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

FORM 10-Q

(Mark one)

☒ **QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the quarterly period ended September 30, 2016

or

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from _____ to _____

Commission File Number 001-37367

OPGEN, INC.

(Exact name of registrant as specified in its charter)

Delaware	**06-1614015**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. employer identification no.)**
708 Quince Orchard Road, Suite 205, Gaithersburg, MD	**20878**
(Address of principal executive offices)	**(Zip code)**

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

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

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

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☒

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

21,717,164 shares of the Company's common stock, par value $0.01 per share, were outstanding as of November 9, 2016.

OPGEN, INC.

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INFORMATION REGARDING FORWARD-LOOKING STATEMENTS

This quarterly report on Form 10-Q of OpGen, Inc. and certain information incorporated herein by reference contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act") and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). In this quarterly report, we refer to OpGen, Inc. as the "Company," "we," "our" or "us." All statements other than statements of historical facts contained herein, including statements regarding our future results of operations and financial position, strategy and plans, and our expectations for future operations, are forward-looking statements. The words "believe," "may," "will," "estimate," "continue," "anticipate," "design," "intend," "expect" or the negative version of these words and similar expressions are intended to identify forward-looking statements.

We have based these forward-looking statements on our current expectations and projections about future events and trends that we believe may affect our financial condition, results of operations, strategy, short- and long-term business operations and objectives, and financial needs. These forward-looking statements are subject to a number of risks, uncertainties and assumptions, including those described in Part II Item 1A "Risk Factors." In light of these risks, uncertainties and assumptions, the forward-looking events and circumstances included herein may not occur, and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements. Given these uncertainties, you should not place undue reliance on these forward-looking statements. Forward-looking statements include, but are not limited to, statements about:

- the commercialization of our current products, including our QuickFISH® and PNA FISH® diagnostic products for infectious diseases, our Acuitas® MDRO test services and our Acuitas Lighthouse® bioinformatics services;
- our ability to grow our customer basis for our current products;
- our liquidity and working capital requirements, including our cash requirements over the next 12 months and beyond;
- anticipated trends and challenges in our business and the competition that we face;
- the execution of our business plan and our growth strategy;
- our expectations regarding the size of and growth in potential markets;
- our opportunity to successfully enter into new collaborative agreements;
- changes in laws or regulations applicable to our business, including potential regulation by the FDA;
- our ability to develop and commercialize new products to address unmet needs in our industry, and the timing of commercialization;
- compliance with the U.S. and international regulations applicable to our business; and
- our expectations regarding future revenue and expenses.

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

Other risks may be described from time to time in our filings made under the securities laws. New risks emerge from time to time. It is not possible for our management to predict all risks. All forward-looking statements in this quarterly report speak only as of the date made and are based on our current beliefs and expectations. We undertake no obligation to update or revise any forward-looking statement, whether as a result of new information, future events or otherwise.

NOTE REGARDING TRADEMARKS

We own various U.S. federal trademark registrations and applications and unregistered trademarks and servicemarks, including OpGen®, Acuitas®, Acuitas Lighthouse® Argus®, AdvanDx®, QuickFISH®, PNA FISH®, and mAST™. All other trademarks, servicemarks or trade names referred to in this quarterly report are the property of their respective owners. Solely for convenience, the trademarks and trade names in this quarterly report are sometimes referred to without the ® and ™ symbols, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto. We do not intend the use or display of other companies' trademarks and trade names to imply a relationship with, or endorsement or sponsorship of us by, any other companies, products or services.

Part I. FINANCIAL INFORMATION

Item 1. Unaudited Condensed Consolidated Financial Statements

OpGen, Inc. and Subsidiaries
Condensed Consolidated Balance Sheets
(unaudited)

	September 30, 2016	December 31, 2015
Assets		
Current assets		
Cash and cash equivalents	$ 4,260,905	$ 7,814,220
Accounts receivable, net	446,686	678,646
Inventory, net	830,205	826,012
Prepaid expenses and other current assets	478,683	566,239
Total current assets	**6,016,479**	**9,885,117**
Property and equipment, net	862,643	1,074,710
Goodwill	600,814	637,528
Intangible assets, net	1,687,952	1,888,814
Deferred offering costs	137,178	—
Other noncurrent assets	270,464	270,327
Total assets	**$ 9,575,530**	**$ 13,756,496**
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	$ 1,936,012	$ 2,285,792
Accrued compensation and benefits	1,230,502	1,081,270
Accrued liabilities	1,155,317	920,286
Deferred revenue	64,424	50,925
Short term notes payable	1,099,974	—
Current maturities of long-term capital lease obligation	207,820	251,800
Total current liabilities	**5,694,049**	**4,590,073**
Deferred rent	421,913	352,985
Note payable	—	993,750
Long-term capital lease obligation and other noncurrent liabilities	184,391	328,642
Total liabilities	**6,300,353**	**6,265,450**
Stockholders' equity		
Common stock, $0.01 par value; 200,000,000 shares authorized; 21,690,555 and 12,547,684 shares issued and outstanding at September 30, 2016 and December 31, 2015, respectively	216,905	125,477
Preferred stock, $0.01 par value; 10,000,000 shares authorized; none issued and outstanding at September 30, 2016 and December 31, 2015, respectively	—	—
Additional paid-in capital	131,590,858	121,490,994
Accumulated other comprehensive gain/(loss)	—	(1,059)
Accumulated deficit	(128,532,586)	(114,124,366)
Total stockholders' equity	**3,275,177**	**7,491,046**
Total liabilities and stockholders' equity	**$ 9,575,530**	**$ 13,756,496**

See accompanying notes to unaudited condensed consolidated financial statements.

OpGen, Inc. and Subsidiaries
Condensed Consolidated Statements of Operations and Comprehensive Loss
(unaudited)

	Three Months Ended September 30, 2016	2015	Nine Months Ended September 30, 2016	2015
Revenue				
Product sales	$ 730,325	$ 929,241	$ 2,705,690	$ 1,432,592
Laboratory services	23,036	23,765	182,130	87,201
Collaboration revenue	6,302	27,780	131,302	308,340
Total revenue	**759,663**	**980,786**	**3,019,122**	**1,828,133**
Operating expenses				
Cost of products sold	400,001	624,635	1,269,990	788,256
Cost of services	51,802	48,467	528,733	198,691
Research and development	2,178,818	1,788,748	6,278,829	3,897,049
General and administrative	1,639,996	1,614,532	4,955,096	3,694,143
Sales and marketing	1,294,640	1,032,759	4,282,628	2,962,555
Transaction expenses	—	525,596	—	525,596
Total operating expenses	**5,565,257**	**5,634,737**	**17,315,276**	**12,066,290**
Operating loss	**(4,805,594)**	**(4,653,951)**	**(14,296,154)**	**(10,238,157)**
Other expense				
Interest and other income/(expense)	623	2,513	(3,078)	9,675
Interest expense	(41,423)	(17,482)	(109,806)	(1,746,853)
Foreign currency transaction (losses)/gains	(1,269)	—	2,293	—
Change in fair value of derivative financial instruments	—	—	—	(647,342)
Total other expense	**(42,069)**	**(14,969)**	**(110,591)**	**(2,384,520)**
Loss before income taxes	**(4,847,663)**	**(4,668,920)**	**(14,406,745)**	**(12,622,677)**
Provision for income taxes	—	1,662	—	1,662
Net loss	**(4,847,663)**	**(4,670,582)**	**(14,406,745)**	**(12,624,339)**
Preferred stock dividends and beneficial conversion	—	—	(332,550)	(244,508)
Net loss available to common stockholders	**$ (4,847,663)**	**$ (4,670,582)**	**$ (14,739,295)**	**$ (12,868,847)**
Net loss per common share - basic and diluted	**$ (0.23)**	**$ (0.38)**	**$ (0.92)**	**$ (2.00)**
Weighted average shares outstanding - basic and diluted	20,938,700	12,261,238	16,028,047	6,444,373
Net loss	$ (4,847,663)	$ (4,670,582)	$ (14,406,745)	$ (12,624,339)
Other comprehensive income/(loss) - foreign currency translation	672	(49)	1,059	(49)
Comprehensive loss	**$ (4,846,991)**	**$ (4,670,631)**	**$ (14,405,686)**	**$ (12,624,388)**

See accompanying notes to unaudited condensed consolidated financial statements.

OpGen, Inc. and Subsidiaries
Condensed Consolidated Statements of Cash Flows
(unaudited)

	Nine Months Ended September 30, 2016	2015
Cash flows from operating activities		
Net loss	$ (14,406,745)	$ (12,624,339)
Adjustments to reconcile net loss to net cash used in operating activities		
Depreciation and amortization	494,828	392,404
Loss on disposal of property and equipment	6,308	—
Deferred tax provision	—	1,662
Noncash interest expense	3,126	1,598,312
Share-based compensation	706,648	1,172,231
Inventory obsolescence	109,367	—
Change in fair value of derivative financial instruments	—	647,342
Changes in operating assets and liabilities, net of effects of acquisition:		
Accounts receivable	231,960	507,066
Inventory	(113,560)	288,126
Other assets	124,133	(306,386)
Accounts payable	(349,780)	(814,855)
Accrued compensation and other liabilities	313,644	(1,752,790)
Deferred revenue	13,499	(180,311)
Net cash used in operating activities	**(12,866,572)**	**(11,071,538)**
Cash flows from investing activities		
Cash acquired in business combinations	—	1,367,211
Purchases of property and equipment (net of proceeds on disposals)	(87,533)	(89,234)
Net cash (used in)/provided by investing activities	**(87,533)**	**1,277,977**
Cash flows from financing activities		
Proceeds from issuance of common stock, net of issuance costs	124	4,958,335
Proceeds from issuance of convertible notes and warrants, net of issuance costs	—	1,388,815
Proceeds from issuance of promissory notes, net of issuance costs	204,895	1,741,667
Proceeds from exercise of stock options and warrants	23,771	214
Proceeds from initial public offering, net of issuance costs	—	12,408,285
Proceeds from private offering of common stock, preferred stock and warrants, net of issuance costs	9,460,751	—
Payments on debt	(101,796)	(153,750)
Payments on capital lease obligations	(188,231)	(112,200)
Net cash provided by financing activities	**9,399,514**	**20,231,366**
Effects of exchange rates on cash	1,276	(193)
Net (decrease)/increase in cash and cash equivalents	(3,553,315)	10,437,612
Cash and cash equivalents at beginning of period	7,814,220	749,517
Cash and cash equivalents at end of period	**$ 4,260,905**	**$ 11,187,129**
Supplemental disclosure of cash flow information		
Cash paid during the period for interest	$ 46,022	$ 201,233
Supplemental disclosures of noncash investing and financing activities:		
Unpaid deferred offering costs	$ 137,178	$ —
Acquisition of equipment purchased through capital leases	$ —	$ 429,320
Common stock issued in business combination	$ —	$ 2,584,090
Conversion of convertible promissory notes to Series A preferred stock	$ —	$ 3,000,000
Conversion of series A preferred stock into common shares	$ —	$ 8,183,661
Exchange of demand notes for IPO units	$ —	$ 2,100,000
Exchange of demand note for convertible debt	$ —	$ 300,000

See accompanying notes to unaudited condensed consolidated financial statements.

Note 1 – Organization

OpGen, Inc. (“OpGen” or the “Company”) was incorporated in Delaware in 2001. On July 14, 2015, OpGen completed the strategic acquisition (the “Merger”) of AdvanDx, Inc. and its wholly owned subsidiary AdvanDx A/S (collectively, “AdvanDx”) (see Note 4). Pursuant to the terms of a merger agreement, Velox Acquisition Corp., OpGen’s wholly-owned subsidiary formed for the express purpose of effecting the Merger, merged with and into AdvanDx, Inc. with AdvanDx, Inc. surviving as OpGen’s wholly-owned subsidiary. OpGen, AdvanDx, Inc. and AdvanDx A/S are collectively referred to hereinafter as the “Company.” The Company’s headquarters are in Gaithersburg, Maryland, and its principal operations are in Gaithersburg, Maryland and Woburn, Massachusetts. The Company also has operations in Copenhagen, Denmark. The Company operates in one business segment.

OpGen is a precision medicine company using molecular diagnostics and informatics to combat infectious disease. OpGen is developing molecular information products and services to combat infectious disease in global healthcare settings, helping to guide clinicians with more rapid information about life threatening infections, improve patient outcomes, and decrease the spread of infections caused by multidrug-resistant microorganisms (“MDROs”). The Company’s proprietary DNA tests and bioinformatics address the rising threat of antibiotic resistance by helping physicians and healthcare providers optimize patient care decisions and protect the hospital biome through customized screening and surveillance products and services. The Company’s molecular information products and services combine Acuitas DNA tests, Acuitas Lighthouse bioinformatics and CLIA lab services for MDRO genetic identification, antibiotic resistance gene information and surveillance, and add to a growing proprietary data warehouse that includes genomic data matched with antibiotic susceptibility information for microbes and patient information. The Company is working to deliver its molecular information products and services to a global network of customers and partners. The Acuitas DNA tests provide rapid microbial ID, and antibiotic resistance gene information. These include the QuickFISH family of FDA-cleared and CE-marked diagnostic products used to rapidly detect pathogens in positive blood cultures, the MDRO Gene Test to detect, type, track, and trend antibiotic resistant organisms in real-time and a rapid antibiotic resistance test in development.

The Company’s operations are subject to certain risks and uncertainties. The risks include rapid technology changes, the need to manage growth, the need to retain key personnel, the need to protect intellectual property and the need to raise additional capital financing on terms acceptable to the Company. The Company’s success depends, in part, on its ability to develop and commercialize its proprietary technology as well as raise additional capital.

Note 2 – Liquidity and management’s plans

The accompanying unaudited condensed consolidated financial statements have been prepared on a going-concern basis, which contemplates the realization of assets and satisfaction of liabilities in the normal course of business. Since inception, the Company has incurred, and continues to incur, significant losses from operations. The Company has funded its operations primarily through external investor financing arrangements and has raised significant funds in 2016 and 2015, including:

On September 13, 2016, the Company entered into a Sales Agreement (the "Sales Agreement") with Cowen and Company, LLC ("Cowen") pursuant to which the Company may offer and sell from time to time in an "at the market offering" up to an aggregate of $25 million of shares (the "Placement Shares") of the Company's common stock, $0.01 par value per share through Cowen, as sales agent, with initial sales limited to an aggregate of $11.5 million of Placement Shares (the "ATM Offering"). Remaining availability under the ATM Offering is $11.5 million of Placement Shares.

On May 19, 2016 and June 27, 2016, the Company offered and sold units in a private offering to members of management and employees and to accredited investors, including Merck Global Health Innovation Fund, LLC (“Merck GHI”) and jVen Capital, LLC (“jVen Capital”), each unit consisting of either (i) one share of common stock and a detachable stock purchase warrant to purchase an additional 0.75 shares of common stock, or (ii) one share of non-voting convertible preferred stock and a detachable stock purchase warrant to purchase an additional 0.75 shares of common stock, at a price of $1.14 per unit. The total net proceeds to the Company, after deducting offering commissions and expenses were $9.5 million. The Company intends to continue to use the proceeds for working capital and general corporate purposes. Pursuant to the private placement, the Company issued 6,744,127 shares of common stock, 2,309,428 shares of non-voting convertible preferred stock and stock purchase warrants to acquire an additional 6,790,169 shares of common stock.

In July 2015, the Company raised $6.0 million by issuing 1,136,364 shares of common stock at $4.40 per share and a $1.0 million senior secured promissory note to Merck GHI pursuant to a Common Stock and Note Purchase Agreement (the “Purchase Agreement”). Under the Purchase Agreement, Merck GHI has the right to participate in future securities offerings made by the Company (see Note 5).

In May 2015, OpGen completed its initial public offering (“IPO”) for total gross proceeds of $17.1 million (see Note 8).

To meet its capital needs, the Company is considering multiple alternatives, including, but not limited to, additional equity financings, debt financings and other funding transactions, licensing and/or partnering arrangements and business combination transactions. There can be no assurance that the Company will be able to complete any such transaction on acceptable terms or otherwise. The Company believes that current cash on hand will be sufficient to fund operations into the first quarter of 2017. In the event the Company is unable to successfully raise additional capital on or before the first quarter of 2017, the Company will not have sufficient cash flows and liquidity to finance its business operations as currently contemplated. Accordingly, in such circumstances the Company would be compelled to immediately reduce general and administrative expenses and delay research and development projects, including the purchase of scientific equipment and supplies, until it is able to obtain sufficient financing. If such sufficient financing is not received timely, the Company would then need to pursue a plan to license or sell its assets, seek to be acquired by another entity, cease operations and/or seek bankruptcy protection. The condensed consolidated financial statements do not include any adjustments relating to recoverability and classification of recorded asset amounts or the amounts and classification of liabilities that might be necessary should the Company be unable to continue in existence.

Note 3 - Summary of significant accounting policies

Basis of presentation and consolidation

The Company has prepared the following unaudited condensed, consolidated financial statements pursuant to the rules and regulations of the Securities and Exchange Commission and the standards of accounting measurement set forth in the Interim Reporting Topic of the Financial Accounting Standards Board (“FASB”) Accounting Standards Codification (“ASC”). Certain information and note disclosures normally included in annual financial statements prepared in accordance with U.S. generally accepted accounting principles (“GAAP”) have been condensed or omitted, although the Company believes that the disclosures made are adequate to make the information not misleading. The Company recommends that the following condensed, consolidated financial statements be read in conjunction with the consolidated financial statements and the notes thereto included in the Company’s latest Annual Report on Form 10-K. In the opinion of management, all adjustments that are necessary for a fair presentation of the Company’s financial position for the periods presented have been reflected. All adjustments are of a normal, recurring nature, unless otherwise stated. The interim condensed consolidated results of operations are not necessarily indicative of the results that may occur for the full fiscal year. The December 31, 2015 consolidated balance sheet included herein was derived from the audited consolidated financial statements, but do not include all disclosures including notes required by GAAP for complete financial statements.

The accompanying unaudited interim condensed consolidated financial statements include the accounts of OpGen and its wholly owned subsidiaries; all intercompany transactions and balances have been eliminated. The Company operates in one business segment. Certain prior period information has been reclassified to conform to the current period presentation.

Foreign currency

AdvanDx A/S is located in Copenhagen, Denmark and uses the Danish Krone as its functional currency. As a result, all assets and liabilities are translated into U.S. dollars based on exchange rates at the end of the reporting period. Income and expense items are translated at the average exchange rates prevailing during the reporting period. Translation adjustments are reported in accumulated other comprehensive loss, a component of stockholder's equity. Foreign currency translation adjustments are the sole component of accumulated other comprehensive loss at September 30, 2016 and December 31, 2015.

Foreign currency transaction gains and losses, excluding gains and losses on intercompany balances where there is no current intent to settle such amounts in the foreseeable future, are included in the determination of net loss. Unless otherwise noted, all references to “$” or “dollar” refer to the U.S. dollar.

Use of estimates

In preparing financial statements in conformity with GAAP, management is required to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. In the accompanying condensed consolidated financial statements, estimates are used for, but not limited to, share-based compensation, allowances for doubtful accounts and inventory obsolescence, valuation of derivative financial instruments, beneficial conversion features of convertible debt, deferred tax assets and liabilities and related valuation allowance, and depreciation and amortization and estimated useful lives of long-lived assets. Actual results could differ from those estimates.

Fair value of financial instruments

All financial instruments classified as current assets and liabilities are carried at cost, which approximates fair value, because of the short-term maturities of those instruments. The carrying value of the Company's debt is reflective of fair value based on instruments with similar terms available to the Company.

For additional fair value disclosures, see Note 6.

Cash and cash equivalents

The Company considers all highly liquid instruments with original maturities of three months or less to be cash equivalents. The Company has cash and cash equivalents deposited in financial institutions in which the balances occasionally exceed the federal government agency ("FDIC") insured limits of $250,000. The Company has not experienced any losses in such accounts and management believes it is not exposed to any significant credit risk.

At September 30, 2016 and December 31, 2015, the Company has funds totaling $243,380, which are required as collateral for letters of credit benefiting its landlords and for credit card processors. These funds are reflected in other noncurrent assets on the accompanying condensed consolidated balance sheets.

Accounts receivable

The Company's accounts receivable result from revenues earned but not collected from customers. Credit is extended based on an evaluation of a customer's financial condition and, generally, collateral is not required. Accounts receivable are due within 30 to 60 days and are stated at amounts due from customers. The Company evaluates if an allowance is necessary by considering a number of factors, including the length of time accounts receivable are past due, the Company's previous loss history and the customer's current ability to pay its obligation. If amounts become uncollectible, they are charged to operations when that determination is made. The allowance for doubtful accounts was $13,193 and $15,596 as of September 30, 2016 and December 31, 2015, respectively.

Revenue earned from one customer represented 11% of total revenues for the three months ended September 30, 2016. No individual customer represented in excess of 10% of revenues for the nine months ended September 30, 2016. Revenue earned from one customer represented 11% of total revenues for the three months ended September 30, 2015. Revenue earned from two customers represented 17% and 10%, respectively, of total revenues for the nine months ended September 30, 2015. No other individual customer represented more than 10% of total revenues in these periods. At September 30, 2016, accounts receivable from one customer represented 11% of total accounts receivable.

Inventory

Inventories are valued using the first-in, first-out method and stated at the lower of cost or market and consist of the following:

	September 30, 2016	December 31, 2015
Raw materials and supplies	$ 552,822	$ 362,526
Work-in process	79,939	150,369
Finished goods	197,444	313,117
Total	$ 830,205	$ 826,012

Inventory includes reagents and components for QuickFISH and PNA FISH kit products, Argus Whole Genome Mapping Systems, reagents and supplies used for Argus consumable kits, and reagents and supplies used for the Company's laboratory services. Inventory reserves for obsolescence and expirations were $700,418 and $591,051 at September 30, 2016 and December 31, 2015, respectively.

Long-lived assets

Property and equipment

Property and equipment is reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to future undiscounted net cash flows expected to be generated by the asset. Recoverability measurement and estimating of undiscounted cash flows is done at the lowest possible level for which we can identify assets. If such assets are considered to be impaired, impairment is recognized as the amount by which the carrying amount of assets exceeds the fair value of the assets. During the three and nine months ended September 30, 2016 and 2015, the Company determined that its property and equipment was not impaired.

Intangible assets and goodwill

Intangible assets and goodwill as of September 30, 2016 were acquired as part of the Merger, and consist of finite-lived intangible assets and goodwill.

Finite-lived intangible assets

Finite-lived intangible assets include trademarks, developed technology and customer relationships and consisted of the following as of September 30, 2016 and December 31, 2015:

		September 30, 2016		December 31, 2015	
	Cost	Accumulated Amortization	Net Balance	Accumulated Amortization	Net Balance
Trademarks and tradenames	$ 461,000	$ (56,049)	$ 404,951	$ (21,471)	$ 439,529
Developed technology	458,000	(79,542)	378,458	(30,474)	427,526
Customer relationships	1,094,000	(189,457)	904,543	(72,241)	1,021,759
	$ 2,013,000	$ (325,048)	$ 1,687,952	$ (124,186)	$ 1,888,814

Finite-lived intangible assets are amortized over their estimated useful lives. The estimated useful life of trademarks was 10 years, developed technology was 7 years, and customer relationships was 7 years. The Company reviews the useful lives of intangible assets when events or changes in circumstances occur which may potentially impact the estimated useful life of the intangible assets.

Total amortization expense of intangible assets was $66,954 and $200,862 for the three and nine months ended September 30, 2016, respectively. Total amortization expense of intangible assets was $57,231 and $57,231 for the three and nine months ended September 30, 2015, respectively. The Company estimates amortization expense related to intangible assets will be $268,000 per year for each of the next five years.

Finite-lived intangible assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of the asset may not be recoverable. If any indicators were present, the Company would test for recoverability by comparing the carrying amount of the asset to the net undiscounted cash flows expected to be generated from the asset. If those net undiscounted cash flows do not exceed the carrying amount (i.e., the asset is not recoverable), the Company would perform the next step, which is to determine the fair value of the asset and record an impairment loss, if any. During the three and nine months ended September 30, 2016 and 2015, the Company determined that its finite-lived intangible assets were not impaired.

Goodwill

Goodwill represents the excess of the purchase price for AdvanDx over the fair values of the acquired tangible or intangible assets and assumed liabilities. Goodwill is not tax deductible in any relevant jurisdictions. As a result of the Merger and subsequent measurement period adjustments recognized in 2016 and 2015, the Company's goodwill balance as of September 30, 2016 was $600,814.

The Company conducts an impairment test of goodwill on an annual basis as of October 1 of each year, and will also conduct tests if events occur or circumstances change that would, more likely than not, reduce the Company's fair value below its net equity value.

Deferred offering costs

As of September 30, 2016, the Company had deferred $137,178 of legal and accounting fees related to its ATM Offering (see Note 8). These offering costs will be offset against ATM proceeds upon the sale of common stock under the offering. As of December 31, 2015, the Company had no deferred offering costs.

Revenue recognition

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

Amounts billed to customers for shipping and handling are included in revenue when the related product or service revenue is recognized. Shipping and handling costs are included in cost of sales.

Revenue from sales of QuickFISH, PNA FISH and XpressFISH diagnostic test products

Revenue is recognized upon shipment to the customer. Sales are recorded net of accruals for estimated rebates, discounts and other deductions and returns.

Revenue from providing laboratory services

The Company recognizes revenue associated with laboratory services contracts when the service has been performed and reports are made available to the customer.

Revenue from funded software development arrangements

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

Revenue from license arrangements

The Company recognizes revenue from licenses of its technologies over the applicable license term.

Revenue from sales of the Argus System

When an Argus System is sold without the Genome Builder software, total arrangement consideration is recognized as revenue when the system is delivered to the customer. Ancillary performance obligations, including installation, limited customer training and limited consumables, are considered inconsequential and are combined with the Argus System as one unit of accounting.

When an Argus System is sold with the Genome Builder software in a multiple-element arrangement, total arrangement consideration is allocated to the Argus System and to the Genome Builder software based on their relative selling prices. Selling prices are determined based on sales of similar systems to similar customers and, where no sales have occurred, on management's best estimate of the expected selling price relative to similar products. Revenue related to the Argus System is recognized when it is delivered to the customer; revenue for the Genome Builder software is recognized when it is delivered to the customer.

Revenue from sales of Genome Builder Software and consumables (on a stand-alone basis)

Revenue is recognized for Genome Builder Software and for consumables, when sold on a standalone basis, upon delivery to the customer.

Revenue from extended warranty service contracts

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

Share-based compensation

Share-based compensation expense is recognized at fair value. The fair value of share-based compensation to employees and directors is estimated, on the date of grant, using the Black-Scholes model. The resulting fair value is recognized ratably over the requisite service period, which is generally the vesting period of the option. For all time-vesting awards granted, expense is amortized using the straight-line attribution method. Share-based compensation expense recognized is based on the value of the portion of stock-based awards that is ultimately expected to vest during the period.

Option valuation models, including the Black-Scholes option pricing model, require the input of highly subjective assumptions, and changes in the assumptions used can materially affect the grant-date fair value of an award. These assumptions include the risk-free rate of interest, expected dividend yield, expected volatility and the expected life of the award.

Income taxes

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the expected future tax consequences attributable to temporary differences between financial statement carrying amounts of existing assets and liabilities and their respective tax basis. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date. A valuation allowance is established when necessary to reduce deferred income tax assets to the amount expected to be realized.

Tax benefits are initially recognized in the financial statements when it is more likely than not the position will be sustained upon examination by the tax authorities. Such tax positions are initially, and subsequently, measured as the largest amount of tax benefit that is greater than 50% likely of being realized upon ultimate settlement with the tax authority, assuming full knowledge of the position and all relevant facts.

The Company had federal net operating loss (“NOL”) carryforwards of $90.3 million at December 31, 2015. Despite the NOL carryforwards, which begin to expire in 2022, the Company may have future tax liability due to alternative minimum tax or state tax requirements. Also, use of the NOL carryforwards may be subject to an annual limitation as provided by Section 382 of the Internal Revenue Code of 1986, as amended (the “Code”). To date, the Company has not performed a formal study to determine if any of its remaining NOL and credit attributes might be further limited due to the ownership change rules of Section 382 or Section 383 of the Code. The Company will continue to monitor this matter going forward. There can be no assurance that the NOL carryforwards will ever be fully utilized.

Loss per share

Basic loss per share is computed by dividing net loss available to common stockholders by the weighted average number of shares of common stock outstanding during the period.

For periods of net income, and when the effects are not anti-dilutive, diluted earnings per share is computed by dividing net income available to common stockholders by the weighted-average number of shares outstanding plus the impact of all potential dilutive common shares, consisting primarily of common stock options and stock purchase warrants using the treasury stock method, and convertible preferred stock and convertible debt using the if-converted method.

For periods of net loss, diluted loss per share is calculated similarly to basic loss per share because the impact of all dilutive potential common shares is anti-dilutive. The number of anti-dilutive shares, consisting of (i) common stock options, (ii) stock purchase warrants, and (iii) restricted stock units representing the right to acquire shares of common stock which have been excluded from the computation of diluted loss per share, was 13.5 million shares and 5.7 million shares as of September 30, 2016 and 2015, respectively. In 2015, the Company’s then-outstanding convertible preferred stock, prior to its conversion in the IPO, contained non-forfeitable rights to dividends, and therefore was considered to be a participating security; the calculation of basic and diluted income (loss) per share excludes net income (but not net loss) attributable to the convertible preferred stock from the numerator and excludes the impact of those shares from the denominator in periods prior to the IPO.

Recent accounting pronouncements

In May 2014, the Financial Accounting Standards Board ("FASB") issued guidance for revenue recognition for contracts, superseding the previous revenue recognition requirements, along with most existing industry-specific guidance. The guidance requires an entity to review contracts in five steps: 1) identify the contract, 2) identify performance obligations, 3) determine the transaction price, 4) allocate the transaction price, and 5) recognize revenue. The new standard will result in enhanced disclosures regarding the nature, amount, timing, and uncertainty of revenue arising from contracts with customers. In August 2015, the FASB issued guidance approving a one-year deferral, making the standard effective for reporting periods beginning after December 15, 2017, with early adoption permitted only for reporting periods beginning after December 15, 2016. In March 2016, the FASB issued guidance to clarify the implementation guidance on principal versus agent considerations for reporting revenue gross rather than net, with the same deferred effective date. In April 2016, the FASB issued guidance to clarify the identification of performance obligations and licensing arrangements. In May 2016, the FASB issued guidance addressing the presentation of sales and other similar taxes collected from customers, providing clarification of the collectibility criterion assessment, as well as clarifying certain transition requirements. The Company is currently evaluating the impact, if any, that this guidance will have on its financial statements.

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

In April 2015, the FASB issued accounting guidance requiring that debt issuance costs related to a recognized liability be presented on the balance sheet as a direct reduction from the carrying amount of that debt liability, consistent with debt discounts. The recognition and measurement guidance for debt issuance costs are not affected. The standard is effective for reporting periods beginning after December 15, 2015. The Company adopted this guidance effective January 1, 2016 on a retrospective basis, and all periods are presented under this guidance.

In April 2015, the FASB issued guidance as to whether a cloud computing arrangement (e.g., software as a service, platform as a service, infrastructure as a service, and other similar hosting arrangements) includes a software license and, based on that determination, how to account for such arrangements. If a cloud computing arrangement includes a software license, then the customer should account for the software license element of the arrangement consistent with the acquisition of other software licenses. If a cloud computing arrangement does not include a software license, the customer should account for the arrangement as a service contract. The guidance is effective for reporting periods beginning after December 15, 2015, and can be adopted on either a prospective or retrospective basis. The Company adopted this guidance for the year ended December 31, 2016, on a prospective basis. The adoption of this new guidance did not have a material impact on the Company's financial statements.

In July 2015, the FASB issued accounting guidance for inventory. Under the guidance, an entity should measure inventory within the scope of this guidance at the lower of cost and net realizable value, except when inventory is measured using LIFO or the retail inventory method. Net realizable value is the estimated selling price in the ordinary course of business, less reasonably predictable costs of completion, disposal, and transportation. In addition, the FASB has amended some of the other inventory guidance to more clearly articulate the requirements for the measurement and disclosure of inventory. The standard is effective for reporting periods beginning after December 15, 2016. The amendments in this pronouncement should be applied prospectively, with earlier application permitted. The Company is currently evaluating the impact, if any, that this new accounting pronouncement will have on its financial statements.

In February 2016, the FASB issued guidance for the accounting for leases. The guidance requires lessees to recognize assets and liabilities related to long-term leases on the consolidated balance sheets and expands disclosure requirements regarding leasing arrangements. The guidance is effective for reporting periods beginning after December 15, 2018 and early adoption is permitted. The guidance must be adopted on a modified retrospective basis and provides for certain practical expedients. The Company is currently evaluating the impact, if any, that this new accounting pronouncement will have on its financial statements.

In March 2016, the FASB issued guidance to clarify the requirements for assessing whether contingent call or put options that can accelerate the payment of principal on debt instruments are clearly and closely related to their debt hosts. The guidance is effective for reporting periods beginning after December 15, 2016, and early adoption is permitted. Entities are required to apply the guidance to existing debt instruments using a modified retrospective transition method as of beginning of the fiscal year of adoption. The Company is currently evaluating the impact, if any, that this new accounting pronouncement will have on its financial statements.

In March 2016, the FASB issued guidance simplifying the accounting for and financial statement disclosure of stock-based compensation awards. Under the guidance, all excess tax benefits and tax deficiencies related to stock-based compensation awards are to be recognized as income tax expenses or benefits in the income statement and excess tax benefits should be classified along with other income tax cash flows in the operating activities section of the statement of cash flows. Under the guidance, companies can also elect to either estimate the number of awards that are expected to vest or account for forfeitures as they occur. In addition, the guidance amends some of the other stock-based compensation awards guidance to more clearly articulate the requirements and cash flow presentation for withholding shares for tax-withholding purposes. The guidance is effective for reporting periods beginning after December 15, 2016 and early adoption is permitted, though all amendments of the guidance must be adopted in the same period. The adoption of certain amendments of the guidance must be applied prospectively, and adoption of the remaining amendments must be applied either on a modified retrospective basis or retrospectively to all periods presented. The Company is currently evaluating the impact, if any, that this new accounting pronouncement will have on its financial statements.

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

Note 4 – Business combination

On July 14, 2015, the Company acquired 100% of the capital stock of AdvanDx in the Merger in a taxable transaction. AdvanDx researches, develops and markets advanced *in vitro* diagnostic kits for the diagnosis and prevention of infectious diseases, and sells its products principally to hospitals and clinical laboratories in the United States and Europe. The Company acquired AdvanDx principally to use AdvanDx's diagnostic capabilities with respect to MDROs and leverage AdvanDx's relationships with hospitals and clinical laboratories to accelerate the sales of all of OpGen's products and services.

Pursuant to an Agreement and Plan of Merger (the "Merger Agreement"), Velox Acquisition Corp. merged with and into AdvanDx, Inc. with AdvanDx, Inc. surviving as a wholly-owned subsidiary of the Company in accordance with the General Corporation Law of the State of Delaware. Under the terms of the Merger Agreement, the merger consideration consisted of an aggregate 681,818 shares of the Company's common stock with a value of $2.6 million (the "Merger Consideration"), which Merger Consideration was distributed in accordance with the liquidation preferences set forth in the AdvanDx, Inc. Restated Certificate of Incorporation, as amended.

The Company accounted for the acquisition of AdvanDx by recording all tangible and intangible assets acquired and liabilities assumed at their estimated fair values on the acquisition date, with the remaining unallocated purchase price recorded as goodwill. The fair value assigned to identifiable intangible assets acquired was determined using an income approach for trade names and customer relationships, and a cost approach for technology. The Company received carryover tax basis in the acquired assets and liabilities and no tax basis in the intangible assets (including goodwill) established on the acquisition date. As a result, the Company recognized deferred tax assets related to foreign taxing jurisdictions of $4.3 million (fully offset by a corresponding valuation allowance) and net deferred tax liabilities of $0.1 million in the U.S. taxing jurisdiction. The net deferred tax liability in the U.S. taxing jurisdiction resulted in an income tax benefit related to a reduction in the Company's previously established valuation allowance (which reduction is accounted for outside of purchase accounting). The following represents the allocation of the purchase price (as adjusted for measurement period adjustments):

Total purchase price - fair value of common stock issued	$ 2,584,090
Fair value of tangible assets acquired:	
Cash	$ 1,367,211
Receivables	536,406
Inventory	881,273
Property and equipment	245,479
Other assets	359,587
Fair value of identifable intangible assets acquired:	
Customer relationships	1,094,000
Developed technology	458,000
Trademarks and tradenames	461,000
Fair value of goodwill	600,814
Deferred tax liabilities, net	129,095
Fair value of liabilities assumed	3,290,585
	$ 2,584,090

The total consideration paid in the acquisition exceeded the estimated fair value of the tangible and identifiable intangible assets acquired and liabilities assumed, resulting in approximately $0.6 million of goodwill. Goodwill, primarily related to expected synergies gained from combining operations, sales growth from future product offerings and customers, together with certain intangible assets that do not qualify for separate recognition, including assembled workforce, is not tax deductible.

Adjustments to goodwill

In the fourth quarter of 2015, the Company adopted new accounting guidance with respect to the accounting for measurement period adjustments resulting from business combinations. Under the new guidance, the Company is required to recognize adjustments to provisional amounts identified during the measurement period in the reporting period in which the adjustments are determined and disclose the portion of the amount recorded in current-period losses by line item that would have been recorded in previous reporting periods if the adjustment had been recognized as of the acquisition date.

During the fourth quarter of 2015, as a result of obtaining new information about facts and circumstances that existed as of the acquisition date, the Company adjusted the provisional estimated fair values of certain acquired assets and liabilities acquired in the Merger, resulting in an increase in goodwill recognized of $345,781. During the first quarter of 2016, the Company identified an additional adjustment to the provisional estimated fair values, resulting in a decrease in goodwill recognized of $36,714.

Pro forma disclosures (unaudited)

The following unaudited pro forma financial information summarizes the results of operations for the three and nine months ended September 30, 2015 as if the Merger had been completed as of January 1, 2015. Pro forma information primarily reflects adjustments relating to (i) elimination of the interest on AdvanDx's outstanding debt, and (ii) the amortization of intangibles acquired. The pro forma amounts do not purport to be indicative of the results that would have actually been obtained if the acquisition occurred as of January 1, 2015 or that may be obtained in the future:

Unaudited pro forma results	Three Months Ended September 30, 2015	Nine Months Ended September 30, 2015
Revenues	$ 1,126,530	$ 3,902,337
Net loss	$ (4,650,817)	$ (15,623,109)
Net loss per share	$ (0.38)	$ (2.29)

Note 5 – 2015 Merck GHI financing

On July 14, 2015, as a condition of the Merger, the Company entered into the Purchase Agreement with Merck GHI, pursuant to which Merck GHI purchased 1,136,364 shares of common stock of the Company at $4.40 per share for gross proceeds of $5.0 million. Pursuant to the Purchase Agreement, the Company also issued to Merck GHI a 8% Senior Secured Promissory Note (the "Merck Note") in the principal amount of $1.0 million with a two-year maturity date from the date of issuance. The Company's obligations under the Merck Note are secured by a lien on all of the Company's assets. Under the Purchase Agreement, Merck GHI has the right to participate in future securities offerings made by the Company. Also in July 2015, the Company entered into a Registration Rights Agreement with Merck GHI and the AdvanDx stockholders who received shares of the Company's common stock in the Merger, which will require the Company to register for resale by such holders in the future, such shares of Company common stock that cannot be sold under an exemption from such registration.

The Company incurred issuance costs of approximately $50,000 related to the financing. Approximately $8,000 of the issuance costs were deferred as debt issuance costs and netted against notes payable in the accompanying condensed consolidated balance sheets as a result of the Company's adoption of the new accounting guidance in 2016, and are being amortized as interest expense over the life of the Merck Note. The remaining $42,000 of issuance costs were charged to additional paid-in capital.

Note 6 - Fair value measurements

The Company classifies its financial instruments using a three-tier fair value hierarchy, which prioritizes the inputs used in measuring fair value. These tiers include:

- Level 1 - defined as observable inputs such as quoted prices in active markets;
- Level 2 - defined as inputs other than quoted prices in active markets that are either directly or indirectly observable; and
- Level 3 - defined as unobservable inputs in which little or no market data exists, therefore requiring an entity to develop its own assumptions such as expected revenue growth and discount factors applied to cash flow projections.

For the nine months ended September 30, 2016, the Company has not transferred any assets between fair value measurement levels.

Financial assets and liabilities measured at fair value on a recurring basis

The Company evaluates financial assets and liabilities subject to fair value measurements on a recurring basis to determine the appropriate level at which to classify them each reporting period. This determination requires the Company to make subjective judgments as to the significance of inputs used in determining fair value and where such inputs lie within the hierarchy.

Prior to its IPO, certain stock purchase warrants contained cash settlement features and, accordingly, the Company considered them to be derivative financial instruments and accounted for them at fair value using level 3 inputs. As a result of the Company's IPO and elimination of the cash settlement features pursuant to their terms, those stock purchase warrants were reclassified to equity. For periods prior to the IPO, the Company determined the fair value of these derivative liabilities using a hybrid valuation method that consisted of a probability weighted expected return method that values the Company's equity securities assuming various possible future economic outcomes while using an option pricing method (that treated all equity linked instruments as call options on the Company's equity value with exercise prices based on the liquidation preference of the then-outstanding Series A redeemable convertible preferred stock) to estimate the allocation of value within one or more of the scenarios. Using this hybrid method, unobservable inputs included the Company's equity value, the exercise price for each option value, expected timing of possible economic outcomes such as initial public offering, risk free interest rates and stock price volatility. The following tables set forth a summary of changes in the fair value of Level 3 liabilities measured at fair value on a recurring basis for the year ended December 31, 2015:

Description	Balance at December 31, 2014	Established in 2015	Change in Fair Value	Reclassified to Equity	Balance at December 31, 2015
Derivative warrant liability	$ —	$ 72,333	$ 647,342	$ (719,675)	$ —

The Company has no financial assets and liabilities measured at fair value on a recurring basis as of September 30, 2016.

Financial assets and liabilities carried at fair value on a non-recurring basis

The Company does not have any financial assets and liabilities measured at fair value on a non-recurring basis.

Non-financial assets and liabilities carried at fair value on a recurring basis

The Company does not have any non-financial assets and liabilities measured at fair value on a recurring basis.

Non-financial assets and liabilities carried at fair value on a non-recurring basis

The Company measures its long-lived assets, including property and equipment and intangible assets (including goodwill), at fair value on a non-recurring basis when they are deemed to be impaired. No such fair value impairment was recognized in the three and nine months ended September 30, 2016 and 2015.

See Note 4 for a discussion of the fair value of assets acquired and liabilities assumed in the Merger.

Note 7 - Debt

As of September 30, 2016, the Company's outstanding debt consisted of the $1.0 million Merck Note that is due in July 2017, along with a financing arrangement for the Company's insurance with a note balance of approximately $0.1 million with final payment scheduled for January 2017. As of December 31, 2015, the only debt outstanding was the $1.0 million Merck Note.

Demand notes

In the fourth quarter of 2014 and first quarter of 2015, the Company raised a total of $2.3 million through the issuance of short-term demand notes. In the first quarter of 2015, $0.3 million of demand notes, held by an entity controlled by our chief executive officer, were settled as partial payment for a 2015 convertible note. All then-outstanding demand notes were tendered as payment for 350,000 units in the Company's IPO (see Note 8). Prior to settlement, the demand notes bore interest at 8% per annum, had a first priority security interest in the assets of the Company, and a term of approximately four months.

2014 convertible debt

In July, August and September 2014, the Company raised $1.5 million through the issuance of convertible debt. All outstanding 2014 convertible debt was converted into Series A redeemable convertible preferred stock and then into 1,500,000 shares of common stock in connection with the Company's IPO (see Note 8). Prior to its conversion, the debt was convertible, at the option of the holders or in certain cases at the Company's option, into shares of Series A redeemable convertible preferred stock or other potential equity securities, bore interest at 8% and was due in full on July 11, 2015.

2015 convertible debt

In February and March 2015, the Company raised $1.5 million in capital through the issuance of 8% secured convertible notes with detachable stock purchase warrants. All outstanding 2015 convertible debt was converted into Series A redeemable convertible preferred stock and then into 1,875,000 shares of common stock in connection with the Company's IPO (see Note 8). Prior to its conversion, the 2015 convertible notes were prepayable by the Company without penalty at any time following the three-month anniversary of the closing of the IPO (provided that before the six-month anniversary of the closing of an IPO, the 2015 convertible notes could only be prepaid out of newly issued capital subsequent to the IPO), and were puttable by the holder to the Company in the event of a defined default. The 2015 convertible notes were each convertible, at the election of the holder, into (i) shares of Series A redeemable convertible preferred stock, at a conversion rate of 1.25 shares of Series A redeemable convertible preferred stock for each $1.00 converted if the conversion occurs prior to closing of an IPO, or (ii) shares of common stock at a conversion rate of one share of common stock for each $1.00 converted if the conversion occurs after the closing of an IPO.

The conversion option embedded in the convertible notes was determined to contain beneficial conversion features, resulting in the bifurcation of those features as an equity instrument (resulting in an additional debt discount) at issuance. After allocation of the gross proceeds to the detachable stock purchase warrants (discussed below) and beneficial conversion feature, the total debt discount recognized was equal to the face value of the 2015 convertible notes. Upon conversion in May 2015, the remaining unamortized beneficial conversion feature of approximately $1.5 million was charged to interest expense in the accompanying condensed consolidated statements of operations and comprehensive loss. Remaining unamortized deferred financing costs of $71,421 were also charged to interest expense upon conversion.

The 2015 convertible note holders also received detachable stock purchase warrants exercisable for 225,011 shares of common stock at 110% of the IPO price and exercisable only if the IPO occurred, and then exercisable beginning on the six-month anniversary of the closing of the IPO. Prior to the IPO, as a result of net settlement features, the stock purchase warrants were considered derivative liabilities, were initially recorded at fair value (resulting in a debt discount) and were marked-to-market at each balance sheet date through earnings. As a result of the elimination of the net settlement features in the IPO, the stock purchase warrants were marked to fair value of $0.7 million on May 8, 2015 and then reclassified to equity.

Total interest expense on all debt instruments was $41,423 and $109,806 for the three and nine months ended September 30, 2016. Total interest expense on all debt instruments was $17,482 and $1,746,853 for the three and nine months ended September 30, 2015.

Note 8 - Stockholders' equity

As of September 30, 2016, the Company has 200,000,000 shares of authorized common shares and 21,690,555 issued and outstanding, and 10,000,000 of authorized preferred shares, of which none were issued or outstanding.

On September 13, 2016, the Company entered into the Sales Agreement with Cowen pursuant to which the Company may offer and sell from time to time, up to an aggregate of $25 million of Placement Shares through Cowen, as sales agent, with initial sales limited to an aggregate of $11.5 million of Placement Shares. Pursuant to the Sales Agreement, Cowen may sell the Placement Shares by any method permitted by law deemed to be an "at the market offering" as defined in Rule 415 of the Securities Act of 1933, as amended, including, without limitation, sales made by means of ordinary brokers' transactions on The NASDAQ Capital Market or otherwise at market prices prevailing at the time of sale, in block transactions, or as otherwise directed by the Company. The Company pays Cowen compensation equal to 3.0% of the gross proceeds from the sales of common stock pursuant to the terms of this Sales Agreement. Remaining availability under the ATM Offering is $11.5 million of Placement Shares. We intend to use the net proceeds from the sale of common stock under the ATM Offering for working capital and other general corporate purposes.

On May 19, 2016 and June 27, 2016, the Company offered and sold units in a private offering to members of management and employees and to accredited investors, including Merck GHI and jVen Capital, each unit consisting of either (i) one share of common stock and a detachable stock purchase warrant to purchase an additional 0.75 shares of common stock, or (ii) one share of non-voting convertible preferred stock and a detachable stock purchase warrant to purchase an additional 0.75 shares of common stock, at a price of $1.14 per unit. The total net proceeds to the Company, after deducting offering commissions and expenses was $9.5 million. Pursuant to the private placement the Company issued 6,744,127 shares of common stock, 2,309,428 of Series A non-voting convertible preferred stock and stock purchase warrants to acquire an additional 6,790,169 shares of common stock. Under the purchase agreement, the Company granted registration rights to the investors in the private financing.

Each share of Series A non-voting convertible preferred stock is convertible at the option of the holder in whole or in part and from time to time into one share of common stock, is entitled to dividends on as “as converted basis” when and if dividends are issued to common stockholders, and participates in liquidation on a *pari passu* basis with common stockholders. The preferred stock was classified as permanent equity. The stock purchase warrants issued as part of the units are exercisable $1.3125 per share beginning 90 days after closing for five years, expiring on May 18, 2021. The warrants are classified as permanent equity at September 30, 2016. In connection with the issuance of Series A non-voting convertible preferred stock, the Company recognized a beneficial conversion feature of $332,550 as a deemed dividend to the preferred shareholders. Holders of the Series A non-voting convertible preferred stock subsequently converted all 2,309,428 shares of preferred stock into 2,309,428 shares of common stock.

The Company filed a registration statement on Form S-3 on June 13, 2016 to register for resale by the investors, from time to time, of the shares of common stock acquired, or underlying the warrants issued, in the private offering. On July 20, 2016, the registration statement was declared effective by the SEC.

In July 2015, the Company issued 1,136,364 shares of common stock to Merck GHI for cash consideration of $5.0 million (see Note 5).

On May 8, 2015, the Company completed its IPO pursuant to which the Company offered and sold 2,850,000 units, each unit consisting of one share of common stock and a detachable stock purchase warrant to purchase an additional share of common stock, at an initial offering price of $6.00 per unit. Of the total gross proceeds of $17.1 million, approximately $2.1 million was used to satisfy outstanding demand notes by exchanging such notes for 350,000 units in the IPO. After considering the demand notes, and underwriting discounts, commissions and offering expenses of $2.9 million (which were charged to additional paid-in capital), the total net cash proceeds to the Company was $12.1 million. On the IPO closing date, the underwriters exercised a portion of their over-allotment option to acquire an additional 422,500 stock purchase warrants for cash of $4,225. In connection with the IPO, all of the Company’s outstanding Series A redeemable convertible preferred stock, 2014 convertible notes and 2015 convertible notes were converted into 7,374,852 shares of common stock.

The stock purchase warrants issued as part of the units (including over-allotment option) are exercisable for 3,272,500 shares of common stock at $6.60 per share beginning six months after the closing of the IPO for five years, expiring on May 8, 2020. Additionally, the Company issued additional warrants to its investment bankers to purchase 185,250 shares of common stock, on the same terms as the warrants issued with the units. The warrants were valued using the Black-Scholes option pricing model and are classified as equity.

All shares of Series A redeemable convertible preferred stock (including those shares issued in connection with the conversion of the 2014 and 2015 convertible debt), were converted into 7,374,852 shares of common stock in connection with the Company’s IPO (see Note 7). Prior to the IPO, the carrying value of the Series A redeemable convertible preferred stock was increased by the accretion of related discounts, issuance costs and accrued but unpaid dividends so that the carrying amount would equal the redemption amount at the dates the stock becomes redeemable. The Company’s redeemable convertible preferred stock was classified as temporary equity due to redemption provisions outside of the Company’s control.

Stock options

In 2002, the Company adopted the 2002 Stock Option and Restricted Stock Plan (the "2002 Plan"), pursuant to which the Company's Board of Directors could grant either incentive stock options or non-qualified stock options, shares of restricted stock, shares of unrestricted common stock, and other share-based awards to officers and employees. In 2008, the Company adopted the 2008 Stock Option and Restricted Stock Plan (the "2008 Plan"), pursuant to which the Company's Board of Directors may grant either incentive or non-qualified stock options or shares of restricted stock to directors, key employees, consultants and advisors.

In April 2015, the Company adopted, and the Company's stockholders approved, the 2015 Equity Incentive Plan (the "2015 Plan"); the 2015 Plan became effective upon the execution and delivery of the underwriting agreement for the Company's IPO. Following the effectiveness of the 2015 Plan, no further grants will be made under the 2002 Plan or 2008 Plan. The 2015 Plan provides for the granting of incentive stock options within the meaning of Section 422 of the Code to employees and the granting of non-qualified stock options to employees, non-employee directors and consultants. The 2015 Plan also provides for the grants of restricted stock, restricted stock units, stock appreciation rights, dividend equivalents and stock payments to employees, non-employee directors and consultants.

Under the 2015 Plan, the aggregate number of shares of the common stock authorized for issuance may not exceed (1) 1,355,000 plus (2) the sum of the number of shares subject to outstanding awards under the 2008 Plan as of the 2015 Plan's effective date, that are subsequently forfeited or terminated for any reason before being exercised or settled, plus (3) the number of shares subject to vesting restrictions under the 2008 Plan as of the 2015 Plan's effective date that are subsequently forfeited. In addition, the number of shares that have been authorized for issuance under the 2015 Plan will be automatically increased on the first day of each fiscal year beginning on January 1, 2016 and ending on (and including) January 1, 2025, in an amount equal to the lesser of (1) 4% of the outstanding shares of common stock on the last day of the immediately preceding fiscal year, or (2) another lesser amount determined by the Company's Board of Directors. Shares subject to awards granted under the 2015 Plan that are forfeited or terminated before being exercised or settled, or are not delivered to the participant because such award is settled in cash, will again become available for issuance under the 2015 Plan. However, shares that have actually been issued shall not again become available unless forfeited. As of September 30, 2016, 655,589 shares remain available for issuance under the 2015 Plan, which includes 501,907 shares automatically added to the 2015 Plan on January 1, 2016.

On April 28, 2016, the Board of Directors of the Company made a stock option award to Evan Jones, the Company's Chief Executive Officer ("CEO") and Chairman of the Board. The non-qualified stock option award to acquire 766,500 shares of common stock represented approximately 6% of outstanding shares of common stock as of the date of the award. The stock option grant has an exercise price of $1.35 per share, a ten-year term and a vesting schedule of 25% vesting of the award on the first annual anniversary of the date of grant and then 6.25% vesting each quarter thereafter over three additional years. The plan under which the award was made incorporates by reference the provisions of the Company's 2015 Plan applicable to stock option awards. The stock option award was contingent on receipt of stockholder approval, as the award was made outside of the Company's stockholder-approved incentive plans. The stockholders approved the stock option award at the Company's Annual Meeting of Stockholders held on June 22, 2016.

For the three and nine months ended September 30, 2016 and 2015, the Company recognized stock compensation expense as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Cost of services	$ —	$ —	$ 5,008	$ —
Research and development	45,945	59,688	181,367	161,819
General and administrative	98,683	156,236	447,811	443,267
Sales and marketing	34,124	45,616	72,462	567,145
	$ 178,752	$ 261,540	$ 706,648	$ 1,172,231

No income tax benefit for stock-based compensation arrangements was recognized in the condensed consolidated statements of operations and comprehensive loss due to the Company's net loss position.

During the three and nine months ended September 30, 2016, the Company granted stock options to acquire 52,500 and 1,426,650 shares of common stock at a weighted average exercise price of $1.66 and $1.42 per share and a weighted average grant date fair value of $0.71 and $0.68 per share, respectively. 443,986 options were forfeited during the three months ended September 30, 2016 at a weighted average exercise price of $4.49 per share. The Company has total stock options to acquire 2,991,715 shares of common stock outstanding at September 30, 2016.

Restricted stock units

In March 2014, the Company awarded restricted stock units to acquire 130,640 shares of common stock to its Chief Executive Officer ("CEO"). The restricted stock units were compensation for his service as CEO from October 2013 through June 2014 and were subject to forfeiture if he did not continue to perform management services through October 24, 2014. The restricted stock units vested on October 24, 2014 and 130,640 shares of common stock were issued to the CEO.

In the fourth quarter of 2015, the Company granted restricted stock units to acquire 75,000 shares of common stock, with a weighted average grant date fair value of $1.70 per share, 25,000 shares of which remain outstanding as of September 30, 2016. 10,416 restricted stock units vested and 39,584 restricted stock units were forfeited during the three months ended September 30, 2016 at a weighted average grant date fair value of $1.70 per share.

Stock purchase warrants

At September 30, 2016, the following warrants to purchase shares of common stock were outstanding:

Issuance	Exercise Price	Expiration	Shares of Common Stock Subject to Warrants
August 2007	$ 7.91	August 2017	8,921
March 2008	$ 790.54	March 2018	46
November 2009	$ 7.91	November 2019	6,674
January 2010	$ 7.91	January 2020	6,674
March 2010	$ 7.91	March 2020	1,277
November 2011	$ 7.91	November 2021	5,213
December 2011	$ 7.91	December 2021	664
March 2012	$ 109.90	March 2019	4,125
February 2015	$ 6.60	February 2025	225,011
May 2015	$ 6.60	May 2020	3,457,750
May 2016	$ 1.31	May 2021	4,739,348
June 2016	$ 1.31	May 2021	2,050,821
			10,506,524

The warrants listed above were issued in connection with various debt, equity or development contract agreements. The warrants issued in February 2015 were initially classified as a liability since the exercise price was variable. The exercise price became fixed as a result of the Company's IPO and, as such, the warrant liability was marked to fair value at that time and reclassified to equity (see Note 6).

Note 9 - Commitments and contingencies

Operating leases

During the second quarter of 2015, the Company extended the term of its Gaithersburg, Maryland office lease, effective May 7, 2015, through January 31, 2021, with one additional five-year renewal at the Company's election. The Company is responsible for all utilities, repairs, insurance, and taxes under this operating lease. Effective July 1, 2015, the Company further modified its lease agreement to add additional leased space to its headquarters. Additionally, the Company leases office space in Denmark; this lease is currently on a month-to-month basis.

The Company also leases a facility in Woburn, Massachusetts under an operating lease that expires in January 2017. On October 17, 2016, AdvanDx, a wholly-owned subsidiary of the Company executed a Lease Extension #6 to Lease Agreement (the "Lease Extension") between the Company and Cummings Properties, LLC with respect to extension of the existing lease for AdvanDx's facility in Woburn Massachusetts (as amended, the "Woburn Lease"). The Lease Extension extends the term of the Woburn Lease for five years, such that the Woburn Lease extends until January 30, 2022. The Company expects the aggregate rent will be approximately $2.2 million over the five-year term, subject to annual cost of living adjustments.

Rent expense under the Company's facility operating leases for the nine months ended September 30, 2016 and 2015 was $756,608 and $447,007, respectively.

Capital leases

The Company leases computer equipment, office furniture, and equipment under various capital leases. The leases expire at various dates through 2020. The leases require monthly principal and interest payments.

Registration and other shareholder rights

In connection with the various investment transactions, the Company entered into registration rights agreements with stockholders, pursuant to which the investors were granted certain demand registration rights and/or piggyback and/or resale registration rights in connection with subsequent registered offerings of the Company's common stock.

Note 10 - License agreements, research collaborations and development agreements

The Company is a party to three license agreements to acquire certain patent rights and technologies. Royalties are incurred upon the sale of a product or service which utilizes the licensed technology. Certain of the agreements require the Company to pay minimum royalties or license maintenance fees. The Company recognized net royalty expense of $71,135 and $216,937 for the three and nine months ended September 30, 2016, respectively. The Company recognized net royalty expense (income) of $7,484 and ($13,769) for the three and nine months ended September 30, 2015, respectively. Income amounts shown for 2015 reflect the April 2015 re-negotiation of one of the Company's license agreements, that reduced the Company's minimum royalties under that agreement. In 2016, future minimum royalty fees are approximately $270,000 under these agreements.

In September 2013, the Company entered into a technology development agreement with Hitachi High-Technologies Corporation ("Hitachi") that included fixed milestone payments for meeting development milestones under the agreement. Since the milestones were substantive, the Company recognized revenue in the periods in which the substantive milestones were achieved. In addition, the Company received an upfront payment which was recognized on a straight-line basis over the term of the technology development agreement, which ended in December 2015. The Company recognized total revenue of $27,780 and $308,340 during the three and nine months ended September 30, 2015, respectively (none in 2016) relating to this arrangement.

In June 2016, the Company entered into a license agreement with Hitachi, pursuant to which it resolved various matters with respect to previously delivered milestones under the technology development agreement and provided a development license and commercial products license to certain technology. The license agreement contains non-contingent multiple elements (the licenses) that the Company determined did not have stand alone value, and a contingent substantive milestone. The licenses are treated as a single unit of accounting and the Company will recognize the revenue associated with that unit of accounting over the applicable license period. During the three and nine months ended September 30, 2016, the Company recognized $6,302 and $131,302 of revenue related to the license agreement.

Note 11 - Related party transactions

In March 2014, the Company entered into a supply agreement with Fluidigm Corporation ("Fluidigm") under which Fluidigm supplies the Company with its microfluidic test platform for use in manufacturing the Acuitas MDRO Gene Test. The Company's CEO and Chairman of the Board of Directors is a director of Fluidigm. On July 12, 2015, the Company entered into a letter agreement (the "Fluidigm Agreement") with Fluidigm to expand the companies' existing relationship to include collaborating on the development of test kits and custom analytic instruments for identification, screening and surveillance testing of MDROs. The Fluidigm Agreement also expands the existing Supply Agreement between the Company and Fluidigm, and provides for expansion of the gene targets and organisms to be tested on the Company's existing CLIA lab-based tests, the Acuitas MDRO Gene Test and the Acuitas Resistome Test, using Fluidigm technologies and products. Additionally, Fluidigm has agreed not to develop or directly collaborate with any third party to develop an FDA approved or CE-marked diagnostic test for the purpose of detecting resistance genes for identified MDROs if the Company meets certain minimum purchase commitments and other requirements. The initial term of the Fluidigm Agreement is five years. Both parties have the ability to extend the term for an additional five years. Under the expanded Supply Agreement, the term was extended until March 17, 2018, and the Company has the right to extend the term of the Supply Agreement for up to two additional three-year terms. The Company paid $0 and $160,089 related to these agreements in the three and nine months ended September 30, 2016, respectively. The Company paid $79,032 and $221,967 related to these agreements in the three and nine months ended September 30, 2015, respectively.

Under the agreements with Fluidigm, the Company had inventory purchases of $23,624 and $91,399 in the three and nine months ended September 30, 2016, respectively. The Company had inventory purchases of $87,127 and $212,925 related to these agreements in the three and nine months ended September 30, 2015, respectively.

In addition, the Company has several capital lease arrangements for laboratory equipment manufactured by Fluidigm. The Company paid $45,106 and $135,319 related to the leased equipment in the three and nine months ended September 30, 2016, respectively. The Company paid $45,106 and $74,812 related to the leased equipment in the three and nine months ended September 30, 2015, respectively.

In October 2016, the Company entered into an agreement in the ordinary course of its business with an affiliate of Merck Global Health Innovation Fund ("Merck GHI"), a principal stockholder of the Company. Under the agreement, the Company will be required to expend up to $175,000 for the procurement of materials related to the activities contemplated by the agreement.

Note 12 – Subsequent events

On October 17, 2016, AdvanDx, a wholly-owned subsidiary of the Company executed a Lease Extension #6 to Lease Agreement between the Company and Cummings Properties, LLC with respect to extension of the existing lease for AdvanDx's facility in Woburn Massachusetts (as amended, the "Woburn Lease"). The Lease Extension extends the term of the Woburn Lease for five years, such that the Woburn Lease extends until January 30, 2022. The Company expects the aggregate rent will be approximately $2.2 million over the five year term, subject to annual cost of living adjustments.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

The following Management's Discussion and Analysis of Financial Condition and Results of Operations should be read in conjunction with the unaudited condensed financial statements and the accompanying notes thereto included in Part I, Item 1 of this quarterly report on Form 10-Q. This discussion contains forward-looking statements, based on current expectations and related to future events and our future financial performance, that involve risks and uncertainties. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of many important factors, including those set forth under Part II. Item 1A. "Risk Factors" of this quarterly report on Form 10-Q and Part 1. Item 1A of our annual report on Form 10-K.

Overview

OpGen, Inc. ("OpGen" or the "Company") was incorporated in Delaware in 2001. On July 14, 2015, OpGen completed the strategic acquisition (the "Merger") of AdvanDx, Inc. and its wholly owned subsidiary AdvanDx A/S (collectively, "AdvanDx") (see Note 4). Pursuant to the terms of a merger agreement, Velox Acquisition Corp., OpGen's wholly-owned subsidiary formed for the express purpose of effecting the Merger, merged with and into AdvanDx, Inc. with AdvanDx, Inc. surviving as OpGen's wholly-owned subsidiary. OpGen, AdvanDx, Inc. and AdvanDx A/S are collectively referred to hereinafter as the "Company." The Company's headquarters are in Gaithersburg, Maryland, and its principal operations are in Gaithersburg, Maryland and Woburn, Massachusetts. The Company also has operations in Copenhagen, Denmark. The Company operates in one business segment.

OpGen is a precision medicine company using molecular diagnostics and informatics to combat infectious disease. OpGen is developing molecular information products and services to combat infectious disease in global healthcare settings, helping to guide clinicians with more rapid information about life threatening infections, improve patient outcomes, and decrease the spread of infections caused by multidrug-resistant microorganisms ("MDROs"). The Company's proprietary DNA tests and bioinformatics address the rising threat of antibiotic resistance by helping physicians and healthcare providers optimize patient care decisions and protect the hospital biome through customized screening and surveillance products and services. The Company's molecular information products and services combine Acuitas DNA tests, Acuitas Lighthouse bioinformatics and CLIA lab services for MDRO genetic identification, antibiotic resistance gene information and surveillance, and add to a growing proprietary data warehouse that includes genomic data matched with antibiotic susceptibility information for microbes and patient information. The Company is working to deliver its molecular information products and services to a global network of customers and partners. The Acuitas DNA tests provide rapid microbial ID, and antibiotic resistance gene information. These include the QuickFISH family of FDA-cleared and CE-marked diagnostic products used to rapidly detect pathogens in positive blood cultures, the MDRO Gene Test to detect, type, track, and trend antibiotic resistant organisms in real-time and a rapid antibiotic resistance test in development.

The Company's operations are subject to certain risks and uncertainties. The risks include rapid technology changes, the need to manage growth, the need to retain key personnel, the need to protect intellectual property and the need to raise additional capital financing on terms acceptable to the Company. The Company's success depends, in part, on its ability to develop and commercialize its proprietary technology as well as raise additional capital.

Recent Developments

Since inception, the Company has incurred, and continues to incur, significant losses from operations. The Company has funded its operations primarily through external investor financing arrangements. The Company raised significant funds in 2016 and 2015, including:

- $12.1 million in net proceeds from its initial public offering ("IPO");
- $6.0 million in net proceeds from the issuances of common stock and a senior secured promissory note to Merck Global Health Innovation Fund, LLC ("Merck GHI"); and
- $9.5 million in net proceeds from the issuances of common stock, non-voting convertible preferred stock and stock purchase warrants in a private placement to members of management and to accredited investors, including Merck GHI and jVen Capital.

See "Liquidity and Capital Resources" below for a description of the Company's recent financing activities.

Results of operations for the three months ended September 30, 2016 and 2015

Revenues

	Three Months Ended September 30, 2016	2015
Revenue		
Product sales	$ 730,325	$ 929,241
Laboratory services	23,036	23,765
Collaboration revenue	6,302	27,780
Total revenue	$ 759,663	$ 980,786

Our total revenue for the three months ended September 30, 2016 decreased approximately 23% to $0.8 million from $1.0 million, when compared to the same period in 2015. This decrease is primarily attributable to:

- Product Sales: the decrease in revenue of approximately 21% in the 2016 period compared to the 2015 period is primarily attributable to decreased rapid pathogen ID and legacy genome mapping product sales; and
- Collaboration Revenue: the decrease in revenue of approximately 77% in the 2016 period compared to the 2015 period is attributable to decreased revenue related to Hitachi contracts.

The Company expects revenues for 2016 to exceed 2015 revenues as a result of a strategic shift away from Argus and Whole Genome Mapping product sales and collaborations to a focus on its QuickFISH and PNAFISH diagnostic products, Acuitas MDRO test and Acuitas Lighthouse services.

Operating expenses

	Three Months Ended September 30, 2016	2015
Cost of products sold	$ 400,001	$ 624,635
Cost of services	51,802	48,467
Research and development	2,178,818	1,788,748
General and administrative	1,639,996	1,614,532
Sales and marketing	1,294,640	1,032,759
Transaction expenses	—	525,596
Total operating expenses	$ 5,565,257	$ 5,634,737

The Company’s total operating expenses for the three months ended September 30, 2016 decreased approximately 1% to $5.6 million from $5.6 million, when compared to the same period in 2015. This decrease is primarily attributable to:

- Costs of products sold: cost of products sales for the three months ended September 30, 2016 decreased approximately 36% when compared to the same period in 2015. The change in costs of products sold is primarily attributable to decreased rapid pathogen ID and legacy genome mapping product sales;
- Research and development: research and development expenses for the three months ended September 30, 2016 increased approximately 22% when compared to the same period in 2015, primarily due to third party software and instrument development costs associated with Automated Pathogen ID project;
- Sales and marketing: sales and marketing expenses for the three months ended September 30, 2016 increased approximately 25% when compared to the same period in 2015 due to increased payroll-related expenses; and
- Transaction expenses: transaction expenses for the three months ended September 30, 2016 decreased approximately 100% when compared to the same period in 2015 due to the prior year acquisition of AdvanDx, Inc.

The Company expects operating expenses for 2016 to exceed 2015 operating expenses as a result of increased sales relating to a strategic shift from Argus and Whole Genome Mapping product sales and collaborations to a focus on its QuickFISH and PNAFISH diagnostic products, Acuitas MDRO test and Acuitas Lighthouse services.

Other income (expense)

	Three Months Ended September 30, 2016	2015
Interest expense	$ (41,423)	$ (17,482)
Foreign currency transaction losses	(1,269)	—
Change in fair value of derivative financial instruments	—	—
Interest and other income	623	2,513
Total other expense	$ (42,069)	$ (14,969)

Other expense for the three months ended September 30, 2016 increased to a net expense of $42,069 from a net expense of $14,969 in the same period of 2015, and was primarily the result of capital leases.

Results of operations for the nine months ended September 30, 2016 and 2015

Revenues

	Nine Months Ended September 30, 2016	2015
Revenue		
Product sales	$ 2,705,690	$ 1,432,592
Laboratory services	182,130	87,201
Collaboration revenue	131,302	308,340
Total revenue	$ 3,019,122	$ 1,828,133

Our total revenue for the nine months ended September 30, 2016 increased approximately 65% to $3.0 million from $1.8 million, when compared to the same period in 2015. This increase is primarily attributable to:

- Product Sales: the increase in revenue of approximately 89% in the 2016 period compared to the 2015 period is primarily attributable to sales of rapid pathogen ID testing products;
- Laboratory Services: the increase in revenue of approximately 109% in the 2016 period compared to the 2015 period as a result of increases in sales of our Acuitas MDRO test services and Acuitas Lighthouse services; and
- Collaboration Revenue: the decrease in revenue of approximately 57% in the 2016 period compared to the 2015 period is attributable to decreased revenue related to Hitachi contracts.

Operating expenses

	Nine Months Ended September 30, 2016	2015
Cost of products sold	$ 1,269,990	$ 788,256
Cost of services	528,733	198,691
Research and development	6,278,829	3,897,049
General and administrative	4,955,096	3,694,143
Sales and marketing	4,282,628	2,962,555
Transaction expenses	—	525,596
Total operating expenses	$ 17,315,276	$ 12,066,290

The Company's total operating expenses for the nine months ended September 30, 2016 increased approximately 44% to $17.3 million from $12.1 million, when compared to the same period in 2015. This increase is primarily attributable to:

- Costs of products sold: cost of products sales for the nine months ended September 30, 2016 increased approximately 61% when compared to the same period in 2015. The change in costs of products sold is primarily attributable to sales of rapid pathogen ID testing products;
- Costs of services: cost of services for the nine months ended September 30, 2016 increased approximately 166% when compared to the same period in 2015. The change in costs of services is primarily attributable to an increase in sales of Acuitas Lighthouse services;
- Research and development: research and development expenses for the nine months ended September 30, 2016 increased approximately 61% when compared to the same period in 2015, primarily due to costs related to the Automated Pathogen ID project;
- General and administrative: general and administrative expenses for the nine months ended September 30, 2016 increased approximately 34% when compared to the same period in 2015, primarily due to payroll and facility costs associated with the AdvanDx acquisition in 2015 and public company costs;
- Sales and marketing: sales and marketing expenses for the nine months ended September 30, 2016 increased approximately 45% when compared to the same period in 2015, primarily due to costs associated with our expanded sales and marketing team, the Intermountain Healthcare Retrospective study, and industry trade show expenses; and
- Transaction expenses: transaction expenses for the nine months ended September 30, 2016 decreased 100% when compared to the same period in 2015 due to the prior year acquisition of AdvanDx Inc.

Other income (expense)

	Nine Months Ended September 30,	
	2016	2015
Interest expense	$ (109,806)	$ (1,746,853)
Foreign currency transaction gains	2,293	—
Change in fair value of derivative financial instruments	—	(647,342)
Interest and other (expense)/income	(3,078)	9,675
Total other expense	$ (110,591)	$ (2,384,520)

Other expense for the nine months ended September 30, 2016 decreased to a net expense of $110,591 from a net expense of $2,384,520 in the same period of 2015, and was primarily the result of a reduction in interest expense due to the settlement of a significant portion of our debt upon the closing of our IPO and the reclassification of derivative warrant liabilities, which were reclassified to stockholders' equity upon the closing of our IPO when their net cash-settlement features lapsed.

Liquidity and capital resources

At September 30, 2016, the Company had cash and cash equivalents of $4.3 million compared to $7.8 million at December 31, 2015. The Company has funded its operations primarily through external investor financing arrangements and has raised significant funds in 2016 and 2015, including:

On September 13, 2016, the Company entered into a Sales Agreement with Cowen pursuant to which the Company may offer and sell from time to time in an "at the market offering", at its option, up to an aggregate of $25 million of shares of the Company's common stock, $0.01 par value per share through Cowen, as sales agent, with initial sales to be limited to an aggregate of $11.5 million of Placement Shares. Remaining availability under the ATM Offering is $11.5 million of Placement Shares.

In May and June 2016, the Company offered and sold units in a private offering to members of management and employees and to accredited investors, including Merck GHI and jVen Capital, each unit consisting of either (i) one share of common stock and a detachable stock purchase warrant to purchase an additional 0.75 shares of common stock, or (ii) one share of non-voting convertible preferred stock a detachable stock purchase warrant to purchase an additional 0.75 shares of common stock, at a price of $1.14 per unit. The total net proceeds to the Company, after deducting offering commissions and expenses was $9.5 million. The Company intends to use the proceeds for working capital and general corporate purposes. Pursuant to the private placement, the Company issued 6,744,127 shares of common stock, 2,309,428 of non-voting convertible preferred stock and stock purchase warrants to acquire an additional 6,790,169 shares of common stock.

In July 2015, the Company raised $6.0 million by issuing 1,136,364 shares of common stock at $4.40 per share and a $1.0 million senior secured promissory note to Merck GHI. Also in July 2015, the Company entered into a Registration Rights Agreement with Merck GHI and the AdvanDx stockholders who received Merger Consideration in the Merger, which will require the Company to register such shares of Company common stock for resale by such holders in the future. Under the Purchase Agreement, Merck GHI has the right to participate in future securities offerings made by the Company.

In May 2015, OpGen completed its IPO pursuant to which it offered and sold 2,850,000 units, each unit consisting of one share of common stock and a detachable stock purchase warrant to purchase an additional share of common stock, at an initial offering price of $6.00 per unit. Of the total gross proceeds of $17.1 million, approximately $2.1 million was used to satisfy outstanding demand notes by exchanging such notes for 350,000 units in the IPO. After considering the demand notes, underwriting discounts and commissions and offering expenses, the total net cash proceeds were $12.1 million. On the IPO closing date, the underwriters exercised their over-allotment option to acquire an additional 422,500 stock purchase warrants. In connection with the IPO, all of OpGen's outstanding Series A redeemable convertible preferred stock, 2014 convertible notes and 2015 convertible notes were converted into 7,374,852 shares of common stock.

To meet its capital needs, the Company is considering multiple alternatives, including, but not limited to, additional equity financings, debt financings and other funding transactions, licensing and/or partnering arrangements and business combination transactions. There can be no assurance that the Company will be able to complete any such transaction on acceptable terms or otherwise. The Company believes that current cash on hand will be sufficient to fund operations into the first quarter of 2017. In the event the Company is unable to successfully raise additional capital on or before the first quarter of 2017, the Company will not have sufficient cash flows and liquidity to finance its business operations as currently contemplated. Accordingly, in such circumstances the Company would be compelled to immediately reduce general and administrative expenses and delay research and development projects, including the purchase of scientific equipment and supplies, until it is able to obtain sufficient financing. If such sufficient financing is not received timely, the Company would then need to pursue a plan to license or sell its assets, seek to be acquired by another entity, cease operations and/or seek bankruptcy protection.

Sources and uses of cash

The Company's principal source of liquidity is from financing activities, including issuances of equity and debt securities. The following table summarizes the net cash and cash equivalents provided by (used in) operating activities, investing activities and financing activities for the periods indicated:

	Nine Months Ended September 30,	
	2016	2015
Net cash used in operating activities	$ (12,866,572)	$ (11,071,538)
Net cash (used in)/provided by investing activities	(87,533)	1,277,977
Net cash provided by financing activities	9,399,514	20,231,366

Net cash used in operating activities

Net cash used in operating activities for the nine months ended September 30, 2016 consists primarily of our net loss of $14.4 million, reduced by certain noncash items, including depreciation and amortization expense of $0.5 million, share-based compensation expense of $0.7 million, and the net change in operating assets and liabilities of $0.2 million. Net cash used in operating activities for the nine months ended September 30, 2015 consists primarily of our net loss of $12.6 million, reduced by certain noncash items, including depreciation and amortization expense of $0.4 million, share-based compensation expense of $1.2 million, change in the fair value of our warrant liability of $0.6 million, noncash interest expense including that associated with the conversion of our convertible notes in May 2015 of $1.6 million, partially offset by the net change in operating assets and liabilities of $2.3 million.

Net cash (used in)/provided by investing activities

Net cash (used in)/provided by investing activities in the nine months ended September 30, 2016 consisted solely of purchases of property and equipment. Net cash (used in)/provided by investing activities in the nine months ended September 30, 2015 consisted of purchases of property and equipment, as well as $1.4 million of cash acquired in business combinations.

Net cash provided by financing activities

Net cash provided by financing activities for the nine months ended September 30, 2016 of $9.4 million consisted primarily of the net proceeds from our private placement of common stock, non-voting convertible preferred stock and stock purchase warrants. Net cash

provided by financing activities for the nine months ended September 30, 2015 of $20.2 million consisted primarily of $3.0 million of net proceeds from the issuance of debt instruments, $12.4 million of net proceeds from our IPO, and $5.0 million of net proceeds from the issuance of common stock of Merck GHI.

Critical accounting policies and use of estimates

This Management's Discussion and Analysis of Financial Condition and Results of Operations is based on our unaudited condensed consolidated financial statements, which have been prepared in accordance with GAAP. The preparation of financial statements in conformity with GAAP requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amount of revenues and expenses during the reporting period. In our unaudited condensed consolidated financial statements, estimates are used for, but not limited to, share-based compensation, allowances for doubtful accounts and inventories, valuation of derivative financial instruments, beneficial conversion features of convertible debt, deferred tax assets and liabilities and related valuation allowance, and depreciation and amortization and estimated useful lives of long-lived assets. Actual results could differ from those estimates.

A summary of our significant accounting policies is included in Note 3 to the accompanying unaudited condensed consolidated financial statements. Certain of our accounting policies are considered critical, as these policies require significant, difficult or complex judgments by management, often requiring the use of estimates about the effects of matters that are inherently uncertain. Our critical policies are summarized in Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations” of our Annual Report on Form 10-K for the year ended December 31, 2015.

Recently issued accounting pronouncements

See Note 3 “Summary of significant accounting policies” in this Form 10-Q for a full description of recent accounting pronouncements, including the respective expected dates of adoption and effects on our condensed, consolidated financial statements.

Contractual obligations and off-balance sheet arrangements

As of September 30, 2016 and December 31, 2015, we did not have any off-balance sheet arrangements, as defined in Item 303(a)(4)(ii) of Regulation S-K promulgated by the SEC.

JOBS Act

On April 5, 2012, the JOBS Act was enacted. Section 107 of the JOBS Act provides that an “emerging growth company” can take advantage of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act, for complying with new or revised accounting standards. In other words, an “emerging growth company” can delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have elected to use the extended transition period for complying with new or revised accounting standards under Section 102(b)(1) of the JOBS Act. This election allows us to delay the adoption of new or revised accounting standards that have different effective dates for public and private companies until those standards apply to private companies. As a result of this election, our financial statements may not be comparable to companies that comply with public company effective dates.

Subject to certain conditions set forth in the JOBS Act, as an “emerging growth company,” we intend to rely on certain of these exemptions, including without limitation, (i) providing an auditor’s attestation report on our system of internal controls over financial reporting pursuant to Section 404(b) of the Sarbanes-Oxley Act of 2002 and (ii) complying with any requirement that may be adopted by the PCAOB regarding mandatory audit firm rotation or a supplement to the auditor’s report providing additional information about the audit and the financial statements, known as the auditor discussion and analysis. We will remain an “emerging growth company” until the earliest of (i) the last day of the fiscal year in which we have total annual gross revenues of $1 billion or more; (ii) December 31, 2019; (iii) the date on which we have issued more than $1 billion in nonconvertible debt during the previous three years; or (iv) the date on which we are deemed to be a large accelerated filer under the rules of the SEC.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

As a smaller reporting company, we are not required to provide the information required by this Item.

Item 4. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Disclosure controls and procedures are controls and other procedures that are designed to ensure that information required to be disclosed in our reports filed or submitted under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed in our reports filed under the Exchange Act is accumulated and communicated to management, including our principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosure.

Our management has carried out an evaluation, under the supervision and with the participation of our principal executive officer and principal financial officer, of the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act), as of September 30, 2016. Based upon that evaluation, our principal executive officer and principal financial officer concluded that, as of the end of the period covered by this report, our disclosure controls and procedures were effective. In designing and evaluating our disclosure controls and procedures, we recognize that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives.

Changes in Internal Control over Financial Reporting

On July 14, 2015, the Company completed the Merger by acquiring 100% of the capital stock of AdvanDx in the Merger. The Company has not yet completed an assessment of the design and/or operating effectiveness of AdvanDx's internal control over financial reporting. There were no changes in the Company's internal control over financial reporting during the quarter ended September 30, 2016 that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

Part II. OTHER INFORMATION

Item 1. Legal Proceedings

None.

Item 1A. Risk Factors

The following are significant factors known to us that could materially harm our business, financial condition or operating results or could cause our actual results to differ materially from our anticipated results or other expectations, including those expressed in any forward-looking statement made in this quarterly report. The risks described are not the only risks facing us. Additional risks and uncertainties not currently known to us, or that we currently deem to be immaterial, also may adversely affect our business, financial condition and operating results. If any of these risks actually occur, our business, financial condition, and operating results could suffer significantly. These risk factors are supplemented by the Risk Factors included in Section 1.A. of our Annual Report on Form 10-K for the year ended December 31, 2015 under the headings "Risks Related to Regulation of our Business," "Risks Related to Compliance with Healthcare and Other Regulations", and "Risks Related to our Intellectual Property."

Risks Related to our Business

We have a history of losses, and we expect to incur losses for the next several years. The report of our independent registered public accounting firm on our financial statements for the years ended December 31, 2015 and 2014 contains explanatory language that substantial doubt exists about our ability to continue as a going concern.

We have incurred substantial losses since our inception, and we expect to continue to incur additional losses for the next several years. For the years ended December 31, 2015 and 2014 we had net losses of $17.4 million and $5.7 million, respectively and for the nine months ended September 30, 2016 our net loss was $14.4 million. From our inception through September 30, 2016, we had an accumulated deficit of $128.5 million. The report of our independent registered public accounting firm on our financial statements for the years ended December 31, 2015 and 2014 contains explanatory language that substantial doubt exists about our ability to continue as a going concern. We completed a number of financings in 2016 and 2015, including our IPO, an additional investment in our common stock and in a promissory note in July 2015 by Merck GHI, and a private placement financing in May and June 2016 to accredited investors, including Merck GHI and jVen Capital. The net proceeds from such financings were approximately $27.6 million.

The July 2015 investment by Merck GHI includes a $1 million senior secured promissory note secured by a security interest in substantially all of our assets, including our intellectual property assets. The secured promissory note requires interest-only payments at a rate of 8% per annum for two years, with the principal due and payable on July 14, 2017. Such secured creditor rights could negatively impact our ability to raise money in the future. If we default on payments under the promissory note, Merck GHI has the rights of a secured creditor. If those rights are exercised, it could have a material adverse effect on our financial condition.

We expect to continue to incur significant operating expenses and anticipate that our expenses will increase due to costs relating to, among other things:

- commercializing our rapid pathogen ID and Acuitas MDRO and Acuitas Lighthouse bioinformatics services;
- and developing automated rapid molecular diagnostic and antibiotic resistance testing products and services;
- developing, presenting and publishing additional clinical and economic utility data intended to increase clinician adoption of our current and future products and services, including the efficacy of use of our products in MDRO surveillance activities;
- expansion of our operating capabilities;
- maintenance, expansion and protection of our intellectual property portfolio and trade secrets;
- future clinical trials;
- expansion of the size and geographic reach of our sales force and our marketing capabilities to commercialize potential future products and services; and
- continued focus on recruiting and retaining our quality assurance and compliance personnel and activities.

Even if we achieve significant revenues, we may not become profitable, and even if we achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain consistently profitable could adversely affect the market price of our common stock and could significantly impair our ability to raise capital, expand our business

or continue to pursue our growth strategy. We believe that current cash on hand will be sufficient to fund operations into the first quarter of 2017. In the event we are unable to successfully raise additional capital on or before the first quarter of 2017, we will not have sufficient cash flows and liquidity to finance our business operations as currently contemplated. Accordingly, in such circumstances we would be compelled to reduce general and administrative expenses and delay research and development projects, including the purchase of scientific equipment and supplies, until we are able to obtain sufficient financing. We have no committed sources of capital and may find it difficult to raise money on terms favorable to us or at all. The failure to obtain sufficient capital to support our operations would have an adverse effect on our business, financial condition and results of operations.

Our products and services may never achieve significant commercial market acceptance.

Our products and services may never gain significant acceptance in the marketplace and, therefore, may never generate substantial revenue or profits for us. Our ability to achieve commercial market acceptance for our products will depend on several factors, including:

- our ability to convince the medical community of the clinical utility of our products and services and their potential advantages over existing tests, including our surveillance services offering, despite the lack of reimbursement for such services;
- our ability to successfully develop automated rapid pathogen ID and antibiotic resistance testing products and services, including bioinformatics, and convince hospitals and other healthcare providers of the patient safety, improved patient outcomes and potential cost savings that could result;
- Our ability to grow our microbial isolate and antibiotic resistance genes knowledgebase;;
- our ability to convince the medical community of the accuracy and speed of our products and services, as contrasted with the current methods available; and
- the willingness of hospitals and physicians to use our products and services.

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

The current customers we are targeting for our rapid pathogen ID and Acuitas MDRO test products and services are acute care hospitals, particularly those with advanced care units, such as intensive care units, and community-based hospitals. We need to provide a compelling case for the savings, patient safety and recovery, reduced length of stay and reduced costs that come from adopting our MDRO diagnosis and management products and services. If we are not able to successfully increase our customer base, sales of our products and our margins may not meet expectations. Attracting new customers and introducing new products and services requires substantial time and expense. Any failure to expand our existing customer base, or launch new products and services, would adversely affect our ability to improve our operating results.

We have seen declining revenues from our current customers for our QuickFISH products as we work to automate and expand our current product offerings. We may not be successful in developing such automated rapid pathogen ID products, which would materially, adversely affect our business.

During the third quarter of 2016, we encountered supply chain issues that impacted our ability to deliver our products to customers. Although such supply chain issues were resolved, future supply chain or other manufacturing issues could adversely affect our ability to deliver our products to our customers and adversely impact our revenues and results of operations.

We are developing new diagnostic products for the more rapid identification of MDROs and antibiotic resistance genomic information. If we are unable to successfully develop, receive regulatory clearance or approval for or commercialize such new products and services, our business will be materially, adversely affected.

We are currently beginning development of a new one-hour antibiotic resistance diagnostic product that we believe could help address many of the current issues with the need for more rapid identification of infectious diseases and testing for antibiotic resistance. Development of new diagnostic products is difficult and we cannot assure you that we will be successful in such product development efforts, or, if successful, that we will receive the necessary regulatory clearances to commercialize such products. Our intent is to identify over 100 antibiotic resistance genes to help guide clinician antibiotic therapy decisions when test results are evaluated using the Acuitas Lighthouse. Although we have demonstrated preliminary feasibility, and confirmed genotype/phenotype predictive algorithms, such product development efforts will require us to work collaboratively with other companies, academic and government laboratories, and healthcare providers to access sufficient numbers of microbial isolates, develop the diagnostic tests, identify and license a third-party rapid array platform, successfully conduct the necessary clinical trials and apply for and receive regulatory clearances or approvals for the intended use of such diagnostic tests. In addition, we would need to successfully

commercialize such products. Such product development, clearance or approval and commercialization activities are time-consuming, expensive and we are not assured that we will have sufficient funds to successfully complete such efforts. We currently estimate that such antibiotic resistance diagnostic tests will be commercially available by 2019. Any significant delays or failures in this process could have a material adverse effect on our business and financial condition.

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

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

We expect to make significant additional investment in the future related to our diagnostic products and services. If we are unable to make such investments our business will suffer.

We anticipate that we will need to make significant investments in the Acuitas MDRO tests and QuickFISH products and services in order to make our business profitable. We have identified potential synergies for future rapid diagnostic test developments based on our existing product and service offerings, but need to expend significant investments to develop such products and services. There can be no assurance that we can obtain sufficient resources or capital from operations or future financings to support these development activities.

To meet its capital needs, the Company is considering multiple alternatives, including, but not limited to, additional equity financings, debt financings and other funding transactions, licensing and/or partnering arrangements and business combination transactions. There can be no assurance that the Company will be able to complete any such transaction on acceptable terms or otherwise. The Company believes that current cash on hand will be sufficient to fund operations into the first quarter of 2017. In the event the Company is unable to successfully raise additional capital on or before the first quarter of 2017, the Company will not have sufficient cash flows and liquidity to finance its business operations as currently contemplated. Accordingly, in such circumstances the Company would be compelled to immediately reduce general and administrative expenses and delay research and development projects, including the purchase of scientific equipment and supplies, until it is able to obtain sufficient financing. If such sufficient financing is not received timely, the Company would then need to pursue a plan to license or sell its assets, seek to be acquired by another entity, cease operations and/or seek bankruptcy protection.

We have in the past, and in the future may, enter into collaborations with third parties to develop product and services candidates. If these collaborations are not successful, our business could be adversely affected.

We have entered into licensing and collaboration agreements with third parties in the past related to our Whole Genome Mapping products and services and may enter into additional collaborations in the future related to our MDRO and bioinformatics products and services. Such collaborations may be with pharmaceutical companies, platform companies or other participants in our industry. We have limited control over the amount and timing of resources that any such collaborators could dedicate to the development or commercialization of the subject matter of any such collaboration. Our ability to generate revenues from these arrangements would depend on our and our collaborator’s abilities to successfully perform the functions assigned to each of us in these arrangements. Our relationships with future collaborators may pose several risks, including the following:

- collaborators have significant discretion in determining the efforts and resources that they will apply to these collaborations;
- collaborators may not perform their obligations as expected;
- we may not achieve any milestones, or receive any milestone payments, under our collaborations, including milestones and/or payments that we expect to achieve or receive;
- the clinical trials, if any, conducted as part of these collaborations may not be successful;

- a collaborator might elect not to continue or renew development or commercialization programs based on clinical trial results, changes in the collaborator's strategic focus or available funding or external factors, such as an acquisition, that diverts resources or creates competing priorities;
- we may not have access to, or may be restricted from disclosing, certain information regarding product or services candidates being developed or commercialized under a collaboration and, consequently, may have limited ability to inform our stockholders about the status of such product or services candidates;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our product candidates if the collaborators believe that competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours;
- product or services candidates developed in collaboration with us may be viewed by our collaborators as competitive with their own product or services, which may cause collaborators to cease to devote resources to the commercialization of our product or services candidates;
- a collaborator with marketing and distribution rights to one or more of our product or services candidates that achieve regulatory approval may not commit sufficient resources to the marketing and distribution of any such product candidate;
- disagreements with collaborators, including disagreements over proprietary rights, contract interpretation or the preferred course of development of any product or services candidates, may cause delays or termination of the research, development or commercialization of such product or services candidates, may lead to additional responsibilities for us with respect to such product or services candidates or may result in litigation or arbitration, any of which would be time-consuming and expensive;
- collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential litigation;
- disputes may arise with respect to the ownership of intellectual property developed pursuant to a collaboration;
- collaborators may infringe the intellectual property rights of third parties, which may expose us to litigation and potential liability; and
- collaborations may be terminated for the convenience of the collaborator and, if terminated, we could be required to raise additional capital to pursue further development or commercialization of the applicable product or services candidates.

If our future collaborations do not result in the successful development and commercialization of products or services, we may not receive any future research funding or milestone or royalty payments under the collaborations. If we do not receive the funding we would expect under these agreements, our development of product and services candidates could be delayed and we may need additional resources to develop our product candidates. All of the risks relating to product and services development, regulatory approval and commercialization described in this "Risk Factors" section and in the "Risk Factors" section of our Form 10-K for the year ended December 31, 2015 related to risks related to the regulation of our business, healthcare regulatory compliance and intellectual property, apply to the potential activities of any collaborators.

We may not be successful in finding strategic collaborators for continuing development of certain of our product or services candidates or successfully commercializing or competing in the market for certain indications.

We may seek to develop strategic partnerships for developing certain of our product or services candidates, due to capital costs required to develop the product or services candidates or manufacturing constraints. We may not be successful in our efforts to establish such a strategic partnership or other alternative arrangements for our product or services candidates because our research and development pipeline may be insufficient, our product or services candidates may be deemed to be at too early of a stage of development for collaborative effort or third parties may not view our product or services candidates as having the requisite potential to demonstrate commercial success.

If we are unable to reach agreements with suitable collaborators on a timely basis, on acceptable terms or at all, we may have to curtail the development of a product or service candidate, reduce or delay our development program, delay our potential commercialization, reduce the scope of any sales or marketing activities or increase our expenditures and undertake development or commercialization activities at our own expense. If we elect to fund development or commercialization activities on our own, we may need to obtain additional expertise and additional capital, which may not be available to us on acceptable terms or at all. If we fail to enter into collaborations and do not have sufficient funds or expertise to undertake the necessary development and commercialization activities, we may not be able to further develop our product candidates and our business, financial condition, results of operations and prospects may be materially and adversely affected.

We may enter into agreements with U.S. or other government agencies, which could be subject to uncertain future funding.

The presence of MDROs and the need for antibiotic stewardship activities have prompted state, federal and international government agencies to develop programs to combat the effects of MDROs. In the future, we may seek to enter into agreements with governmental funding sources or contract with government healthcare organizations to sell our products and services. If we enter into such funding agreements, we would rely on the continued performance by these government agencies of their responsibilities under these agreements, including adequate continued funding of the agencies and their programs. We have no control over the resources and funding that government agencies may devote to these agreements, which may be subject to annual renewal.

Government agencies may fail to perform their responsibilities under these agreements, which may cause them to be terminated by the government agencies. In addition, we may fail to perform our responsibilities under these agreements. Any government agreements would be subject to audits, which may occur several years after the period to which the audit relates. If an audit identified significant unallowable costs, we could incur a material charge to our earnings or reduction in our cash position. As a result, we may be unsuccessful entering, or ineligible to enter, into future government agreements.

We are an early commercial stage company and may never be profitable.

We rely principally on the commercialization of our QuickFISH and Acuitas MDRO test products and our Acuitas Lighthouse bioinformatics system and services to generate future revenue growth. To date, the Acuitas MDRO test products and Acuitas Lighthouse products and services have delivered only minimal revenue. We believe that our commercialization success is dependent upon our ability to significantly increase the number of hospitals, long-term care facilities and other inpatient healthcare settings that use our products. We have experienced very limited revenue and customer adoption for our Acuitas MDRO products and services to date. If demand for products does not increase as quickly as we have planned, we may be unable to increase our revenue levels as expected. We are currently not profitable. Even if we succeed in increasing adoption of our products by our target markets, maintaining and creating relationships with our existing and new customers and developing and commercializing additional molecular testing products, we may not be able to generate sufficient revenue to achieve or sustain profitability.

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

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

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

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

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

We sell our products through our own direct sales force, which sells our Acuitas MDRO test products and services, which includes our QuickFISH products, and our Acuitas Lighthouse bioinformatics services and surveillance product and services offerings. All of these products and services may be offered and sold to different potential customers or involve discussions with multiple personnel in in-patient facilities. Our future sales will depend in large part on our ability to increase our marketing efforts and adequately address our customers' needs. The inpatient health care facility industry is a large and diverse market. As a result, we believe it is necessary to maintain a sales force that includes sales representatives with specific technical backgrounds that can support our customers' needs. We will also need to attract and develop sales and marketing personnel with industry expertise. Competition for such employees is intense. We may not be able to attract and retain sufficient personnel to maintain an effective sales and marketing force. If we are

unable to successfully market our products and adequately address our customers' needs, it could negatively impact sales and market acceptance of our products and we may never generate sufficient revenue to achieve or sustain profitability.

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

We commenced the formal commercial launch of our CLIA lab in late 2013, launched our Acuitas MDRO Gene Test in the second quarter of 2014, launched our Acuitas CR Elite Test in December 2014, our Acuitas Resistome Test in the second quarter of 2015, and we began providing Acuitas Lighthouse portal services in December 2015. In addition, we integrated the sales of our QuickFISH products beginning in the third quarter of 2015. We anticipate future growth in our business operations. This future growth could create strain on our organizational, administrative and operational infrastructure, including laboratory operations, quality control, customer service and sales force management. We may not be able to maintain the quality or expected turn-around times of our diagnostic or screening results, or satisfy customer demand as it grows. Our ability to manage our growth properly will require us to continue to improve our operational, financial and management controls, as well as our reporting systems and procedures. The time and resources required to implement the systems to handle such growth is uncertain, and failure to complete this in a timely and efficient manner could adversely affect our operations.

We may fail to realize some or all of the anticipated benefits of the business combination of OpGen and AdvanDx, which may adversely affect the value of our common stock.

The success of the continued integration of AdvanDx will depend, in part, on our ability to realize the anticipated benefits and cost savings from combining the respective business and operations of OpGen and AdvanDx. To realize these anticipated benefits and cost savings, we must successfully combine the acquired business with our legacy operations and integrate our respective operations, technologies and personnel, which is particularly challenging given the geographic and cultural differences between the personnel and facilities based in Maryland and Massachusetts, plus the European operations of AdvanDx, and the lack of experience we have in combining businesses. If we are not able to fully achieve these objectives within the anticipated time frame or at all, the anticipated benefits and cost savings of the acquisition may not be realized fully or at all or may take longer to realize than expected, and the value of our common stock may be adversely affected. In addition, the overall integration of the businesses is a complex, time-consuming and expensive process that, without proper planning and effective and timely implementation, could significantly disrupt our operations.

Risks in integrating AdvanDx into our operations in order to realize the anticipated benefits of the acquisition include, among other factors:

- coordinating research and development activities to enhance the introduction of new diagnostic tests and technology of the combined business;
- failure to successfully integrate and harmonize financial reporting and information technology systems of the two companies;
- retaining each company's relationships with its partners;
- retaining and integrating key employees from OpGen and AdvanDx;
- managing effectively the diversion of management's attention from business matters to integration issues;
- combining research and development capabilities effectively and quickly;
- integrating partnership efforts so that new partners acquired can easily do business with us; and
- transitioning all facilities to a common information technology environment.

Actual cost synergies, if achieved at all, may be lower than we expect and may take longer to achieve than anticipated. If we are not able to adequately address these challenges, we may be unable to successfully integrate the operations of the business acquired from AdvanDx into our own, or to realize the anticipated benefits of the integration. The anticipated benefits and synergies assume a successful integration and are based on projections, which are inherently uncertain, and other assumptions. Even if integration is successful, anticipated benefits and synergies may not be achieved. An inability to realize the full extent of, or any of, the anticipated benefits of the acquisition, as well as any delays encountered in the integration process, could have an adverse effect on our business and results of operations, which may affect the value of the shares of our common stock.

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

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

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

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

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

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

If our sole laboratory facility or manufacturing facility becomes inoperable, we will be unable to perform Acuitas MDRO test services, or manufacture our QuickFISH PNA Fish products, and our business will be harmed.

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

In order to establish a redundant laboratory facility, we would have to spend considerable time and money securing adequate space, constructing the facility, recruiting and training employees, and establishing the additional operational and administrative infrastructure necessary to support a second facility. Additionally, any new clinical laboratory facility opened by us would be required to be certified under CLIA, a federal law that regulates clinical laboratories that perform testing on specimens derived from humans for the purpose of providing information for the diagnosis, prevention or treatment of disease. We would also be required to secure and maintain state licenses required by several states, including Maryland, California, Florida, New York and Pennsylvania which can take a significant amount of time and result in delays in our ability to begin operations at that facility. We currently have active licenses in Maryland, Florida and Pennsylvania. If we failed to secure any such licenses, we would not be able to process samples

from recipients in such states. We also expect that it would be difficult, time-consuming and costly to train, equip and use a third-party to perform tests on our behalf. We could only use another facility with the established state licensures and CLIA certification necessary to perform our current or future tests following validation and other required procedures. We cannot assure you that we would be able to find another CLIA-certified facility willing or able to adopt our current or future tests and comply with the required procedures, or that this laboratory would be willing or able to perform the tests for us on commercially reasonable terms.

We manufacture the QuickFISH and PNA Fish products in a leased facility located in Woburn Massachusetts. If demand for these products increase beyond our current forecasts or, regulatory requirements arise, we may not be able to meet our obligations to produce these products, and backlog or reduced demand for such products could occur. If we decide to relocate the facility, we will need to obtain all necessary FDA certifications, which could delay our ability to manufacture these products. If any of these issues occur, it could have a material adverse effect on our financial condition and results of operations.

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

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

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

We rely on several sole suppliers and manufacturers, including Fluidigm Corporation, for supplying certain laboratory reagents, raw materials, supplies and substances which we use in our laboratory operations and products and to manufacture our products. An interruption in our operations could occur if we encounter delays or difficulties in securing these items or manufacturing our products, and if we cannot, then obtain an acceptable substitute. Any such interruption could significantly affect our business, financial condition, results of operations and reputation.

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

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

Our competitors include rapid diagnostic testing and traditional microbiology companies, commercial laboratories, information technology companies, and hospital laboratories who may internally develop testing capabilities. Principal competitive factors in our target market include: organizational size, scale, and breadth of product offerings; rapidity of test results; quality and strength of clinical and analytical validation data and confidence in diagnostic results; cost effectiveness; ease of use; and regulatory approval status.

Our principal competition comes from traditional methods used by healthcare providers to diagnose and screen for MDROs and from other molecular diagnostic companies creating screening and diagnostic products such as Cepheid, Becton-Dickinson, bioMerieux, Accelerate Diagnostics, T2 Biosystems and Nanosphere.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

We have incurred net losses since inception and do not expect to become profitable in 2016 or for several years thereafter. To the extent that we continue to generate taxable losses, unused losses will carry forward to offset future taxable income, if any, until such unused losses expire. We may be unable to use these net operating loss carryforwards ("NOLs"), and certain tax credit carryforwards to offset income before such unused NOLs tax credit carryforwards expire. Under Section 382 of the Code, if a corporation undergoes an "ownership change" (generally defined as a greater than 50% change (by value) in its equity ownership over a three-year period), the corporation's ability to use its pre-change NOLs and other pre-change tax attributes to offset its post-change income may be further limited. The Merger with AdvanDx resulted in an ownership change for AdvanDx and, accordingly, AdvanDx's net operating loss carryforwards and certain other tax attributes in U.S. taxing jurisdictions are subject to limitations on their use after the Merger. OpGen's net operating loss carryforwards may also be subject to limitation as a result of prior shifts in equity ownership and/or the Merger. Additional ownership changes in the future could result in additional limitations on our net operating loss carryforwards. Consequently, even if we achieve profitability, we may not be able to utilize a material portion of our net operating loss carryforwards and other tax attributes, which could have a material adverse effect on cash flow and results of operations. We have not performed an analysis on previous ownership changes. It is possible that we have experienced an ownership change, or that we will experience an ownership change in the future. We had U.S. federal NOL carryforwards of $90.3 million and research and development tax credits of $2.0 million as of December 31, 2015, that may already be or could be limited if we experience an ownership change.

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

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

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

Risks Related to our Securities and Public Company Status

Trading of our common stock is limited, and trading restrictions imposed on us by applicable regulations may further reduce trading in our common stock, making it difficult for our stockholders to sell their shares; and future sales of common stock could reduce our stock price.

Trading of our common stock is currently conducted on the NASDAQ Capital Market. The liquidity of our common stock is limited, not only in terms of the number of shares that can be bought and sold at a given price, but also as it may be adversely affected by delays in the timing of transactions and reduction in security analysts' and the media's coverage of us, if at all. As of September 30, 2016, a significant number of the issued and outstanding shares of our common stock were held by officers, directors and beneficial

owners of at least 10% of our outstanding shares, each of whom is subject to certain restrictions with regard to trading our common stock. In addition, Merck GHI became our principal stockholder following the 2016 private offering financing transaction; as of September 30, 2016 it owns approximately 25% of our outstanding common stock, and has the right to acquire approximately 3.0 million additional shares upon the exercise of stock purchase warrants. These factors may result in different prices for our common stock than might otherwise be obtained in a more liquid market and could also result in a larger spread between the bid and asked prices for our common stock. In addition, without a large public float, our common stock is less liquid than the stock of companies with broader public ownership, and, as a result, the trading prices of our common stock may be more volatile. In the absence of an active public trading market, an investor may be unable to liquidate his investment in our common stock. Trading of a relatively small volume of our common stock may have a greater impact on the trading price of our stock than would be the case if our public float were larger. We cannot predict the prices at which our common stock will trade in the future, if at all.

Directors, executive officers, principal stockholders and affiliated entities own a significant percentage of our capital stock, and they may make decisions that you do not consider to be in the best interests of our stockholders.

Our directors, executive officers, principal stockholders and affiliated entities beneficially own, in the aggregate, approximately 65% of our outstanding common stock as of the date of this filing. As a result, if some or all of them acted together, they would have the ability to exert substantial influence over the election of our Board of Directors and the outcome of issues requiring approval by our stockholders. This concentration of ownership may also have the effect of delaying or preventing a change in control of the Company that may be favored by other stockholders. This could prevent transactions in which stockholders might otherwise recover a premium for their shares over current market prices.

The exercise of outstanding common stock purchase warrants and stock options will have a dilutive effect on the percentage ownership of our capital stock by existing stockholders.

As of September 30, 2016, we had outstanding warrants to acquire 10,506,524 shares of our common stock, and stock options to acquire 2,991,715 shares of our common stock. The expiration of the term of such options and warrants range from August 2017 to June 2026. A significant number of such warrants are out of the money, but the holders have the right to effect a cashless exercise of such warrants. If a significant number of such warrants and stock options are exercised by the holders, the percentage of our common stock owned by our existing stockholders will be diluted.

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

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

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

Accounting methods and policies for diagnostic companies, including policies governing revenue recognition, research and development and related expenses and accounting for stock-based compensation, are subject to further review, interpretation and guidance from relevant accounting authorities, including the SEC. Changes to, or interpretations of, accounting methods or policies may require us to reclassify, restate or otherwise change or revise our financial statements, including those contained in this Quarterly Report. Restatement of our financial statements could have a negative impact on our business.

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

As a public company, we will be required to maintain internal control over financial reporting and to report any material weaknesses in such internal control. Section 404 of the Sarbanes-Oxley Act of 2002 requires that we evaluate and determine the effectiveness of our internal control over financial reporting and, beginning with our annual report for the year ending December 31, 2016, provide a management report on internal control over financial reporting. If we have a material weakness in our internal control over financial reporting, we may not detect errors on a timely basis and our financial statements may be materially misstated. We are in the process

of compiling the system and processing documentation necessary to perform the evaluation needed to comply with Section 404 of the Sarbanes-Oxley Act of 2002. We may not be able to complete our evaluation, testing and any required remediation in a timely fashion.

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

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

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

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

Item 2. Unregistered Sales of Equity and Use of Proceeds

Unregistered Sales of Equity Securities

On May 19, 2016 and June 27, 2016, the Company offered and sold units in a private offering to members of management and employees and to accredited investors, including Merck GHI and jVen Capital, each unit consisting of either (i) one share of common stock and a detachable stock purchase warrant to purchase an additional 0.75 shares of common stock, or (ii) one share of non-voting convertible preferred stock a detachable stock purchase warrant to purchase an additional 0.75 shares of common stock, at a price of $1.14 per unit. The total net proceeds to the Company, after deducting offering commissions and expenses was $9,460,749. The Company is using the proceeds for working capital and general corporate purposes. Pursuant to the private offering the Company issued 6,744,127 shares of common stock, 2,309,428 shares of Series A non-voting convertible preferred stock and stock purchase warrants to acquire an additional 6,790,169 shares of common stock.

Each share of non-voting convertible preferred stock was convertible at the option of the holder in whole or in part and from time to time into one share of common stock, is entitled to dividends on as “as converted basis” when and if dividends are issued to common stockholders, and participates in liquidation on a *pari passu* basis with common stockholders. Holders of the Series A non-voting convertible preferred stock subsequently converted all 2,309,428 shares of preferred stock into 2,309,428 shares of common stock. The stock purchase warrants issued as part of the units are exercisable $1.3125 per share beginning 90 days after closing for five years, expiring on May 18, 2021.

On July 20, 2016, the Company’s registration statement on Form S-3, registering for resale by the holders of the shares of common stock acquired in the private offering was declared effective by the SEC.

Item 3. Defaults Upon Senior Securities

None.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

None.

Item 6. Exhibits

The exhibits listed in the Exhibit Index, which is incorporated herein by reference, are filed or furnished as part of this quarterly report on Form 10-Q.

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.

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

Date: November 14, 2016

EXHIBIT INDEX

Exhibit Number	Description
1.1	Sales Agreement by and between OpGen, Inc. and Cowen and Company, LLC, dated September 13, 2016 (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K, filed with the SEC on September 14, 2016)
10.1!	Separation Agreement and General Release, effective September 8, 2016, by and between OpGen, Inc. and Kevin Krenitsky, M.D. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K/A, Amendment No. 1, filed with the SEC on September 9, 2016)
10.2*	Lease Agreement and Lease Amendments and Lease Extensions by and between Cummings Properties LLC, Lessor, and AdvanDx, Inc., Lessee
31.1*	Certification of Chief Executive Officer pursuant to Rule 13a-14(a)/15d-14(a)
31.2*	Certification of Chief Financial Officer pursuant to Rule 13a-14(a)/15d-14(a)
32.1*	Certification of Chief Executive Officer and Chief Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101*	Interactive data files pursuant to Rule 405 of Regulation S-T; (i) the Condensed Consolidated Balance Sheets, (ii) the Condensed Consolidated Statements of Operations and Comprehensive Loss, (iii) the Condensed Consolidated Statements of Cash Flows and (iv) the Notes to Unaudited Condensed Consolidated Financial Statements.

! Indicates a management contract
* Filed or furnished herewith

Exhibit 10.2

CUMMINGS PROPERTIES, LLC

STANDARD FORM

COMMERCIAL LEASE 03030131-AFA

In consideration of the covenants herein contained, Cummings Properties, LLC ("LESSOR"), does hereby lease to AdvanDx, Inc. (a DE corp.), 222 Partridge Lane, Concord, MA 01742 ("LESSEE"), the following described premises ("the leased premises"): approximately 1,426 square feet (including 14.7% common area) at 25-K Olympia Avenue, Suite 600, Woburn, MA 01801, **TO HAVE AND HOLD** the leased premises for a term of two (2) years commencing at noon on April 1, 2003 and ending at noon on March 30, 2005 unless sooner terminated as herein provided. LESSOR and LESSEE now covenant and agree that the following terms and conditions shall govern this lease during the term hereof and for such further time as LESSEE shall hold the leased premises or any portion thereof.

1. **RENT.** LESSEE shall pay to LESSOR base rent at the rate of thirty two thousand seven hundred ninety eight (32,798) U.S. dollars per year, drawn on a U.S. bank, payable in advance in monthly installments of $2,733.16 on the first day in each calendar month. The first monthly payment, plus an appropriate fraction of a monthly payment for any portion of a month at the commencement of the lease term, shall be made upon LESSEE's execution of this lease. All payments shall be made to LESSOR or agent at 200 West Cummings Park, Woburn, Massachusetts 01801, or at such other place as LESSOR shall from time to time in writing designate. If the "Cost of Living" has increased as shown by the Consumer Price Index (Boston, Massachusetts, all items, all urban consumers), U.S. Bureau of Labor Statistics, the amount of base rent due during each calendar year of this lease and any extensions thereof shall be annually adjusted in proportion to any increase in the Index. All such adjustments shall take place with the rent due on January 1 of each year during the lease term. The base month from which to determine the amount of each increase in the Index shall be January 2003 which figure shall be compared with the figure for November 2003 and each November thereafter to determine the percentage increase (if any) in the base rent to be paid during the following calendar year. In the event the Consumer Price Index as presently computed is discontinued as a measure of "Cost of Living" changes, any adjustment shall then be made on the basis of a comparable index then in general use.

2. **SECURITY DEPOSIT.** LESSEE shall pay to LESSOR a security deposit in the amount of eight thousand (8,000) U.S. dollars upon the execution of this lease by LESSEE, which shall be held as security for LESSEE's performance as herein provided and refunded to LESSEE without interest at the end of this lease, subject to LESSEE's satisfactory compliance with the conditions hereof. LESSEE may not apply the security deposit to any payment due under the lease. In the event of any default or breach of this Lease by LESSEE, however, LESSOR may elect to apply the security deposit first to any unamortized improvements completed for LESSEE's occupancy, then to offset any outstanding invoice or other payment due to LESSOR, and then to outstanding rent. If all or any portion of the security deposit is applied to cure a default or breach during the term of the lease, LESSEE shall restore said deposit forthwith. LESSEE's failure to remit the full security deposit or any portion thereof or to restore said deposit when due shall constitute a substantial lease default. Until such time as LESSEE pays the security deposit and first month's rent, LESSOR may declare this lease null and void for failure of consideration.

3. **USE OF PREMISES.** LESSEE shall use the leased premises only for the purpose of executive and administrative offices and laboratory space.

4. **ADDITIONAL RENT.** LESSEE shall pay to LESSOR as additional rent a proportionate share (based on square footage leased by LESSEE as compared with the total leaseable square footage of the building or

buildings of which the leased premises are a part (hereinafter called the building)) of any increase in the real estate taxes levied against the land and building, whether such increase is caused by an increase in the tax rate or the assessment on the property, or a change in the method of determining real estate taxes. LESSEE shall make payment within 10 days after receipt of any invoice from LESSOR, and any additional rent shall be prorated should the lease terminate before the end of any tax year. The base from which to determine the amount of any increase in taxes shall be the rate and the assessment in effect as of July 1, 2002.

5. **UTILITIES.** LESSOR shall provide equipment per LESSOR's building standard specifications to heat the leased premises in season and to cool all office areas between May 1 and November 1. LESSEE shall pay all charges for utilities used on the leased premises, including electricity, gas, oil, water and sewer, and shall use whichever utility service provider LESSOR shall designate from time to time. LESSEE shall pay the utility provider or LESSOR, as applicable, for all such utility charges as determined by separate meters serving the leased premises and/or as a proportionate share of the utility charges for the building if not separately metered. LESSEE shall also pay LESSOR a proportionate share of any other fees and charges relating in any way to utility use at the building.

6. **COMPLIANCE WITH LAWS.** LESSEE acknowledges that no trade, occupation, activity or work shall be conducted in the leased premises or use made thereof which may be unlawful, improper, noisy, offensive, or contrary to any applicable statute, regulation, ordinance or bylaw. LESSEE shall keep all employees working in the leased premises covered by Worker's Compensation Insurance and shall obtain any licenses and permits necessary for LESSEE's use and occupancy. LESSEE shall be responsible for causing the leased premises and any alterations by LESSEE allowed hereunder to be in full compliance with any applicable statute, regulation, ordinance or bylaw.

7. **FIRE, CASUALTY, EMINENT DOMAIN.** Should a substantial portion of the leased premises, or of the property of which they are a part, be substantially damaged by fire or other casualty, or be taken by eminent domain, LESSOR may elect to terminate this lease. When such fire, casualty, or taking renders the leased premises substantially unsuitable for their intended use, a proportionate abatement of rent shall be made, and LESSEE may elect to terminate this lease if: (a) LESSOR fails to give written notice within 30 days of its intention to restore the leased premises; or (b) LESSOR fails to restore the leased premises to a condition substantially suitable for their intended use within 90 days of said fire, casualty or taking. LESSOR reserves all rights for damages or injury to the leased premises for any taking by eminent domain, except for damage to LESSEE's property or equipment.

8. **FIRE INSURANCE.** LESSEE shall not permit any use of the leased premises which will adversely affect or make voidable any insurance on the property of which the leased premises are a part, or on the contents of said property, or which shall be contrary to any law, regulation or recommendation from time to time made by the Insurance Services Office (or successor organization), state fire prevention agency, local fire department, LESSOR's insurer, or any similar entity. LESSEE shall on demand reimburse LESSOR and all other tenants all extra insurance premiums caused by LESSEE's use of the leased premises. LESSEE shall not vacate the leased premises or permit same to be unoccupied other than during LESSEE's customary non-business days or hours, or cause or allow the utilities serving the leased premises to be terminated.

9. **SIGNS.** LESSEE, at LESSEE's expense, shall erect promptly upon commencement of this lease, and then maintain signage for the leased premises in accordance with building standards for style, size, location, etc. now or hereafter made by LESSOR. LESSEE shall obtain the prior written consent of LESSOR before erecting any sign on the leased premises, which consent shall include approval as to size, wording, design and location. LESSOR may at LESSEE's expense remove and dispose of any sign not approved, erected, maintained or displayed in conformance with this lease.

10. **MAINTENANCE OF PREMISES.** LESSOR will be responsible for all structural maintenance of the leased premises and for the normal day time maintenance of all space heating and cooling equipment,

sprinklers, doors, locks, plumbing, and electrical wiring, but specifically excluding damage caused by the careless, malicious, willful, or negligent acts of LESSEE or others, and chemical, corrosion, or water damage from any source. LESSEE agrees to maintain at its expense all other aspects of the leased premises in the same condition as they are at the commencement of the term or as they may be put in with LESSOR's written consent during the term of this lease, normal wear and tear only excepted, and whenever necessary, to replace light bulbs and glass, acknowledging that the leased premises are now in good order and the light bulbs and glass whole. LESSEE shall at all times properly control and vent all solvents, degreasers, radioactive materials, smoke, odors, and any other materials that may be harmful, and shall not cause the area surrounding the leased premises or any other common area as defined below to be in anything other than a neat and clean condition, depositing all waste in appropriate receptacles. LESSEE shall be solely responsible for any damage to plumbing equipment, sanitary lines, or any other portion of the building which results from the discharge or use of any substance by LESSEE. LESSEE shall not permit the leased premises to be overloaded, damaged, stripped or defaced, nor suffer any waste, and will not keep animals within the leased premises. If the leased premises include any wooden mezzanine type space, the floor capacity of such space is suitable only for office use, light storage or assembly work. LESSEE will protect any carpet with plastic or Masonite chair pads under any rolling chairs. Unless heat is provided at LESSOR's expense, LESSEE shall maintain sufficient heat to prevent freezing of pipes or other damage. Any increase in air conditioning equipment or electrical capacity, or any installation or maintenance of any "non-building standard" leasehold improvements or equipment which is necessitated by some specific aspect of LESSEE's use of the leased premises, whether installed by LESSOR, LESSEE or a prior occupant, shall be LESSEE's sole responsibility, at LESSEE's expense, and subject to LESSOR's prior written consent. All maintenance provided by LESSOR shall be during LESSOR's normal business hours.

11. **ASSIGNMENT OR SUBLEASING.** LESSEE shall not assign this lease or sublet or allow any other entity or individual to occupy the whole or any part of the leased premises without LESSOR's prior written consent in each and every instance. In no case may LESSEE assign this lease or sublet the leased premises to any other current or prospective tenant of LESSOR, or any affiliate of such current or prospective tenant. As a condition to any assignment or subletting, an additional security deposit shall be paid to and held by LESSOR. In the event LESSEE notifies LESSOR in writing of its desire to assign or sublet the leased premises, LESSOR shall have the option to terminate this lease, at an effective date to be determined by LESSOR, upon written notice to LESSEE. Notwithstanding LESSOR's consent to any assignment or subleasing, LESSEE and GUARANTOR shall remain liable to LESSOR for the payment of all rent and for the full performance of all covenants and conditions of this lease.

12. **ALTERATIONS.** LESSEE shall not make structural alterations or additions of any kind to the leased premises, but may make nonstructural alterations with LESSOR's prior written consent. All such allowed alterations shall be at LESSEE's expense and shall conform with LESSOR's construction specifications. If LESSOR or its agent provides any services or maintenance for LESSEE in connection with such alterations or otherwise under this lease, including any maintenance or repairs LESSEE is required but has failed to do, LESSEE will promptly pay any just invoice. LESSEE shall obtain a lien waiver from any contractor it employs prior to commencement of any work. LESSEE shall not permit any mechanics' liens, or similar liens, to remain upon the leased premises in connection with work of any character performed or claimed to have been performed at the direction of LESSEE and shall cause any such lien to be released or removed forthwith without cost to LESSOR. Any alterations or additions shall become part of the leased premises and the property of LESSOR. Any alterations completed by LESSOR or LESSEE shall be LESSOR's building standard unless noted otherwise. LESSOR shall have the right at any time to make additions to the building, change the arrangement of parking areas, stairs, or walkways, or otherwise alter common areas or the exterior of the building.

13. **LESSOR'S ACCESS.** LESSOR and its agents and designees may at any reasonable time enter to view the leased premises; to show the leased premises to others; to make repairs and alterations as LESSOR or its

designee should elect to do for the leased premises, the common areas, or any other portions of the building; and without creating any obligation or liability for LESSOR, to make repairs which LESSEE is required but has failed to do.

14. **SNOW REMOVAL.** The plowing of snow from all roadways and unobstructed parking areas shall be at the sole expense of LESSOR. The control of snow and ice on all walkways, steps and loading areas serving the leased premises and all other areas not readily accessible to plows shall be the sole responsibility of ~~LESSEE~~.* Notwithstanding the foregoing, however, LESSEE shall hold LESSOR and OWNER harmless from any and all claims by LESSEE's employees, agents, callers or invitees for damage or personal injury resulting in any way from snow or ice on any area serving the leased premises.
*LESSOR

15. **ACCESS AND PARKING.** Unless otherwise provided herein, LESSEE shall have the right without additional charge to use parking facilities provided for the leased premises in common with others entitled to the use thereof. Said parking areas plus any stairs, corridors, walkways, elevators or other common areas (herein collectively called the common areas) shall in all cases be considered a part of the leased premises when they are used by LESSEE or LESSEE's employees, agents, callers or invitees. LESSEE will not obstruct in any manner any portion of the building or the walkways or approaches to the building. No unattended parking will be permitted between 7:00 PM and 7:00 AM without LESSOR's prior written approval, and from November 15 through April 15 annually, such parking shall be permitted only in those areas designated for assigned overnight parking. Unregistered or disabled vehicles, or storage trailers of any type, may not be parked at any time. LESSOR may tow, at LESSEE's sole risk and expense, any misparked vehicle belonging to LESSEE or LESSEE's employees, agents, callers or invitees, at any time. LESSOR does not provide and shall not be responsible for providing any security services.

16. **LIABILITY.** LESSEE shall be solely responsible as between LESSOR and LESSEE for deaths or personal injuries to all persons whomsoever occurring in or on the leased premises (including any common areas that are considered part of the leased premises hereunder) from whatever cause arising, and damage to property, including damage by fire or other casualty, to whomsoever belonging, arising out of the use, control, condition or occupation of the leased premises by LESSEE; and LESSEE agrees to indemnify and save harmless LESSOR and OWNER from any and all liability, including but not limited to costs, expenses, damages, causes of action, claims, judgments and attorney's fees caused by or in any way growing out of any matters aforesaid, except for death, personal injuries or property damage directly resulting from the sole negligence of LESSOR.

17. **INSURANCE.** LESSEE will secure and carry at its own expense a commercial general liability policy insuring LESSEE, LESSOR and OWNER against any claims based on bodily injury (including death) or property damage arising out of the condition of the leased premises (including any common areas that are considered part of the leased premises hereunder) or their use by LESSEE, including damage by fire or other casualty, such policy to insure LESSEE, LESSOR and OWNER against any claim up to $1,000,000 in the case of any one accident involving bodily injury (including death), and $1,000,000 against any claim for damage to property. This insurance shall be primary to and not contributory with any insurance carried by LESSOR, whose insurance shall be considered excess. LESSOR and OWNER shall be included in each such policy as additional insureds using ISO Form CG 20 26 11 85 or some other form approved by LESSOR, and each such policy shall be written by or with a company or companies satisfactory to LESSOR. Prior to occupancy, LESSEE shall deliver to LESSOR certificates and any applicable riders or endorsements showing that such insurance is in force, and thereafter will provide renewal certificates at least 15 days prior to the expiration of any such policies. All such insurance certificates shall provide that such policies shall not be cancelled without at least 10 days prior written notice to each insured. In the event LESSEE fails to provide or maintain such insurance at any time during the term of this lease, LESSOR may elect to contract for such insurance at LESSEE's expense.

18. **BROKERAGE.** LESSEE warrants and represents to LESSOR that LESSEE has dealt with no broker or third person with respect to this lease, and LESSEE agrees to indemnify LESSOR against any brokerage claims arising by virtue of this lease. LESSOR warrants and represents to LESSEE that LESSOR has employed no exclusive broker or agent in connection with the letting of the leased premises. In the event either party elects to employ a broker or third person on its behalf for any extension, renewal, or expansion of this lease, any fees or commissions shall be the sole responsibility of the party engaging such broker or third person.

19. **SUBORDINATION.** This lease shall be subject and subordinate to any and all mortgages and other instruments in the nature of a mortgage, now or at any time hereafter, and LESSEE shall, when requested, promptly execute and deliver such written instruments as shall be necessary to show the subordination of this lease to said mortgages or other such instruments in the nature of a mortgage.

20. **DEFAULT AND ACCELERATION OF RENT.** In the event that: (a) any assignment for the benefit of creditors, trust mortgage, receivership or other insolvency proceeding shall be made or instituted with respect to LESSEE or LESSEE's property; (b) LESSEE shall default in the observance or performance of any of LESSEE's covenants, agreements, or obligations hereunder, and such default shall not be corrected within 10 days after written notice thereof; or (c) LESSEE vacates the leased premises, then LESSOR shall have the right thereafter, while such default continues and without demand or further notice, to re-enter and take possession of the leased premises, to declare the term of this lease ended, and to remove LESSEE's effects, without being guilty of any manner of trespass or conversion, and without prejudice to any remedies which might be otherwise used for arrears of rent or other default or breach of the lease. If LESSEE shall default in the payment of the security deposit, rent, taxes, or substantial invoice from LESSOR or LESSOR's agent for goods and/or services or other sum herein specified, and such default shall continue for 10 days after written notice thereof, and, because both parties agree that nonpayment of said sums when due is a substantial breach of the lease, and, because the payment of rent in monthly installments is for the sole benefit and convenience of LESSEE, then, in addition to any other remedies, the entire balance of rent due hereunder shall become immediately due and payable as liquidated damages. LESSOR, without being under any obligation to do so and without thereby waiving any default, may remedy same for the account and at the expense of LESSEE. If LESSOR pays or incurs any obligations for the payment of money in connection therewith, such sums paid or obligations incurred, plus interest and costs, shall be paid to LESSOR by LESSEE as additional rent. Any sums received by LESSOR from or on behalf of LESSEE at any time shall be applied first to any unamortized improvements completed for LESSEE's occupancy, then to offset any outstanding invoice or other payment due to LESSOR, and then to outstanding rent. If any rent or other payment is not received by LESSOR within five days after such payment is due, then LESSEE shall pay LESSOR a late charge equal to one percent of such overdue payment or $35, whichever is greater. LESSEE shall also pay LESSOR interest at the rate of 18 percent per annum on any payment from LESSEE to LESSOR which is past due.

21. **NOTICE.** Any notice from LESSOR to LESSEE relating to the leased premises or to the occupancy thereof shall be deemed duly served when left at the leased premises, or served by constable, or sent to the leased premises or to the last address designated by notice in accordance with this section, by certified or registered mail, return receipt requested, postage prepaid, or by recognized courier service with a receipt therefor, addressed to LESSEE. Any notice from LESSEE to LESSOR relating to the leased premises or to the occupancy thereof shall be deemed duly served when served by constable, or delivered to LESSOR by certified or registered mail, return receipt requested, postage prepaid, or by recognized courier service with a receipt therefor, addressed to LESSOR at 200 West Cummings Park, Woburn, MA 01801 or at LESSOR's last designated address. No oral notice or representation shall have any force or effect. Time is of the essence in the service of any notice.

22. **OCCUPANCY.** In the event that LESSEE takes possession of the leased premises prior to the start of the lease term, LESSEE will perform and observe all of its covenants from the date upon which it takes possession. LESSEE shall not remove LESSEE's goods or property from the leased premises other than in the ordinary and

usual course of business, without having first paid LESSOR all rent which may become due during the entire term of this lease. LESSOR may require LESSEE to relocate to another similar facility upon prior written notice to LESSEE and on terms comparable to those herein. In the event that LESSEE continues to occupy or control all or any part of the leased premises after the termination of this lease without the written permission of LESSOR, LESSEE shall be liable to LESSOR for any and all loss, damages or expenses incurred by LESSOR, and all other terms of this lease shall continue to apply, except that use and occupancy payments shall be due in full monthly installments at a rate which shall be two times the greater of the monthly rent due under this lease immediately prior to termination or LESSOR's then current published rent for the leased premises, it being understood that such extended occupancy is a tenancy at sufferance, solely for the benefit and convenience of LESSEE and is of greater rental value. LESSEE's control or occupancy of all or any part of the leased premises beyond noon on the last day of any monthly rental period shall constitute LESSEE's occupancy for an entire additional month, and increased payment as provided in this section shall be due and payable immediately in advance. LESSOR's acceptance of any payments from LESSEE during such extended occupancy shall not alter LESSEE's status as a tenant at sufferance.

23. **FIRE PREVENTION.** LESSEE agrees to use every reasonable precaution against fire, and agrees to provide and maintain approved, labeled fire extinguishers, emergency lighting equipment, and exit signs, and complete any other modifications within the leased premises as required or recommended by the Insurance Services Office (or successor organization), OSHA, the local fire department, LESSOR's insurer or any similar entity.

24. **OUTSIDE AREA.** Any goods, equipment, or things of an type or description held or stored in any common area without LESSOR's prior written consent shall be deemed abandoned and may be removed by LESSOR at LESSEE's expense without notice. LESSEE shall maintain a building standard size dumpster in a location approved by LESSOR, which dumpster shall be provided and serviced at LESSEE's expense by whichever disposal firm LESSOR may designate from time to time. Alternatively, if a shared dumpster or compactor is provided by LESSOR, LESSEE shall pay the disposal firm or LESSOR, as applicable, LESSEE's proportionate share of any costs associated therewith.

25. **ENVIRONMENT.** LESSEE will so conduct and operate the leased premises as not to interfere in any way with the use and enjoyment of other portions of the same or neighboring buildings by others by reason of odors, smoke, exhaust, smells, noise, pets, accumulation of garbage or trash, vermin or other pests, or otherwise, and will at its expense employ a professional pest control service if determined necessary by LESSOR. LESSEE agrees to maintain efficient and effective devices for preventing damage to plumbing and heating equipment from solvents, degreasers, cutting oils, propellants, acids, etc. which may be present at the leased premises. No hazardous materials or wastes shall be stored, disposed of, or allowed to remain at the leased premises at any time, and LESSEE shall be solely responsible for any and all corrosion or other damage in any way associated with the use, storage and/or disposal of same by LESSEE.

26. **RESPONSIBILITY.** Neither LESSOR nor OWNER shall be held liable to anyone for loss or damage caused in any way by the use, leakage, seepage, flooding or escape of water in any form or from any source, or for the interruption or cessation of any service rendered customarily to the leased premises or building or agreed to by the terms of this lease, or due to any accident, the making of repairs, alterations or improvements, labor difficulties, weather conditions, mechanical breakdowns, trouble or scarcity in obtaining fuel, electricity, service or supplies from the sources from which they are usually obtained for the building, or due to any change in any utility or service provider, or any cause beyond LESSOR's immediate control.

27. **SURRENDER.** On or before the termination of this lease, LESSEE shall remove all of LESSEE's goods and effects from the leased premises. LESSEE shall deliver to LESSOR the leased premises and all keys and locks thereto, all fixtures and equipment connected therewith, and all alterations, additions and improvements made to or upon the leased premises, whether completed by LESSEE, LESSOR or others, including but not

limited to any offices, partitions, window blinds, floor coverings (including computer floors), plumbing and plumbing fixtures, air conditioning equipment and ductwork of any type, exhaust fans or heaters, water coolers, burglar alarms, telephone wiring, telephone equipment, air or gas distribution piping, compressors, overhead cranes, hoists, trolleys or conveyors, counters, shelving or signs attached to walls or floors, and all electrical work, including but not limited to lighting fixtures of any type, wiring, conduit, EMT, transformers, distribution panels, bus ducts, raceways, outlets and disconnects, and furnishings and equipment which have been bolted, welded, nailed, screwed, glued or otherwise attached to any wall, floor, ceiling, roof, pavement or ground, or which have been directly wired to any portion of the electrical system or which have been plumbed to the water supply, drainage or venting systems serving the leased premises. LESSEE shall deliver the leased premises fully sanitized from any chemicals or other contaminants, broom clean, and in at least the same condition as they were at the commencement of this lease or any prior lease between the parties for the leased premises, or as they were modified during said term with LESSOR's written consent, reasonable wear and tear only excepted. Any of LESSEE's property that remains in the leased premises upon termination of the lease shall be deemed abandoned and shall be disposed of as LESSOR sees fit, with no liability to LESSEE for loss or damage thereto, and at the sole risk of LESSEE. LESSOR may remove and store any such property at LESSEE's expense; retain same under LESSOR's control; sell same at public or private sale (without notice) and apply the net proceeds of such sale to the payment of any sum due hereunder; or destroy same. In no case shall the leased premises be deemed surrendered to LESSOR until the termination date provided herein or such other date as may be specified in a written agreement between the parties, notwithstanding the delivery of any keys to LESSOR.

28. **GENERAL.** (a) The invalidity or unenforceability of any provision of this lease shall not affect or render invalid or unenforceable any other provision hereof. (b) The obligations of this lease shall run with the land, and this lease shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns, except that LESSOR and OWNER shall be liable for obligations occurring only while lessor or owner of the leased premises. (c) Any action or proceeding arising out of the subject matter of this lease shall be brought by LESSEE within one year after the cause of action has occurred and only in a court within the commonwealth of Massachusetts. (d) If LESSOR is acting under or as agent for any trust or corporation, the obligations of LESSOR shall be binding upon the trust or corporation, but not upon any trustee, officer, director, shareholder, or beneficiary of the trust or corporation individually. (e) If LESSOR is not the owner (OWNER) of the leased premises, LESSOR represents that OWNER has agreed to be bound by the terms of this lease unless LESSEE is in default hereof. (f) This lease is made and delivered in the commonwealth of Massachusetts, and shall be interpreted, construed, and enforced in accordance with the laws thereof. (g) This lease was the result of negotiations between parties of equal bargaining strength, and when executed by both parties shall constitute the entire agreement between the parties, superseding all prior oral and written agreements, representations, statements and negotiations relating in any way to the subject matter herein. This lease may not be extended or amended except by written agreement signed by both parties or as otherwise provided herein, and no other subsequent oral or written representation shall have any effect hereon. (h) Notwithstanding any other statements herein, LESSOR makes no warranty, express or implied, concerning the suitability of the leased premises for LESSEE's intended use. (i) LESSEE agrees that if LESSOR does not deliver possession of the leased premises as herein provided for any reason, LESSOR shall not be liable for any damages to LESSEE for such failure, but LESSOR agrees to use reasonable efforts to deliver possession to LESSEE at the earliest possible date. A proportionate abatement of rent, excluding the cost of any amortized improvements to the leased premises, for such time as LESSEE may be deprived of possession of the leased premises, except where a delay in delivery is caused in any way by LESSEE, shall be LESSEE's sole remedy. (j) Neither the submission of this lease form or any amendment hereof, nor the prospective acceptance of the security deposit and/or rent shall constitute a reservation of or option for the leased premises, or an offer to lease, it being expressly understood and agreed that neither this lease nor any amendment shall bind either party in any manner whatsoever unless and until it has been executed by both parties. (k) LESSEE shall not be entitled to exercise any option or receive LESSOR's consent as provided for herein if LESSEE is at that time in default of any terms or conditions hereof. (l) Except as otherwise provided herein, neither LESSOR, nor OWNER, nor LESSEE shall be liable for any special, incidental, indirect or consequential damages, including

but not limited to lost profits or loss of business, arising out of or in any manner connected with performance or nonperformance under this lease, even if any party has knowledge of the possibility of such damages. (m) The headings in this lease are for convenience only and shall not be considered part of the terms hereof. (n) No restriction, condition or other endorsement by LESSEE on any check, nor LESSOR's deposit of any full or partial payment, shall bind LESSOR in any way or limit LESSOR's rights under this lease. (o) LESSOR, LESSEE, OWNER and GUARANTOR hereby waive any and all rights to a jury trial in any proceeding in any way arising out of this lease. (p) LESSEE shall pay LESSOR for legal and administrative expenses incurred by LESSOR in connection with any consent requested by LESSEE or in enforcing any or all obligations of LESSEE under this lease. (q) LESSEE will conform to all rules and regulations now or hereafter made by LESSOR for parking, for the care, use, or alteration of the building, its facilities and approaches and for the administration of this lease, and will not permit any employee or visitor to violate this or any other covenant or obligation of LESSEE. (r) **See attached Rider to Lease for additional provisions.**

29. **SECURITY AGREEMENT.** LESSEE hereby grants LESSOR continuing interest in all existing or hereafter acquired property of LESSEE in any of LESSOR's buildings to secure the payment of rent, the cost of leasehold improvements, and the performance of any other obligations of LESSEE under this lease or any subsequent lease between the parties. This provision shall survive termination of this lease, and shall not negate or replace any continuing security interest of LESSOR under any prior lease between the parties. Default in the payment or performance of any of LESSEE's obligations under this lease or any subsequent lease shall be a default under this security agreement, and shall entitle LESSOR to immediately exercise all of the rights and remedies of a secured party under the Uniform Commercial Code. LESSEE agrees to execute a UCC-1 Financing Statement and any other financing agreement as requested by LESSOR in connection with this security interest.

30. **WAIVERS, ETC.** No consent or waiver, express or implied, by LESSOR to or of any breach of any covenant, condition or duty of LESSEE shall be construed as a consent or waiver to or of any other breach of the same or any other covenant, condition or duty. If LESSEE is several persons, several corporations or a partnership, LESSEE's obligations are joint or partnership and also several. Unless repugnant to the context, "LESSOR" and "LESSEE" mean the person or persons, natural or corporate, named above as LESSOR and as LESSEE respectively, and their respective heirs, executors, administrators, successors and assigns.

31. **AUTOMATIC FIVE-YEAR EXTENSIONS.** This lease including all terms, conditions, escalations, etc. shall be automatically extended for additional successive periods of five years each unless LESSOR or LESSEE shall **[can't read the text]** other party's option not to so extend the lease. The time for serving such written notice shall be not more than 12 months or less than six months prior to the expiration of the then current lease period. Time is of the essence.

PARAGRAPH 31 DOES NOT APPLY

IN WITNESS WHEREOF, LESSOR and LESSEE have hereunto set their hands and common seals, intending to be legally bound hereby this __9_ day of ____April, 2003.

LESSOR: **CUMMINGS PROPERTIES, LLC**

By: illegible signature

Duly Authorized

LESSEE: **ADVANDX, INC.**

By: /s/ Henrik Stender

Duly Authorized

Print Name: Henrik Stender

REV. 04/02

GUARANTY

IN CONSIDERATION of Cummings Properties, LLC making this lease with LESSEE at the request of the undersigned (GUARANTOR) and in reliance on this guaranty, GUARANTOR hereby personally guarantees the prompt payment of rent by LESSEE and the performance by LESSEE of all terms, conditions, covenants and agreements of the lease, any amendments thereto and any extensions or assignments thereof, and the undersigned promises to pay all expenses, including reasonable attorney's fees, incurred by LESSOR in enforcing all obligations of LESSEE under the lease or incurred by LESSOR in enforcing this guaranty. LESSOR'S consent to any assignments, subleases, amendments and extensions by LESSEE or to any compromise or release of LESSEE'S liability hereunder, with or without notice to the undersigned, or LESSOR'S failure to notify the undersigned of any default and/or reinstatement of the lease by LESSEE, shall not relieve the undersigned from liability as GUARANTOR. IN WITNESS WHEREOF, the undersigned GUARANTOR has hereunto set his/her/its hand and common seal, intending to be legally bound hereby this __9 day of ____April, 2003.

/s/ Henrik Stender
Signature

Address: 222 Partridge Ln

Concord, MA 01742

Print name: Henrik Stender

RIDER TO LEASE

The following additional provisions are incorporated into and made a part of the attached lease:

A. **CONFLICTS.** In the event of any conflict between any provision of this Rider to Lease and the attached lease, the provisions of this Rider shall govern.

B. **SOUTH ESSEX SEWERAGE DISTRICT.** With respect to leases at Cummings Center in Beverly (only), LESSEE shall fully comply with all regulations of the South Essex Sewerage District (SESD) now or hereafter in effect, including prompt filing with LESSOR of any documents required by SESD regulations, and LESSEE agrees to indemnify and hold harmless LESSOR and OWNER from any and all liability arising out of any noncompliance by LESSEE with such regulations.

C. **ACTIVITY AND USE RESTRICTION.** With respect to leases at Cummings Center in Beverly and 10 and 18 Commerce Way in Woburn (only), and except as provided below, the following activities and uses are expressly prohibited at the property of which the leased premises are a part: residential uses (except for facilities for adult congregate care or assisted living, senior housing, nursing home uses and other adult residential facilities in certain designated areas of the property); child care, day care, or public or private elementary or secondary schools; a public park, playground or playing field, or other activities involving more than casual contact with the ground; cultivation out-of-doors of fruits and vegetables destined for human consumption; and fishing or swimming in the ponds and other waterways on or adjacent to the property. In addition, implementation of a health and safety plan is required for construction, utilities maintenance and other intrusive activities which are likely to involve extensive exposure to or contact with subsurface soils at the property. Notices of Activity and Use Limitation providing further information have been recorded at the Essex South Registry of Deeds and the Middlesex South Registry of Deeds, respectively, as well as recorded amendments authorizing both child care and a public elementary school in specific locations at Cummings Center.

D. **REMEDIES.** Notwithstanding Section 20 above, in the event the entire balance of rent due under this lease becomes due and payable as liquidated damages, said amount shall be discounted to its net present value as of the date of LESSOR'S notice of default, using the published prime rate then in effect. Furthermore, LESSEE'S covenants under this lease shall be independent of LESSOR'S covenants, and LESSOR'S failure to perform any of its covenants under this lease, including a covenant constituting a significant inducement to LESSEE to enter into this lease, shall not excuse the payment of rent or any other charges by LESSEE or allow LESSEE to terminate this lease.

E. **PARKING.** LESSEE shall be entitled to use, in common with others, a proportionate share of the total number of common area parking spaces provided for the building (based on square footage leased by LESSEE as compared with the total leasable square footage of the building). The number of spaces used by LESSEE'S employees, agents and invitees shall not at any time exceed LESSEE'S proportionate share of the total spaces for the building. For purposes of determining LESSEE'S compliance with this paragraph at any time, the number of spaces used by LESSEE shall be presumed to equal the number of persons who are then present at the leased premises.

AU LESSOR
HS LESSEE

RIDER TO LEASE
(Continued)

F. **RECORDING AND SECURITY.** Although LESSOR may choose at any time to record activities at the building with unmonitored remote television cameras, LESSEE acknowledges and agrees that, as provided in Section 15 above, LESSOR is not thereby or in any other way providing any security service for LESSEE or its employees, agents, invitees, contractors and representatives, and that LESSOR has made no representations whatsoever, written or oral, concerning the safety of the leased premises or the presence, effectiveness or operability of any security devices or security measures, or the safety or security of LESSEE, its employees, agents, invitees, callers, contractors and representatives, or LESSEE'S property, against the criminal or wrongful acts of third parties. Additionally, LESSEE accepts full responsibility for protecting the persons and property of LESSEE and those of its employees, agents, invitees, callers, contractors and representatives, and (acknowledging that security devices or measures may fail or be thwarted by criminals, by other third parties or by electrical or mechanical malfunction), agrees not to rely on any such devices or measures, and to protect itself, its property, and its employees, agents, invitees, callers, contractors and representatives as if such devices or measures did not exist.

G. **ELECTRIC SERVICE.** With respect to leases at Cummings Center in Beverly (only), LESSEE agrees that in the event its average electricity use at the leased premises is expected to exceed 200 kW of demand per month during the term of this lease, it will not self-generate or co-generate at the leased premises during the term of this lease or any extension(s) hereof.

H. * LESSOR, at LESSOR'S cost, shall modify the leased premises according to a mutually agreed upon plan attached hereto before or about the time LESSEE takes possession of the leased premises.

I. * Notwithstanding monthly rent as provided in Section 1 above, LESSEE may deduct $356.50 per month from each monthly rental payment due from April 1, 2003 through March 30, 2004 (only), provided LESSOR receives each such monthly payment on or before the first day of the month for which that rent is due and LESSEE is not otherwise in default of the lease or in arrears of any rent or invoice payments. Time is of the essence.

J. * At any one time during the initial term of this lease, provided LESSEE is not then in default of this lease or in arrears of any rent or invoice payments, LESSEE shall have the option to lease larger similar space of approximately 3,000 square feet. LESSEE shall give LESSOR written notice of such requirement for larger space, and shall then execute LESSOR'S then current standard form lease or amendment to lease for such larger space in the same or other buildings of LESSOR at LESSOR'S then current published rates for a term equivalent to the initial term of this lease within three business days of LESSOR'S written notice to LESSEE that said larger space will be available. If LESSOR does not offer such larger similar space within six months after receipt of written notice from LESSEE, then LESSEE shall have the option within 30 days thereafter to terminate the unexpired portion of this lease, without penalty, by serving LESSOR with 30 days written notice to that effect. Cancellation of the lease shall be LESSEE'S exclusive remedy for any failure by LESSOR to offer such larger similar space or any breach by LESSOR of the provisions of this paragraph. Time is of the essence.

K. * With reference to Section 25 above, no hazardous materials or hazardous wastes shall be used, processed, stored, or disposed of in any manner or form within the leased premises or any extension thereof in violation of any applicable local, state, or federal law, rule or regulation. LESSEE shall be solely responsible for and shall indemnify and hold LESSOR harmless from any and all liability, damage or personal injury associated with any use, processing, storage, or disposal of such materials.

AU	LESSOR
HS	LESSEE

RIDER TO LEASE
(Continued)

L. LESSEE warrants and represents that it does not intend to use, process, store or dispose of any hazardous materials, hazardous substances or chemicals at the leased premises except those described in the attached ("Exhibit A"), and further that the use, processing, storage or disposal of the chemicals in the quantities described in Exhibit A shall not create any chemical, biological or other contamination at the leased premises. LESSEE shall warrant to LESSOR in writing semiannually on or before each January 1 and July 1 that its procedures for storage and handling of chemicals have not changed in any way and that the quantities have not increased. If, however, the quantities of chemicals or the procedures for storage or handling of chemicals at the leased premises change in any way from the quantities or procedures set forth in Exhibit A such that LESSOR shall reasonably determine in good faith, that the risk of contamination of the leased premises or violation of law by LESSEE has been materially increased, then the following Paragraphs M and N shall apply.

M. Prior to the termination date of the lease, LESSEE, at LESSEE'S sole expense, shall engage an independent and certified industrial hygienist ("the CIH") to prepare a decontamination work plan for the leased premises in accordance with all CIH professional standards and all applicable laws to address all conditions arising out of LESSEE'S tenancy. LESSEE shall submit said plan to LESSOR for LESSOR'S review and consent. LESSEE shall then complete all measures specified in said plan, including testing and cleaning of all surfaces, HVAC equipment, ductwork, and other building components recommended therein. The CIH shall certify that as of the termination date of the lease, the entire leased premises and any extension thereof used in any way by LESSEE is free from any harmful chemical, biological, radioactive or other contamination arising out of LESSEE'S tenancy, in accordance with all applicable CIH professional standards and all applicable laws. Said certification shall confirm the clean condition of all HVAC equipment, ductwork, plumbing fixtures, drains, tanks, mechanical systems, cabinetry, casework, pH adjustment tanks, acid neutralization equipment, all other surfaces, and the indoor air quality at the leased premises, and shall specify that there are no restrictions on future use and occupation by others. Time is of the essence. (This paragraph will apply in the event the quantities of chemicals or the procedures for storage or handling of chemicals at the leased premises change in any way from the quantities or procedures set forth in Exhibit A such that LESSOR has reasonably determined that the risk of contamination of the leased premises or violation of law by LESSEE has been materially increased in accordance with Paragraph L above.)

AU	LESSOR
HS	LESSEE

N. LESSEE shall provide LESSOR with a standard performance bond, financial guaranty bond or letter of credit in an amount not less than $25,000, and in a form satisfactory to LESSOR'S counsel, to secure LESSEE'S performance of its obligations under Paragraph M above, within 30 days after LESSOR'S written notice to LESSEE to that effect. Time is of the essence. (This paragraph will apply in the event the quantities of chemicals or the procedures for storage or handling of chemicals at the leased premises change in any way from the quantities or procedures set forth in Exhibit A such that LESSOR has reasonably determined that the risk of contamination of the leased premises or violation of law by LESSEE has been materially increased in accordance with Paragraph L above.)

O. LESSEE'S maintenance obligations as provided in Section 10 above shall specifically include, without limitation, semiannual inspections, and repair and replacement as needed, of all acid neutralization, pH adjustment and other wastewater treatment tanks and equipment, and drain lines into which said tanks and equipment discharge; backflow preventers; air filters; and all other exhaust and intake fan components, including belts. LESSEE shall be responsible for ail maintenance and repairs of said equipment, both routine and otherwise, including semiannual (or more frequent if necessary) cleaning and replenishment of neutralizing materials in pH adjustment tanks. LESSEE acknowledges and agrees that the plumbing, electrical, heating and cooling systems provided and maintained by LESSOR are intended and sized only for office use, and any maintenance or additional equipment necessitated by LESSEE'S use of and operation at the leased premises shall be at LESSEE'S sole expense. LESSEE agrees that all wastewater discharged from the leased premises shall be neutralized to a pH of 7.0±, or, in the case of deionized water, shall be appropriately diluted or treated, and shall fully comply with all applicable state and local statutes, codes, regulations and/or ordinances.

P. * LESSEE shall notify LESSOR in writing upon LESSOR's request and 30 days prior to the expiration of the lease term of LESSEE'S compliance with its inspection and maintenance obligations as stated above.

Q. * The preceding two paragraphs regarding LESSEE's maintenance responsibility are a key consideration of this lease.

R. LESSEE acknowledges and agrees that certain non-building standard HVAC and other equipment shall be used to serve the leased premises in common with the other facilities at 25-K Olympia Avenue. LESSEE shall pay LESSOR a proportionate share of any fees and charges relating to use of such equipment.

LESSOR: **CUMMINGS PROPERTIES, LLC**

By: illegible signature
Duly Authorized

Date: 4/9/03

LESSEE: **ADVANDX, INC.**

By: /s/ Henrik Stender
Duly Authorized

Print Name: Henrik Stender

CUMMINGS PROPERTIES, LLC
STANDARD FORM

W02100077-SFC-E

AMENDMENT TO LEASE #6

In connection with a lease in effect between the parties at 400 TradeCenter, Suite 6990, Woburn, Massachusetts, fully executed on April 9, 2003 and currently terminating on January 30, 2015 and in consideration of the mutual benefits to be derived herefrom. Cummings Properties, LLC, LESSOR, and AdvanDx, Inc., LESSEE, hereby agree to amend said lease, including its terms, conditions, covenants and obligations ("terms"), as follows:

1. Effective March 1, 2010, base rent shall be changed to three hundred eighteen thousand eight hundred twenty five (318,825) dollars per year or $26,568.75 per month.

2. Effective March 1, 2010, the base month from which to determine the amount of each annual increase in the "Cost of Living" shall *~~be~~ November 2009, which figure shall be compared with the figure for November 2010, and each November thereafter to determine the increase (if any) in the base rent to be paid during the following calendar year. Notwithstanding anything to the contrary in the lease, the "Cost of Living" increase during each calendar year of the lease term through January 30, 2015 (only) shall be the percentage increase as determined in accordance with Sections 1 and 2 hereof and Section 1 of the lease, less one percent.
*remain

3. LESSEE acknowledges that, notwithstanding Section 26 of Lease Extension #3 ("LE3"), LESSOR shall apply the $30,300 cash security deposit toward the $30,969 of outstanding charges provided for in Additional Work Authorizations numbered 2, 4, 5, 7 and 8 attached hereto. LESSEE further acknowledges that the remaining $669 balance of said outstanding charges, together with the $150,000 outstanding balance of the Non-Standard Charges provided for in Section 10 of LE3 (collectively, the "Amortized Charges"), have been incorporated into the base rent set forth in Section 1 above.

4. The parties acknowledge and agree that (a) the Completion Date provided for in Section 8 of LE3 shall be February 1, 2010, and (b) notwithstanding Section 1 of LE3, the current lease expiration date is January 30, 2015.

5. LESSEE acknowledges that LESSOR has remeasured Suite 6990 in accordance with Section 11 of LE3 and that effective February 1, 2010, (a) the size of Suite 6990 shall be decreased to approximately 12,460 square feet (including 15.6% common area), and (b) the size of the area attributable to the monthly discount provided for in Section 25 of LE3 shall be decreased to 1,593 square feet. Accordingly, monthly rent for the month of February 2010 is changed to $23,362.50, and said monthly discount shall be changed to $2,987.21 effective February 1, 2010. All other terms of said Section 25 shall continue to apply.

6. Pursuant to Section 18 of LE3, effective March 1, 2010, the size of the premises shall be increased by approximately 310 square feet with the addition of 100 TradeCenter, Suite P-650 ("P-650"). The premises shall thereafter consist of approximately 12,460 square feet (including 15.6% common area) at Suite 6990 and approximately 310 square feet (without common area) at Suite P-650.

7. * Notwithstanding Sections 3 and 5 of the lease, Suite P-650 shall be used for inactive storage (only), and accordingly, no heating or air conditioning shall be provided there. LESSEE agrees to take possession of P-650 in "as is" condition.

8. * Notwithstanding base rent as provided in Section 1 above, annual base rent for the purpose of computing any "Cost of Living" adjustment effective January 1, 2011 through January 30, 2015 (only) shall be $280,350. The amount of any adjustment shall, however, be added to the annual base rent of $318,825, and shall otherwise be in accordance with Section 1 of the lease and Sections 1 and 2 above.

9. Notwithstanding anything to the contrary in the lease, provided LESSEE is not then in arrears of any rent or invoice payments or otherwise in default of the lease, LESSEE may, on the first day of any calendar month prior to January 2015, pre-pay the entire then-outstanding Beginning Balance of the Amortized Charges (the "Pay-Off Amount") as set forth in the mutually agreed upon schedule attached hereto as Exhibit A. On the first day of the applicable calendar month, LESSEE shall pay (a) the then-current monthly rent due less $3,206.28, and (b) the Pay-Off Amount by bank check, certified check, cash or wire transfer, and otherwise in full accordance with Section 1 of the lease. Upon LESSEE'S full payment of the Pay-Off Amount in accordance with this section, LESSEE'S monthly rent shall be reduced by $3,206.28 per month effective the first calendar month following the month in which LESSEE pays the Pay-Off Amount to LESSOR. Time is of the essence.

This amendment shall not bind any party in any manner whatsoever until it has been executed by all parties. All other terms of the lease shall continue to apply, and to the extent any inconsistency exists between this amendment and the lease, including any prior amendments, the terms herein shall control and supersede any earlier, provisions. In witness whereof, LESSOR and LESSEE, intending to be legally bound, have caused this amendment to be executed this 18th day of March, 2010.

LESSOR: **CUMMINGS PROPERTIES, LLC**

By: illegible signature
Duly Authorized

LESSEE: **ADVANDX, INC.**

By: /s/ Thais T. Johanson
Duly Authorized

Print Name: Thais T. Johanson

Title: CEO

06/09

CUMMINGS PROPERTIES, LLC
STANDARD FORM

AMENDMENT TO LEASE # 7

In connection with a lease in effect between the parties at 400 TradeCenter, Suite 6990 and 100 TradeCenter, Suite P-650, Woburn, Massachusetts ("premises" or "leased premises"), fully executed on April 9, 2003 and currently terminating on January 30, 2015, and in consideration of the mutual benefits to be derived herefrom, Cummings Properties, LLC, LESSOR, and AdvanDx, Inc., LESSEE, hereby agree to amend said lease, including its terms, conditions, covenants, and obligations ("terms"), as follows:

1. LESSEE acknowledges and agrees that LESSEE has not paid to LESSOR any of the $48,000 security deposit increase provided for in Section 10 of the Consent and Waiver by and among LESSOR, LESSEE, and Square 1 Bank. Accordingly, LESSOR is currently holding a cash security deposit in the amount of $100,000.

2. Section 24 of Lease Extension #3 and Section 10 of said Consent and Waiver are hereby deleted and the following shall now apply. The security deposit is hereby increased by $24,000 from $100,000 to a new total of $124,000. LESSEE shall pay this increase upon LESSEE'S execution of this amendment.

3. In lieu of the $124,000 cash security deposit provided for in Section 2 above and in Section 2 of the lease, LESSEE may provide to LESSOR and shall thereafter maintain throughout the entire lease term an Irrevocable Letter of Credit negotiable on sight in the amount of $124,000, provided said Letter of Credit is issued by a commercial bank acceptable to LESSOR; provides for payment to LESSOR immediately and on sight upon LESSOR'S delivery to the bank of a statement that the drawing represents amounts due to LESSOR from LESSEE under the lease or is otherwise permitted under the lease; terminates no earlier than two months after the termination of the lease; and is otherwise in a form acceptable to counsel for LESSOR. In addition, LESSOR shall be entitled to draw on said Letter of Credit and hold the proceeds as a cash security deposit presentation of a statement that LESSOR feels insecure about the continues solvency of the issuing bank. Either the Letter of Credit or the above-described cash security deposit increase shall be delivered to LESSOR upon LESSEE'S execution of this amendment. If the cash security deposit is fully paid, LESSOR shall then refund it to LESSEE upon delivery to LESSOR of a Letter of Credit that fully complies with this section. LESSEE shall pay LESSOR for all legal and administrative expenses incurred by LESSOR in connection with this Letter of Credit.

This amendment shall not bind any party in any manner whatsoever until it has been executed by all parties. All other terms of the lease shall continue to apply, and to the extent any inconsistency exists between this amendment and the lease, including any prior amendments, the terms herein shall control and supersede any earlier provisions. In witness whereof, LESSOR and LESSEE, intending to be legally bound, have caused this amendment to be executed this 23 day of May, 2013.

LESSOR: **CUMMINGS PROPERTIES, LLC**

By: illegible signature
Duly Authorized

LESSEE: **ADVANDX, INC.**

By: /s/ Tucker P. Kelly
Duly Authorized

Print Name: Tucker P. Kelly

Title: CFO

04/11

CUMMINGS PROPERTIES, LLC

CONSENT AND WAIVER

Cummings Properties, LLC, ("LESSOR"), and AdvanDx, Inc., ("LESSEE"), are parties to a lease (the "LEASE") fully executed on April 9, 2003 and currently terminating on January 30, 2015, for leased premises located at 400 TradeCenter, Suite 6990 and 100 TradeCenter, Suite P-650, Woburn Massachusetts (the "PREMISES"). Subject to the following provisions, and for valuable consideration, the receipt of which is hereby acknowledged, LESSOR hereby consents to the security interest granted to Square 1 Bank (a NC bank), 406 Blackwell Street, Suite 240, Durham, NC 27701, ("LENDER") in all personal property of LESSEE pursuant to the terms of that certain separate Loan and Security Agreement between LESSEE and LENDER dated as of April 24, 2013.

1. Except as otherwise provided herein, this Consent and Waiver shall not alter or modify any term, condition, covenant, or obligation ("terms") of the lease. LESSEE shall pay to LESSOR, upon LESSEE'S execution of this Consent and Waiver, $450 towards LESSOR'S expenses in connection with this Consent and Waiver, and all reasonable additional costs and expenses incurred by LESSOR in connection with the negotiation and execution of this Consent and Waiver.

2. LENDER represents that it has been granted a security interest by LESSEE in and to all personal property of LESSEE including without limitation LESSEE'S goods, inventory, furniture and/or equipment (the "COLLATERAL"). LESSEE similarly represents that it has granted said security interest to LENDER.

3. Upon full execution of this Consent and Waiver and full payment of the security deposit increase set forth in Section 10 below, LESSOR agrees to subordinate its security interest in the COLLATERAL to LENDER'S security interest in the COLLATERAL. LENDER hereby represents that it will not file and it will not require LESSOR to file any UCC-3 amendment specifically acknowledging the subordination granted by LESSOR to LENDER pursuant to the terms of this Consent and Waiver.

4. LESSOR will use commercially reasonable efforts to give LENDER notice of any financial default by LESSEE under the lease at least 10 days prior to LESSOR'S termination of the lease. LENDER shall not be obligated in any manner to cure any such default. LENDER will use commercially reasonable efforts to give LESSOR written notice if LENDER intends to exercise its rights under this Consent and Waiver.

5. [Section intentionally omitted].

6. LESSOR agrees not to interfere with LENDER'S enforcement of its rights in and to the COLLATERAL, including the removal of same if LENDER determines it necessary to do so. LENDER shall pay LESSOR for any and all physical damage to the premises in any way caused by LENDER'S actions in this regard. All leasehold improvements or alterations, including, but not limited to, those items referred to in Section 27 of the lease, shall remain a part of the premises and shall not be removed at any time.

7. If LENDER exercises its rights under its security interest, LENDER may enter the PREMISES for a period not to exceed 90 consecutive days, provided LENDER pays to LESSOR the then-current rental rate for use and occupancy of the premises and all real estate taxes, utilities, trash, and common area

ENA	LESSOR
DK	LENDER
	LESSEE

maintenance charges due under the LEASE calculated on a per diem basis based on a 30-day month from the date on which LENDER takes possession to the date on which the premises are completely vacated and surrendered to LESSOR in the same condition as when first used or occupied by LENDER.

8. LENDER also agrees to indemnify and hold LESSOR harmless from any and all liability, damages, and claims in any way caused by, occurring during, or arising out of LENDER'S enforcement of its rights in connection with its security interest, except for claims directly resulting from LESSOR'S negligence or willful misconduct.

9. [Section intentionally omitted].

10. The security deposit is hereby increased by $48,000 from $100,000 to a new total of $148,000. LESSEE shall pay this increase upon LESSEE'S execution of this Consent and Waiver.

11. This Consent and Waiver shall inure to the benefit of LESSOR, LESSEE, and LENDER, respectively, their successors and assigns, and shall be binding upon LESSOR, LESSEE, and LENDER, respectively, and their successors and assigns.

12. Except as provided in Section 1 above, if any party has employed an attorney, accountant, real estate broker, tenant representative, or other third party on its behalf in connection with this Consent and Waiver and/or any future extension, renewal, or expansion of the lease, then payment of any and all fees or commissions shall be the sole responsibility of the party engaging any such third party. LESSEE, LENDER, and LESSOR agree that the party who so engages any such third party shall indemnify the others against any and all claims for any and all such fees or commissions.

13. All terms herein that are applicable to matters other than LENDER'S security interest, right of entry and/or notice shall survive as between LESSOR and LESSEE after termination of said security interest.

14. This Consent and Waiver may be executed in one or more counterparts, each of which shall constitute an original, and when the respective signature pages are attached together, shall constitute one Instrument.

15. Notices required by this Consent and Waiver shall be in writing by prepaid certified or registered mail, return receipt requested, or by recognized overnight courier service with a receipt therefore, to the following address: if to LENDER: Square 1 Bank, 406 Blackwell Street, Suite 240, Durham, NC 27701, Attn: Loan Operations Manager, with a copy to Square 1 Bank, 890 Winter Street, Suite 110, Waltham, MA 02451, Attn: Phil Gager, and if to LESSOR: Cummings Properties, LLC, 200 West Cummings Park, Woburn, MA 01801.

ENA	LESSOR
DK	LENDER
	LESSEE

This Consent and Waiver shall not bind any party in any manner whatsoever until it has been executed by all parties. To the extent any inconsistency exists between this Consent and Waiver and the lease, including any prior amendments, the terms herein shall control and supersede any earlier provisions. In witness whereof, LESSOR, LESSEE, and LENDER, intending to be legally bound, have caused this Consent and Waiver to be executed this ____1st___ day of _____May_____, 2013.

LESSOR: **CUMMINGS PROPERTIES, LLC**

By: illegible signature
Duly Authorized

LESSEE: **ADVANDX, INC**.

By: /s/ Tucker P. Kelly
Duly Authorized

Print Name: Tucker P. Kelly

Title: CFO

LENDER: SQUARE 1 BANK

By: /s/ David B. Kho
Duly Authorized

Print Name: David B. Kho

Title: AVP

W11140715-MAB-B

LEASE EXTENSION #4

In connection with a lease in effect between the parties at 400 TradeCenter. Suite 6990 and 100 TradeCenter, Suite P-650, Woburn, Massachusetts ("premises" or "leased premises"), fully executed on April 9, 2003 and currently terminating on January 30, 2015, and in consideration of the mutual benefits to be derived herefrom, Cummings Properties, LLC, LESSOR, and AdvanDx. Inc. , LESSEE, hereby agree to amend said lease, including its terms, conditions, covenants, and obligations ("terms"), as follows:

1. The lease is hereby extended for an additional term of one year ending at noon on January 30, 2016.

2. Effective February 1, 2015, base rent shall be changed to four hundred forty thousand five hundred sixty five (440,565) dollars per year or $36,713.75 per month.

3. Effective February 1, 2015, the base month from which to determine the amount of each annual increase in the "Cost of Living" shall be November 2014, which figure shall be compared with the figure for November 2015, and each November thereafter to determine the increase (if any) in the base rent to be paid during the following calendar year.

4. Sections 19, 20, and 21 of Lease Extension #3 are hereby deleted and of no further force or effect.

5. In the event that any hazardous material and/or hazardous waste remains in the premises after the termination of the lease or, if applicable, the date LESSEE otherwise vacates the premises, including but not limited to relocating to a new premises pursuant to an amendment to the lease, or in the event that any manifest(s) need to be prepared for the delivery, transport, removal, and/or disposal of any hazardous material and/or hazardous waste to or from the premises (e.g., EPA Form 8700-22) and LESSEE'S authorized representative is unavailable for any reason, LESSEE hereby authorizes LESSOR to execute any and all manifests and related documents necessary to properly effectuate such delivery, transport, removal, and/or disposal on LESSEE'S behalf and at LESSEE'S sole expense using LESSEE'S Hazardous Waste Generator Identification Number. The premises shall be deemed occupied by LESSEE in accordance with Sections 22 and 27 of the lease unless and until LESSEE has provided, to LESSOR'S satisfaction and/or the satisfaction of LESSOR'S CIH, the required CIH certification and all applicable decommissioning statements, all in accordance with the terms of the Paragraphs M, O, and P of the Rider to Lease.

6. Notwithstanding anything to the contrary in the lease, LESSOR agrees to pay a brokerage commission, currently estimated to be $12,770, on LESSEE'S behalf to Cushman & Wakefield of Massachusetts, Inc. on account of this extension (only). LESSEE represents and warrants that this amount is the total commission to be paid on account of this extension.

7. Upon full execution of this extension, the $19,658 restoration charge for non-standard carpet as set forth in that certain January 4, 2010 Additional Work Authorization shall be satisfied in full and no longer due from LESSEE to LESSOR.

8. In the event that, on or before 5:00 PM on January 1, 2016, LESSEE and LESSOR fully execute a mutually agreed upon lease extension for a minimum of five years commencing on or before February 1, 2016 and for a minimum of 12,770 square feet, LESSOR will credit up to $127,700 toward rent under

the lease extension. This credit shall be applied in equal monthly installments of up to $2,128.33 towards LESSEE'S then-current monthly rent due from February 1, 2016 through January 30, 2021 (only), provided LESSEE is not then in arrears of any rent or invoice payment or otherwise in default of the lease.

This extension shall not bind any party in any manner whatsoever until it has been executed by all parties. All other terms of the lease shall continue to apply, and to the extent any inconsistency exists between this extension and the lease, including any prior amendments, the terms herein shall control and supersede any earlier provisions. In witness whereof, LESSOR and LESSEE, intending to be legally bound, have caused this extension to be executed this 19th day of December, 2014.

LESSOR: **CUMMINGS PROPERTIES, LLC**

By: illegible signature
Duly Authorized

LESSEE: **ADVANDX, INC.**

By: /s/ Donald B. Hawthorne
Duly Authorized

Print Name: Donald B. Hawthorne

Title: President and CEO

04/11

W10150579-MAB-B

LEASE EXTENSION # 5

In connection with a lease in effect between Cummings Properties, LLC, LESSOR, and AdvanDx, Inc., LESSEE, at 400 TradeCenter, Suite 6990 and 100 TradeCenter, Suite P-650, Woburn, Massachusetts ("premises" or "leased premises"), fully executed on April 9, 2003 and currently scheduled to terminate on January 30, 2016, and in consideration of the mutual benefits to be derived herefrom, the parties hereby agree to amend said lease, including its terms, conditions, covenants, and obligations ("terms"), as follows:

1. The lease is hereby extended for an additional term of one year and is now currently scheduled to terminate at noon on January 30, 2017, unless otherwise terminated or extended as provided in the lease, as amended.

2. Effective February 1, 2016, base rent shall be changed to five hundred four thousand four hundred fourteen (504,414) dollars per year or $42,034.50 per month.

3. Effective February 1, 2016, the base month from which to determine the amount of each annual increase in the "Cost of Living" shall be November 2015, which figure shall be compared with the figure for November 2016, and each November thereafter to determine the increase (if any) in the base rent to be paid during the following calendar year.

4. If the lease terminates pursuant to Section 20 of the lease, LESSEE acknowledges and agrees that the lease may, at LESSOR'S election, be reinstated by LESSOR with or without notice to LESSEE, and LESSOR may require one or more conditions prior to reinstatement.

5. LESSEE shall deliver to LESSOR a copy of the policy of insurance to be maintained by LESSEE throughout the term of the lease, together with the declarations page and all applicable riders and endorsements, showing that such insurance is in force, and thereafter will deliver, prior to the expiration of any such policy, notice of renewal of same. In the event any such policy or coverage changes, a copy of the policy, together with the declarations page and all applicable riders and endorsements, shall be delivered to LESSOR within 10 days of such change.

6. Section 8 of Lease Extension #4 is hereby deleted and of no further force or effect and the following shall now apply. In the event that, on or before 5:00 PM on December 30, 2016, LESSEE and LESSOR fully execute a mutually agreed upon lease extension further extending the term of the lease for a minimum of five years commencing on February 1, 2017 and for a minimum of 12,770 square feet, LESSOR will credit up to $127,700 towards monthly rent due during said extended term of the lease. This credit shall be applied in equal monthly installments of up to $2,128.33 towards LESSEE'S then-current monthly rent due from February 1, 2017 through January 30, 2022 (only), provided LESSEE is not then in arrears of any rent or invoice payment or otherwise in default of the lease.

This extension shall not bind any party in any manner whatsoever until it has been executed by all parties. All other terms of the lease shall continue to apply, and to the extent any inconsistency exists between this extension and the lease, including any prior amendments and extensions, the terms herein shall control and supersede any earlier provisions. In witness whereof, LESSOR and LESSEE, intending to be legally bound, have caused this extension to be executed this 24 day of December, 2015.

LESSOR: **CUMMINGS PROPERTIES, LLC**

By: illegible signature
Duly Authorized

LESSEE: **ADVANDX, INC.**

By: /s/ Evan Jones
Duly Authorized

Print Name: Evan Jones

Title: Chairman and CEO

04/15

CUMMINGS PROPERTIES, LLC
STANDARD FORM

LEASE EXTENSION # 6

In connection with a lease in effect between Cummings Properties. LLC, LESSOR. And AdvanDx, Inc. ,LESSEE, at 400 TradeCenter, Suite 6990 and 100 TradeCenter, Suite P-650, Woburn . Massachusetts ("premises" or "leased premises"), fully executed on April 9, 2003 and currently scheduled to terminate on January 30, 2017 , and in consideration of the mutual benefits to be derived herefrom, the parties hereby agree to amend said lease, including its terms, conditions, covenants, and obligations ("terms"), as follows:

1. The lease is hereby extended for an additional term of five years and is now currently scheduled to terminate at noon on January 30, 2022, unless otherwise terminated or extended as provided in the lease, as amended.

2. Effective February 1, 2018, base rent shall be changed to four hundred fifty three thousand three hundred nine (453,309.00) dollars per year or $37,775.75 per month.

3. Effective February 1, 2017, the base month from which to determine the amount of each annual increase in the "Cost of Living" shall be November 2016, which figure shall be compared with the figure for November 2017, and each November thereafter to determine the increase (if any) in the base rent to be paid during the following calendar year.

4. Notwithstanding monthly rent as provided in Sections 2 and 3 above, in satisfaction of Section 6 of Lease Extension #5. LESSEE may deduct $2,128.33 per month from each monthly rental payment due from February l, 2017 through January 30, 2022 (only), provided LESSEE is not then in arrears of any rent or invoice payment or otherwise in default of the lease.

5. Notwithstanding anything to the contrary in the lease. LESSOR agrees to pay a brokerage commission to EDGE Commercial Real Estate ("EDGE") on account of this extension (only) in accordance with a separate agreement between LESSOR and EDGE (the "Commission"). LESSEE represents and warrants to LESSOR that (i) the Commission is the only commission to be paid to EDGE on account of this extension; and (ii) LESSEE has dealt with no broker, tenant representative, or third person with respect to this extension except EDGE.

6. Paragraph M of the Rider to Lease is hereby deleted and of no further force or effect and the following shall now apply. On or before the termination of the lease or, if applicable, the date LESSEE otherwise vacates the premises, including but not limited to relocating to a new premises pursuant to an amendment to the lease (in either case, the "Vacate Date"), LESSEE shall, at its sole expense, have the entire premises, including all extensions thereof (e.g., shafts, ducts, etc.) used in any way by LESSEE, cleaned, sanitized, and tested, and shall provide LESSOR with a written certification from a licensed, independent, and certified industrial hygienist ("CIH") stating that as of the Vacate Date, the entire premises have been cleaned, sanitized, and tested and are free from all harmful chemical, biological, radioactive, and other contamination arising out of LESSEE's tenancy, that there are no restrictions on future use or occupation by others, including any demolition, modification, and/or disposal of any materials as non-hazardous waste, and that the indoor air quality at the premises is satisfactory. Said cleaning, testing, and certification shall be completed in accordance with all CIH professional standards and all applicable laws and shall include, but not be limited to, all cabinetry, countertops, walls, ceilings, floors, casework, and all other surfaces, all mechanical and HVAC equipment ductwork, diffusers, return air grilles, filters, makeup air units, exhaust fans, hoods, plumbing lines and fixtures, drains,

septic systems (if any), and all acid neutralization, pH adjustment, and other wastewater treatment tanks, piping, and equipment. If LESSEE used, stored, and/or disposed of any radioactive materials at, in, on, or near the premises. LESSEE shall provide LESSOR with a written statement from all applicable governmental authorities that the premises have been fully decommissioned in accordance with all applicable laws on or before the Vacate Date.

7. The phrase "Paragraphs M, O, and P of the Rider to Lease" in Section 5 of Lease Extension #4 is hereby deleted and replaced with the phrase "Section 6 of Lease Extension #6 and Paragraphs O and P of the Rider to Lease."

This extension shall not bind any party in any manner whatsoever until it has been executed by all parties. All other terms of the lease shall continue to apply, and to the extent any inconsistency exists between this extension and the lease, including any prior amendments and extensions, the terms herein shall control and supersede any earlier provisions. In witness whereof, LESSOR and LESSEE, intending to be legally bound, have caused this extension to be executed this 14th day of October. 2016.

LESSOR: **CUMMINGS PROPERTIES, LLC**

By: illegible signature

Duly authorized

LESSEE: **ADVANDX, INC.**

By: /s/ Timothy C. Dec

Duly authorized

Print name: Timothy C. Dec
Title: CFO

Exhibit 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER

PURSUANT TO RULE 13A-14(A)/15D-14(A)

I, Evan Jones, certify that:

1. I have reviewed this quarterly report on Form 10-Q of OpGen, Inc.

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and we have:

    a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant is made known to us by others within those entities, particularly during the period in which this report is being prepared;

    b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

    c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

    d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's Board of Directors (or persons performing the equivalent functions):

    a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

    b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 14, 2016

/s/ Evan Jones
Evan Jones
Chief Executive Officer (principal executive officer)

Exhibit 31.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER

PURSUANT TO RULE 13A-14(A)/15D-14(A)

I, Timothy C. Dec, certify that:

1. I have reviewed this quarterly report on Form 10-Q of OpGen, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and we have:

    a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant is made known to us by others within those entities, particularly during the period in which this report is being prepared;

    b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

    c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

    d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's Board of Directors (or persons performing the equivalent functions):

    a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

    b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting

Date: November 14, 2016

/s/ Timothy C. Dec
Timothy C. Dec
Chief Financial Officer (principal financial officer and
principal accounting officer)

Exhibit 32.1

CERTIFICATION
PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED
PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the quarterly report on Form 10-Q of OpGen, Inc. (the "Company") for the quarterly period ended September 30, 2016 (the "Report") as filed with the Securities and Exchange Commission on the date hereof, the undersigned Chief Executive Officer and Chief Financial Officer of the Company hereby certify that, to such officer's knowledge:

(1) the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

This certification is provided solely pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.

Date: November 14, 2016

By: /s/ Evan Jones
Evan Jones
Chief Executive Officer
(principal executive officer)

Date: November 14, 2016

By: /s/ Timothy C. Dec
Timothy C. Dec
Chief Financial Officer
(principal financial officer and principal accounting officer)

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.