prospects of the Company from that known to the Holders at the time of their request and have withdrawn the request with reasonable promptness after learning of such information then the Holders shall not be required to pay any of such expenses and shall not forfeit their right to one registration pursuant to Section 2.1(a) or Section 2.1(b). All Selling Expenses relating to Registrable Securities registered pursuant to this Section 2 shall be borne and paid by the Holders pro rata on the basis of the number of Registrable Securities registered on their behalf.

2.7 Delay of Registration; Liquidated Damages. No Holder shall have any right to obtain or seek an injunction restraining or otherwise delaying any registration pursuant to this Agreement as the result of any controversy that might arise with respect to the interpretation or implementation of this Section 2. In the event of a delay by the Company in filing a registration statement covering Registrable Securities as required by this Agreement, or in the event of a failure to maintain the effectiveness of any such registration statement as required by this Agreement, the Company shall pay to the Holders affected by such delay or failure cash, as liquidated damages and not as a penalty, in the amount of \$10,000 per month (pro-rated for partial months) on a pro rata basis in proportion to the number of Registrable Securities held by such Holders, until such time as the delay or failure is cured. Such payments shall be made to each Holder in cash no later than five (5) business days after the end of each monthly period in which such liquidated damages accrue.

2.8 Indemnification. If any Registrable Securities are included in a registration statement under this Section 2:

(a) To the extent permitted by law, the Company will indemnify and hold harmless each selling Holder, and the partners, members, officers, directors, and stockholders of each such Holder; legal counsel and accountants for each such Holder; any underwriter (as defined in the Securities Act) for each such Holder; and each Person, if any, who controls such Holder or underwriter within the meaning of the Securities Act or the Exchange Act, against any Damages, and the Company will pay to each such Holder, underwriter, controlling Person, or other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; provided, however, that the indemnity agreement contained in this Section 2.8(a) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Company, which consent shall not be unreasonably withheld, nor shall the Company be liable for any Damages to the extent that they arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of any such Holder, underwriter, controlling Person, or other aforementioned Person expressly for use in connection with such registration.

(b) To the extent permitted by law, each selling Holder, severally and not jointly, will indemnify and hold harmless the Company, and each of its directors, each of its officers who has signed the registration statement, each Person (if any), who controls the Company within the meaning of the Securities Act, legal counsel and accountants for the Company, any underwriter (as defined in the Securities Act), any other Holder selling securities in such registration statement, and any controlling Person of any such underwriter or other Holder, against any Damages, in each case only to the extent that such Damages arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of such selling Holder expressly for use in connection with such registration; and each such selling Holder will pay to the Company and each other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; provided, however, that the indemnity agreement contained in this Section 2.8(b) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Holder, which consent shall not be unreasonably withheld; and provided further that in no event shall the aggregate amounts payable by any Holder by way of indemnity or contribution under Sections 2.8(b) and 2.8(d) exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of fraud or willful misconduct by such Holder.

(c) Promptly after receipt by an indemnified party under this Section 2.8 of notice of the commencement of any action (including any governmental action) for which a party may be entitled to indemnification hereunder, such indemnified party will, if a claim in respect thereof is to be made against any indemnifying party under this Section 2.8, give the indemnifying party notice of the commencement thereof. The indemnifying party shall have the right to participate in such action and, to the extent the indemnifying party so desires, participate jointly with any other indemnifying party to which notice has been given, and to assume the defense thereof with counsel mutually satisfactory to the parties; provided, however, that an indemnified party (together with all other indemnified parties that may be represented without conflict by one counsel) shall have the right to retain one separate counsel, with the fees and expenses to be paid by the indemnifying party, if representation of such indemnified party by the counsel retained by the indemnifying party would be inappropriate due to actual or potential differing interests between such indemnified party and any other party represented by such counsel in such action. The failure to give notice to the indemnifying party within a reasonable time of the commencement of any such action shall relieve such indemnifying party of any liability to the indemnified party under this Section 2.8, to the extent that such failure materially prejudices the indemnifying party's ability to defend such action. The failure to give notice to the indemnifying party will not relieve it of any liability that it may have to any indemnified party otherwise than under this Section 2.8.

(d) To provide for just and equitable contribution to joint liability under the Securities Act in any case in which either (i) any party otherwise entitled to indemnification hereunder makes a claim for indemnification pursuant to this Section 2.8 but it is judicially determined (by the entry of a final judgment or decree by a court of competent jurisdiction and the expiration of time to appeal or the denial of the last right of appeal) that such indemnification may not be enforced in such case, notwithstanding the fact that this Section 2.8 provides for indemnification in such case, or (ii) contribution under the Securities Act may be required on the part of any party hereto for which indemnification is provided under this Section 2.8, then, and in each such case, such parties will contribute to the aggregate losses, claims, damages, liabilities, or expenses to which they may be subject (after contribution from others) in such proportion as is appropriate to reflect the relative fault of each of the indemnifying party and the indemnified party in connection with the statements, omissions, or other actions that resulted in such loss, claim, damage, liability, or expense, as well as to reflect any other relevant equitable considerations. The relative fault of the indemnifying party and of the indemnified party shall be determined by reference to, among other things, whether the untrue or allegedly untrue statement of a material fact, or the omission or alleged omission of a material fact, relates to information supplied by the indemnifying party or by the indemnified party and the parties' relative intent, knowledge, access to information, and opportunity to correct or prevent such statement or omission; provided, however, that, in any such case, (x) no Holder will be required to contribute any amount in excess of the public offering price of all such Registrable Securities offered and sold by such Holder pursuant to such registration statement, and (y) no Person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) will be entitled to contribution from any Person who was not guilty of such fraudulent misrepresentation; and provided further that in no event shall a Holder's liability pursuant to this Section 2.8(d), when combined with the amounts paid or payable by such Holder pursuant to Section 2.8(b), exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of willful misconduct or fraud by such Holder.

(e) Notwithstanding the foregoing, to the extent that the provisions on indemnification and contribution contained in the underwriting agreement entered into in connection with the underwritten public offering are in conflict with the foregoing provisions, the provisions in the underwriting agreement shall control.

(f) Unless otherwise superseded by an underwriting agreement entered into in connection with the underwritten public offering, the obligations of the Company and Holders under this Section 2.8 shall survive the completion of any offering of Registrable Securities in a registration under this Section 2, and otherwise shall survive the termination of this Agreement.

2.9 Reports Under Exchange Act. With a view to making available to the Holders the benefits of SEC Rule 144 and any other rule or regulation of the SEC that may at any time permit a Holder to sell securities of the Company to the public without registration or pursuant to a registration on Form S-3, the Company shall:

(a) make and keep available adequate current public information, as those terms are understood and defined in SEC Rule 144;

(b) use commercially reasonable efforts to file with the SEC in a timely manner all reports and other documents required of the Company under the Securities Act and the Exchange Act (at any time after the Company has become subject to such reporting requirements); and

(c) furnish to any Holder, so long as the Holder owns any Registrable Securities, forthwith upon request (i) a copy of the most recent annual or quarterly report of the Company and such other reports and documents so filed by the Company; and (ii) such other information as may be reasonably requested in availing any Holder of any rule or regulation of the SEC that permits the selling of any such securities without registration.

2.10 "Market Stand-off" Agreement. Each Holder hereby agrees that it will not, without the prior written consent of the managing underwriter(s), during the period commencing on the date of the final prospectus relating to the registration by the Company of shares of its Common Stock and ending on the date specified by the Company and the managing underwriter(s) (such period not to exceed ninety (90) days: (i) lend, offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right, or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any securities convertible into or exercisable or exchangeable (directly or indirectly) for Common Stock held immediately before the effective date of the registration statement for such offering; or (ii) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of such securities, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Common Stock or other securities, in cash, or otherwise. The underwriters in connection with such registration are intended third-party beneficiaries of this Section 2.10 and shall have the right, power, and authority to enforce the provisions hereof as though they were a party hereto. Each Holder further agrees to execute such agreements as may be reasonably requested by the underwriters in connection with such registration that are consistent with this Section 2.10 or that are necessary to give further effect thereto.

2.11 Restrictions on Transfer.

(a) The Registrable Securities shall not be sold, pledged, or otherwise transferred, and the Company shall not recognize and shall issue stop-transfer instructions to its transfer agent with respect to any such sale, pledge, or transfer, except upon the conditions specified in this Agreement, which conditions are intended to ensure compliance with the provisions of the Securities Act. A transferring Holder will cause any proposed purchaser, pledgee, or transferee of the Common Stock and the Registrable Securities held by such Holder to agree to take and hold such securities subject to the provisions and upon the conditions specified in this Agreement. Notwithstanding the foregoing, no Holder may transfer the rights under this Agreement to any transferee of less than twenty-five percent (25%) of the Registrable Securities held by such Holder.

(b) Each certificate or instrument representing (i) the Registrable Securities, and (ii) any other securities issued in respect of the securities referenced in clause (i), upon any stock split, stock dividend, recapitalization, merger, consolidation, or similar event, shall (unless otherwise permitted by the provisions of Section 2.11(c)) be stamped or otherwise imprinted with a legend substantially in the following form:

THE SECURITIES REPRESENTED HEREBY HAVE BEEN ACQUIRED FOR INVESTMENT AND HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933. SUCH SHARES MAY NOT BE SOLD, PLEDGED, OR TRANSFERRED IN THE ABSENCE OF SUCH REGISTRATION OR A VALID EXEMPTION FROM THE REGISTRATION AND PROSPECTUS DELIVERY REQUIREMENTS OF SAID ACT.

THE SECURITIES REPRESENTED HEREBY MAY BE TRANSFERRED ONLY IN ACCORDANCE WITH THE TERMS OF AN AGREEMENT BETWEEN THE COMPANY AND THE STOCKHOLDER, A COPY OF WHICH IS ON FILE WITH THE SECRETARY OF THE COMPANY.

The Holders consent to the Company making a notation in its records and giving instructions to any transfer agent of the Restricted Securities in order to implement the restrictions on transfer set forth in this Section 2.11.

(c) The holder of each certificate representing Restricted Securities, by acceptance thereof, agrees to comply in all respects with the provisions of this Section 2. Before any proposed sale, pledge, or transfer of any Restricted Securities, unless there is in effect a registration statement under the Securities Act covering the proposed transaction, the Holder thereof shall give notice to the Company of such Holder's intention to effect such sale, pledge, or transfer. Each such notice shall describe the manner and circumstances of the proposed sale, pledge, or transfer in sufficient detail and, if reasonably requested by the Company, shall be accompanied at such Holder's expense by either (i) a written opinion of legal counsel who shall, and whose legal opinion shall, be reasonably satisfactory to the Company, addressed to the Company, to the effect that the proposed transaction may be effected without registration under the Securities Act; (ii) a "no action" letter from the SEC to the effect that the proposed sale, pledge, or transfer of such Restricted Securities without registration will not result in a recommendation by the staff of the SEC that action be taken with respect thereto; or (iii) any other evidence reasonably satisfactory to counsel to the Company to the effect that the proposed sale, pledge, or transfer of the Restricted Securities may be effected without registration under the Securities Act, whereupon the Holder of such Restricted Securities shall be entitled to sell, pledge, or transfer such Restricted Securities in accordance with the terms of the notice given by the Holder to the Company. The Company will not require such a legal opinion or "no action" letter (x) in any transaction in compliance with SEC Rule 144 or (y) in any transaction in which such Holder distributes Restricted Securities to an Affiliate of such Holder for no consideration; provided that each transferee agrees in writing to be subject to the terms of this Section 2.11. Each certificate or instrument evidencing the Restricted Securities transferred as above provided shall bear, except if such transfer is made pursuant to SEC Rule 144, the appropriate restrictive legend set forth in Section 2.11(b), except that such certificate shall not bear such restrictive legend if, in the opinion of counsel for such Holder and the Company, such legend is not required in order to establish compliance with any provisions of the Securities Act.

2.12 Termination of Registration Rights. The right of any Holder to request registration or inclusion of Registrable Securities in any registration pursuant to Section 2.1 or Section 2.2 shall terminate when all of such Holder's Registrable Securities are eligible to be sold without restriction under SEC Rule 144 within any 90-day period.

2.13 Limitations on Subsequent Registration Rights. From and after the date of this Agreement, the Company shall not, without the prior written consent of the Holders of a majority of the Registrable Securities then outstanding, enter into any agreement with any holder or prospective holder of any securities of the Company that (i) would provide to such holder the right to include securities in any registration or (ii) allow such holder or prospective holder to initiate a demand for registration of any securities held by such holder or prospective holder.

3. Miscellaneous.

3.1 Successors and Assigns. The rights under this Agreement may be assigned (but only with all related obligations) by a Holder to a transferee of Registrable Securities that acquires at least twenty-five percent (25%) of the Registrable Securities; provided, however, that (x) the Company is, within a reasonable time after such transfer, furnished with written notice of the name and address of such transferee and the Registrable Securities with respect to which such rights are being transferred; and (y) such transferee agrees in a written instrument delivered to the Company to be bound by and subject to the terms and conditions of this Agreement. The terms and conditions of this Agreement inure to the benefit of and are binding upon the respective successors and permitted assignees of the parties. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and permitted assignees any rights, remedies, obligations or liabilities under or by reason of this Agreement, except as expressly provided herein.

3.2 Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of Delaware excluding that body of law pertaining to conflict of law.

3.3 Counterparts; Facsimile. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. This Agreement may also be executed and delivered by facsimile or electronic mail (including pdf or any electronic signature) and in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

3.4 Titles and Subtitles. The titles and subtitles used in this Agreement are for convenience only and are not to be considered in construing or interpreting this Agreement.

3.5 Notices. All notices and other communications given or made pursuant to this Agreement shall be in writing and shall be deemed effectively given upon the earlier of actual receipt or: (i) personal delivery to the party to be notified; (ii) when sent, if sent by electronic mail or facsimile during the recipient's normal business hours, and if not sent during normal business hours, then on the recipient's next business day; (iii) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid; or (iv) one (1) business day after the business day of deposit with a nationally recognized overnight courier, freight prepaid, specifying next-day delivery, with written verification of receipt. All communications shall be sent to the respective parties at their addresses as set forth on Schedule A hereto, or to the principal office of the Company and to the attention of the Chief Executive Officer, in the case of the Company, or to such email address, facsimile number, or address as subsequently modified by written notice given in accordance with this Section 3.5.

If notice is given to the Company,

OpGen, Inc.
708 Quince Orchard Road
Gaithersburg, MD 20878
Attention: Timothy C. Dec
Chief Financial Officer

a copy shall also be sent to:

Ballard Spahr LLP
1735 Market Street, 51st Floor
Philadelphia, PA 19103-7599
Attn: Mary J. Mullany.

3.6 Amendments and Waivers. Any term of this Agreement may be amended and the observance of any term of this Agreement may be waived (either generally or in a particular instance, and either retroactively or prospectively) only with the written consent of the Company and the holders of a majority of the Registrable Securities then outstanding; provided that the Company may in its sole discretion waive compliance with Section 2.11(c) (and the Company's failure to object promptly in writing after notification of a proposed assignment allegedly in violation of Section 2.11(c) shall be deemed to be a waiver); and provided further that any provision hereof may be waived by any waiving party on such party's own behalf, without the consent of any other party. Notwithstanding the foregoing, this Agreement may not be amended or terminated and the observance of any term hereof may not be waived with respect to any Investor without the written consent of such Investor, unless such amendment, termination, or waiver applies to all Investors in the same fashion. No waivers of or exceptions to any term, condition, or provision of this Agreement, in any one or more instances, shall be deemed to be or construed as a further or continuing waiver of any such term, condition, or provision.

3.7 Severability. In case any one or more of the provisions contained in this Agreement is for any reason held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision of this Agreement, and such invalid, illegal, or unenforceable provision shall be reformed and construed so that it will be valid, legal, and enforceable to the maximum extent permitted by law.

3.8 Entire Agreement. This Agreement constitutes the full and entire understanding and agreement among the parties with respect to the subject matter hereof, and any other written or oral agreement relating to the subject matter hereof existing between the parties is expressly canceled.

3.9 Delays or Omissions. No delay or omission to exercise any right, power, or remedy accruing to any party under this Agreement, upon any breach or default of any other party under this Agreement, shall impair any such right, power, or remedy of such nonbreaching or nondefaulting party, nor shall it be construed to be a waiver of or acquiescence to any such breach or default, or to any similar breach or default thereafter occurring, nor shall any waiver of any single breach or default be deemed a waiver of any other breach or default theretofore or thereafter occurring. All remedies, whether under this Agreement or by law or otherwise afforded to any party, shall be cumulative and not alternative.

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COMPANY:

OPGEN, INC.

By: /s/ Timothy C. Dec
Name: Timothy C. Dec
Title: Chief Financial Officer

INVESTORS:

JVEN CAPITAL, LLC

By: /s/ Evan Jones
Name: Evan Jones
Title: Managing Member

MERCK GLOBAL HEALTH INNOVATION FUND, LLC

By: /s/ William J. Taranto
Name: William J. Taranto
Title: President

SCHEDULE A

Investors

Merck Global Health Innovation Fund, LLC

Two Merck Drive 2W116

Whitehouse Station, New Jersey 08889

Telephone: (908) 423-6551

jVen Capital, LLC

11009 Cripplegate Road

Potomac, Maryland 20854

Attention: Evan Jones

email: ejones@opgen.com

THE SECURITIES REPRESENTED BY THIS NOTE HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED, AND HAVE BEEN ACQUIRED FOR INVESTMENT AND NOT WITH A VIEW TO, OR IN CONNECTION WITH, THE SALE OR DISTRIBUTION THEREOF. NO SUCH TRANSFER MAY BE EFFECTED WITHOUT AN EFFECTIVE REGISTRATION STATEMENT RELATED THERETO OR AN OPINION OF COUNSEL IN A FORM SATISFACTORY TO THE COMPANY THAT SUCH REGISTRATION IS NOT REQUIRED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

OPGEN, INC.
AMENDED & RESTATED SENIOR SECURED CONVERTIBLE PROMISSORY NOTE

Note No. A&R SS-1
Amount: \$1,000,000.00

Original Issue Date: July 14, 2015
A&R Date: June 6, 2017

1. **Principal Amount.** For value received, OpGen, Inc., a Delaware corporation (the "Company"), does hereby promise to pay to the order of Merck Global Health Innovation Fund, LLC or its assignee (the "Holder"), the principal sum of One Million and 00/100 Dollars (\$1,000,000.00), plus interest accrued thereon, as hereinafter specified (collectively, the "Obligations") on the earliest to occur of (i) July 14, 2018 (the "Maturity Date") or (ii) an Event of Default (as defined below).
2. **Note Purchase Agreement; Amended & Restated Note.** This Note was originally issued pursuant to the Common Stock and Note Purchase Agreement, dated as of July 14, 2015, among the Company and the Holder (as the same may be amended from time to time, the "Purchase Agreement"), and is subject to the provisions thereof. Capitalized terms used but not defined herein have the meanings given to them in the Purchase Agreement. This Note is amended and restated as of June 6, 2017 (the "A&R Date") to: (a) extend the Maturity Date from July 14, 2017 to July 14, 2018; (b) increase the interest rate from eight percent (8%) to ten percent (10%) per annum; (c) provide for the issuance of warrants to purchase Common Stock of the Company in an amount equal to ten percent (10%) of the outstanding principal sum of, plus accrued and unpaid interest on, this Note as of the A&R Date; and (d) include a voluntary conversion right to the Holder as of the Maturity Date at a discount equal to ten percent (10%) of the then-current market price of the Common Stock of the Company. This Note, as amended and restated, is referred to as the "Note" herein. By accepting this Note, as amended and restated, the Holder consents to the Company's entry into that certain Note Purchase Agreement, dated May 31, 2017, by and between the Company and jVen Capital, and the request by the Company for the issuance of the promissory notes thereunder in accordance with the terms of such Note Purchase Agreement.
3. **Definitions.** In addition to the other terms defined herein, the following terms shall have the following meanings ascribed to them:
 - 3.1 "Bankruptcy Law" means Title 11, United States Code or any similar Federal or state law for the relief of debtors.
 - 3.2 "Common Stock" means the common stock, par value \$0.01 per share, of the Company.

3.3 "Qualified Financing" means an offering of equity or debt securities of the Company with net proceeds to the Company of at least \$5 million.

3.4 "Securities Act" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

4. **Interest.**

4.1 From the Original Issue Date up to the A&R Date, the Company agrees to pay interest on the unpaid principal amount, at a rate equal to eight percent (8%) per annum, compounded annually (the "Original Interest Rate"), until the principal amount and all interest accrued thereon are paid; provided that, upon the occurrence and during the continuation of an Event of Default, as defined in Section 9 below, the Original Interest Rate will be fifteen percent (15%) per annum.

4.2 As of and after the A&R Date, the Company agrees to pay interest on the unpaid principal amount, at a rate equal to ten percent (10%) per annum, compounded annually (the "Interest Rate"), until the principal amount and all interest accrued thereon are paid; provided that, upon the occurrence and during the continuation of an Event of Default, as defined in Section 9 below, the Interest Rate will be fifteen percent (15%) per annum. Interest shall be due and payable to the Holder on the Maturity Date. In no event shall the amount of interest paid or agreed to be paid to the Holder hereunder exceed the highest lawful rate permissible under any law which a court of competent jurisdiction may deem applicable hereto. In such event, the Interest Rate shall automatically be reduced to the maximum rate permitted by such law.

5. **Warrants.** Within fifteen (15) business days of the A&R Date, the Company shall issue to the Holder a Warrant, in the form attached to this Note as Exhibit A, to purchase shares of Common Stock equal to ten percent (10%) of the principal amount of, plus accrued and unpaid interest on, this Note as of the A&R Date, calculated by dividing ten percent (10%) of the principal amount of, plus accrued and unpaid interest on, this Note as of the A&R Date by the closing sale price of the Common Stock on the trading day immediately preceding the date of issuance as reported on the NASDAQ Capital Market. If a Qualified Financing is consummated after the Warrant is issued, the terms of the Warrant, other than the exercise price, shall be amended to reflect terms equivalent to any warrants issued in such Qualified Financing.

6. **Security Agreement and Intercreditor Agreement.** In order to secure the payment and performance of this Note the Company has granted the Holder a first priority security interest in the Collateral as set forth in that certain Security Agreement dated as of July 14, 2015, by and between the Company, the Company's wholly owned subsidiary, AdvanDx, Inc., a Delaware corporation ("AdvanDx"), and the Holder (as amended or restated from time to time, the "Security Agreement"). As of the A&R Date, the Company, AdvanDx, the Holder and jVen Capital are entering into an Intercreditor Agreement.

7. **Payment.**

7.1 **Repayment.** All payment of principal shall be due and payable in lawful money of the United States of America at the principal office of the Holder, or at such other place as the holder hereof may from time to time designate in writing to the Company, not later than 5:00 p.m., Eastern Time, on the Maturity Date. All payments shall be applied first to the payment of any fees or charges outstanding hereunder, second to interest accrued and unpaid hereunder, and thereafter to principal.

7.2 **Prepayment.** The Company may prepay, without penalty, any principal amount on this Note, in whole or in part, at any time. Any prepayment will be applied first to the payment of any fees or charges outstanding hereunder, second to interest accrued and unpaid hereunder, and thereafter to principal.

7.3 **Ranking.** All payments under this Note shall rank senior to all other existing and future indebtedness of the Company, excluding any capital and equipment leases except as, and only to the extent, expressly set forth in the Intercreditor Agreement.

8. **Conversion.**

8.1 **Conversion Upon Maturity.** The Holder will have the option to convert (a "**Conversion**") the principal and accrued interest of this Note into shares of Common Stock of the Company at a discount of ten percent (10%) of the closing price of the Company's Common Stock on the principal exchange or association market on which it is listed as of the date that is one (1) business day prior to the date the Conversion Notice (as defined below) is delivered to the Company (referred to in this **Section 8** as the "**Conversion Date**"). If the Common Stock is not then-listed on an established securities exchange, national market system or automated quotation system, but the Common Stock is regularly quoted by a nationally recognized securities dealer, the "closing price" on the Conversion Date shall be the mean of the high bid and low asked prices for such date or, if there are no high bid and low asked prices for a share of Common Stock on such date, the high bid and low asked prices for a share of Common Stock on the immediately preceding date for which such information exists, as reported in *The Wall Street Journal* or such other nationally published source as the Company reasonably deems reliable; or if the Common Stock is neither listed on an established securities exchange, national market system or automated quotation system nor regularly quoted by a nationally recognized securities dealer, the "closing price" on the Conversion Date shall be established by the Board of Directors of the Company in good faith and approved by the Holder in its reasonable discretion.

8.2 **Mechanics and Effect of a Conversion.**

(a) The Holder shall provide written notice (the "**Conversion Notice**") to the Company at least three (3) business days prior to the Maturity Date; provided, that if the Maturity Date is not a business day, the Conversion Notice shall be due on the date that is the business day immediately preceding the Maturity Date. The Conversion Notice can be delivered to the Company via electronic mail, hand delivery or overnight delivery; provided that the delivery date shall be the date it is received by the Company.

(b) No fractional shares of Common Stock will be issued upon a Conversion of this Note. In lieu of any fractional shares to which the Holder may otherwise be entitled, the Company will pay to the Holder in cash the unconverted amount that would otherwise be converted into such fractional shares.

(c) Upon a Conversion of this Note, the Holder shall surrender this Note, duly endorsed, at the principal offices of the Company or any transfer agent of the Company, and this Note shall be canceled in all respects. The Company will, at its expense, as soon as practicable thereafter, issue and deliver to the Holder a certificate or certificates for the shares of Common Stock to which the Holder is entitled upon the Conversion.

(d) Upon Conversion of this Note, the Company will be forever released from all of its obligations and liabilities under this Note with regard to that portion of the principal amount and accrued interest being converted, including, without limitation, the obligation to pay such converted portion of the principal amount and accrued interest.

8.3 **Authorization of Conversion Shares.** The Company hereby covenants and agrees to take all such actions as may be necessary to authorize such number of shares of Common Stock as will be sufficient to accomplish a Conversion.

9. **Events of Default.** The occurrence of any one or more of the following events shall constitute an "**Event of Default**" under this Note:

9.1 **Payment Default.** The Company shall fail to pay the outstanding principal or accrued interest amount due under this Note, or any portion thereof when due, whether on the Maturity Date, or on such earlier date as is required by **Section 10**, or otherwise;

9.2 **Other Default.** The Company shall materially breach any representation, warranty, covenant, agreement or obligation of the Company under this Note, the Security Agreement, the Intercreditor Agreement or the Purchase Agreement, and shall fail to cure such breach within ten (10) days after written notice thereof to the Company;

9.3 **Other Indebtedness.** The Company shall default under any other material indebtedness of the Company, and shall fail to cure such default within ten (10) days after written notice thereof to the Company;

9.4 **Judgments.** Any money judgment, writ or similar process shall be entered or filed against the Company or any of its property or other assets for more than \$100,000, and shall remain unvacated, unbonded or unstayed for a period of thirty (30) days unless otherwise consented to by the Holder, which consent will not be unreasonably withheld; or

9.5 **Bankruptcy, Etc.** (a) The Company, pursuant to or within the meaning of any Bankruptcy Law, (i) admits in writing its inability to pay its debts generally as they become due, (ii) commences a voluntary case or proceeding under any Bankruptcy Law with respect to itself, (iii) consents to the entry of a judgment, decree or order for relief against it in an involuntary case or proceeding under any Bankruptcy Law, (iv) consents to the appointment of a custodian of it or for any part of its assets, (v) consents to or acquiesces in the institution of bankruptcy or insolvency proceedings against it, (vi) applies for, consents to or acquiesces in the appointment of or taking possession by a custodian of the Company or for any part of its assets, (vii) makes a general assignment for the benefit of its creditors, or (viii) takes any corporate act to authorize any of the foregoing; or (b) an involuntary petition is filed against the Company (unless such petition is dismissed or discharged within sixty (60) days) under any Bankruptcy Law now or hereafter in effect, or a custodian, receiver, trustee or assignee for the benefit of creditors (or other similar official) is appointed to take possession, custody or control of any property of the Company.

10. **Remedies.** Upon or at any time after the occurrence of an Event of Default specified in Sections 9.1, 9.2, 9.3 or 9.4 hereof, all Obligations under this Note shall, upon the demand of the Holder, become due and payable without further presentment, demand, protest or other notice of any kind, all of which are hereby expressly waived. Upon the occurrence of an Event of Default specified in Section 9.5 hereof, all Obligations shall thereupon and concurrently therewith automatically become due and payable without presentment, demand, protest or other notice of any kind, all of which are hereby expressly waived.

11. **Certain Negative Covenants.** So long as the Company shall have any obligation under this Note, the Company shall not without the Holder's written consent:

11.1 **Distributions on Capital Stock.** Pay, declare or set apart for such payment, any dividend or other distribution (whether in cash, property or other securities) on shares of capital stock other than dividends on shares of Common Stock solely in the form of additional shares of Common Stock or, directly or indirectly or through any subsidiary make any other payment or distribution in respect of its capital stock except for distributions pursuant to any shareholders' rights plan which is approved by a majority of the Company's disinterested directors.

11.2 **Restriction on Stock Repurchases.** Redeem, repurchase or otherwise acquire (whether for cash or in exchange for property or other securities or otherwise) in any one transaction or series of related transactions any shares of capital stock of the Company or any warrants, rights or options to purchase or acquire any such shares.

11.3 **Borrowings.** Create, incur, assume or suffer to exist any liability for borrowed money in excess of \$50,000, except (a) borrowings in existence or committed on the date hereof and of which the Company has informed Holder in writing prior to the date hereof, (b) indebtedness to trade creditors incurred in the ordinary course of business consistent with past practices or (c) borrowings, the proceeds of which shall be used to repay this Note.

11.4 **Sale of Assets.** Sell, lease or otherwise dispose of any significant portion of its assets outside the ordinary course of business.

11.5 **Advances and Loans.** Lend money, give credit or make advances to any person, firm, joint venture or corporation, including, without limitation, officers, directors, employees, subsidiaries and affiliates of the Company, except loans, credits or advances in existence or committed on the date hereof and which the Company has informed Holder in writing prior to the date hereof.

11.6 **Contingent Liabilities.** Assume, guarantee, endorse, contingently agree to purchase or otherwise become liable upon the obligation of any person, firm, partnership, joint venture or corporation, except by the endorsement of negotiable instruments for deposit or collection and except assumptions, guarantees, endorsements and contingencies (a) in existence or committed on the date hereof and which the Company has informed Holder in writing prior to the date hereof, and (b) similar transactions in the ordinary course of business.

11.7 Limitation on Liens. Grant, or permit to be created, any lien other than the security interests created under the Security Agreement and any security interest which would constitute a Permitted Lien (as defined in the Security Agreement).

12. Certain Affirmative Covenants. So long as the Company shall have any obligation under this Note:

12.1 Payment of Taxes. The Company will promptly pay and discharge or cause to be paid and discharged, before the same shall become in default, all taxes and assessments imposed upon the Company or any of its subsidiaries or upon the income and profits of the Company or any of its subsidiaries, or upon any property, real, personal or mixed, belonging to the Company or any of its subsidiaries, or upon any part thereof by the United States or any State thereof, as well as all material claims for labor, materials and supplies which, if unpaid, would become a Lien upon such property or any part thereof; provided, however, that neither the Company nor any of its subsidiaries shall be required to pay and discharge or to cause to be paid and discharged any such tax, assessment, charge, levy or claim so long as both (i) the Company has established adequate reserves for such tax, assessment, charge, levy or claim and (ii) the Company or a subsidiary shall be contesting the validity thereof in good faith by appropriate proceedings.

12.2 Notice of Certain Events. The Company shall, immediately after it becomes aware of the occurrence of (i) any Event of Default (as hereinafter defined) or any event which, upon notice or lapse of time or both, would constitute such an Event of Default, or (ii) any action, suit or proceeding at law or in equity or by or before any governmental instrumentality or agency which could reasonably be expected to materially impair the right of the Company to carry on its business substantially as then conducted, or could reasonably be expected to have a material adverse effect on the properties, assets, financial condition, operating results or business of the Company and its subsidiaries taken as a whole, give notice to the holder of this Note, specifying the nature of such event.

12.3 Maintenance of Existence. The Company shall preserve, renew and maintain in full force and effect the corporate or organizational existence of the Company and its subsidiaries.

12.4 Maintenance of Property; Insurance. The Company shall:

(a) maintain and preserve all of its property useful and necessary in its business in good working order and condition, ordinary wear and tear excepted; and

(b) maintain insurance with respect to its property and business with financially sound and reputable insurance companies that are not Affiliates of the Borrower, in such amounts and covering such risks as are usually insured against by similar companies engaged in the same or a similar business.

12.5 **Additional Collateral.** With respect to any property acquired after the Closing Date by the Company or any of its subsidiaries, the Company shall promptly, and in any event within 30 days of acquiring such property:

(a) execute and deliver to the Holder such supplements or amendments to the Security Agreement or such other documents as the Holder deems necessary or advisable to grant to the Holder a security interest in such property; and

(b) take all actions necessary or advisable to grant to the Holder a perfected first priority security interest in such property, including the filing of UCC-1 financing statements in such jurisdictions as may be required by the Security Agreement or by law or as may be requested by the Holder.

13. **Waiver and Amendment.** The Company hereby waives demand for payment, presentment for payment, protest, notice of payment, notice of dishonor, notice of nonpayment, notice of acceleration of maturity and diligence in taking any action to collect sums owing hereunder. Any waiver by the Holder of a breach of any provision of this Note shall not operate as or be construed to be a waiver of any other breach of such provision or of any breach of any other provision of this Note. The failure or delay of the Holder to insist upon strict adherence to any term of this Note on one or more occasions shall not be considered a waiver or deprive the Holder of the right thereafter to insist upon strict adherence to that term or any other term of this Note. Any waiver must be in writing. Any term of this Note may be amended and the observance of any term of this Note may be waived (either generally or in a particular instance and either retroactively or prospectively), with the written consent of the Company and the Holder. This Note may not be terminated or amended and the observance of any term of this Note may not be waived with respect to the Holder without the consent of the Holder. Any waiver or amendment effected in accordance with this section shall be binding upon the Company and the Holder.

14. **Governing Law.** EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN THE PURCHASE AGREEMENT, IN ALL RESPECTS, INCLUDING ALL MATTERS OF CONSTRUCTION, VALIDITY AND PERFORMANCE, THIS NOTE AND THE OBLIGATIONS ARISING HEREUNDER SHALL BE GOVERNED BY, AND CONSTRUED AND ENFORCED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF DELAWARE APPLICABLE TO OBLIGATIONS MADE AND PERFORMED IN THAT STATE, AND ANY APPLICABLE LAWS OF THE UNITED STATES OF AMERICA.

15. **Transfer.** This Note may be transferred or assigned by the Holder at any time and in any manner without the prior written consent of the Company, subject only to applicable securities laws. The Company may not transfer or assign this Note or any of its rights hereunder without the prior written consent of the Holder. The Holder shall promptly notify the Company of any transfer or assignment of this Note.

16. **Notices.** Notices hereunder shall be made as described in the Purchase Agreement.

17. **Stockholders, Officers and Directors Not Liable.** In no event shall any stockholder, officer or director of the Company be liable for any amounts due or payable pursuant to this Note. This Note is solely an obligation of the Company.

18. **Loss of Note.** Upon receipt by the Company of evidence satisfactory to it of the loss, theft, destruction or mutilation of this Note or any Note exchanged for it, and indemnity satisfactory to the Company (in case of loss, theft or destruction) or surrender and cancellation of such Note (in the case of mutilation), the Company will make and deliver in lieu of such Note a new Note of like tenor.

19. **Waiver of Jury Trial.** THE COMPANY HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN ANY LEGAL PROCEEDING DIRECTLY OR INDIRECTLY RELATING TO THIS NOTE, THE SECURITY AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY WHETHER BASED ON CONTRACT, TORT OR ANY OTHER THEORY.

20. **Remedies; Expenses.** Upon the occurrence of any Event of Default and after any applicable cure period provided for herein, the Holder may, at its option, declare all indebtedness of principal and interest due and payable, whereupon this Note shall be immediately due and payable, and the Holder shall have and may exercise from time to time any and all rights and remedies available to it under any applicable law. The rights, remedies, powers and privileges herein provided are cumulative and not exclusive of any rights, remedies, powers and privileges provided by law. The Company shall reimburse the Holder on demand for all of its reasonable out-of-pocket costs, expenses and fees (including reasonable expenses and fees of its legal counsel) incurred by the Holder in connection with the enforcement of the Holder's rights hereunder and under the Security Agreement.

[Signature page follows]

