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## OpGen (Nasdaq/OPGN)

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**BUY**
**AMR Gene Panel is near-term focus**

*OpGen is a precision medicine company using molecular diagnostics and bioinformatics to help combat infectious disease*

### Investment Highlights

**1) OpGen reported financial results for their Q2/2018 quarter, including an increase in revenues of 12% year-over-year to \$790,000 from \$700,000, led by growth in collaboration revenue from a contract with the US CDC. Net loss for the quarter decreased to \$3.3 million or (\$0.57) per share, from \$4.2 million or (\$3.73) per share in the prior year period, primarily due to reduced operating expenses but also from improved product margins. R&D progress during the quarter centered around OpGen's Acuitas AMR Gene Panel u5.47, including positive dialogue with the US FDA regarding regulatory pathway and recent presentation of clinical data for the panel at the ASM Microbe conference. Operating cash burn was approximately \$3 million in the third quarter, and at the end of the period OpGen held \$7.4 million in cash on hand. The Company was also able to successfully modify the terms of its long-term debt held by Merck's Global Innovation Fund (MRK, Not Rated) including extending the note's maturity.**

**2) While Company management did not provide specific financial guidance for the remainder of 2018, they did express optimism regarding commercial momentum for new gene panel products.** Thus, we are estimating that product sales will improve slightly for the second half of this year, allowing OpGen to post 12% growth in overall revenues this year to \$3.6 million. Assuming improved gross margins and reduced overhead expense levels for the rest of the year, we are also estimating that OpGen will record a net loss of \$12.0 million or (\$2.00) per share in 2018E, an improvement over 2017's net loss of \$15.4 million or (\$9.81) per share. Current cash on hand for the Company is estimated to last into calendar 2019.

**3) OpGen's focus for the next year or two is clearly on advancing its Acuitas AMR gene panel test program, which also employs the Company's Acuitas Lighthouse software for analysis.** Timing is short-term; OpGen's goal is to complete its first clinical trial for bacterial isolates and file a 510 (k) application with the FDA by the

**Current Price \$1.80**
**Price Target \$3.20**

Estimates	F2016A	F2017A	F2018E
Revenues(\$000s)	\$4,026	\$3,211	\$3,600 E
1Q March	1,077	772	846 A
2Q June	1,183	703	789 A
3Q September	760	745	
4Q December	1,007	991	

EPS (diluted)	(\$27.59)	(\$9.81)	(\$2.00) E
1Q March	(8.98)	(4.78)	(0.75) A
2Q June	(9.27)	(3.73)	(0.57) A
3Q September	(5.79)	(1.74)	
4Q December	(5.27)	(1.33)	

EBITDA/Share	(\$25.21)	(\$8.72)	(\$1.68)
EVEBITDA (x)	N/A	N/A	N/A

Stock Data	
52-Week Range	\$1.62-\$10.25
Shares Outstanding (mil.)	6.0
Market Capitalization (mil.)	\$10.8
Enterprise Value (mil.)	\$3.8
Debt to Capital (6/18)	16.9%
Book Value/Share (6/18)	\$1.07
Price/Book	1.7 x
Average Trading Volume (3-month)	230,000
Insider Ownership	4.0%
Institutional Ownership	33.2%
Short interest	600,000
Dividend / Yield	\$0.00/0.0%



Price target and ratings changes over the past 3 yrs:  
 Initiated - June 19, 2017 - Buy - Price Target \$2.00  
 Updated - August 6, 2018 - Buy - Price Target \$3.20 (Reverse Stock Split)

end of this year, with subsequent 510(k) submissions targeted for early 2019. OpGen introduced a Research Use Only (RUO) version of the Acuitas AMR Gene Panel u5.47 earlier in 2018, and the Company hopes this year to sign up a number of large hospitals, pharmaceutical companies and clinical research organizations under this program and record associated revenues from sale of the test panel reagents. Further down the road, the Company also plans to enter into additional agreements for both supply and cooperative development in support of the broader Acuitas product family, add revenue-generating system placements for its QuantStudio 5 and EZ1 Advanced XL products, as well as continue to seek third-party funding for additional development programs.

## Conclusion

OpGen continues to make progress in transitioning its diagnostic product line to its new Acuitas Rapid Tests and Acuitas Lighthouse Knowledgebase offerings, which are targeting the large, expanding multi-drug resistant organism market. While this transitioning is happening, however, OPGN shares continue to suffer, and the stock is currently trading at significant valuation discounts to its six-stock peer diagnostic products group. With several new partnerships signed recently, and more to possibly come in the future to go along with new regulatory approvals and product launches, we believe OPGN shares are poised for a bounce-back as positive news flow continues into the future, and thus we are maintaining our BUY rating on OPGN shares and instituting a new 12-18 month price target of \$3.20 per share reflecting a recent reverse stock split. (For complete stock valuation methodology, please see our Initiation Report dated 6/19/2017)

## Risk Factors

**In addition to normal economic and market risk factors that impact most equities and the common risks shared by OpGen with other companies in the industry, we believe an investment in OPGN involves the following risks:**

- **Reliance on key management** – At present, OPGN relies on several key members of its management team who either founded the Company or have been in key executive positions for an extended period of time. Should one or more of these key executives leave the Company, OPGN could find it difficult to replace their long-standing knowledge of operations and industry expertise.
- **Reliance on partnerships** – To date, OPGN has signed a number of marketing and development partnerships and joint ventures for its diagnostic tests and information services. Thus, in the future certain factors related to product marketing and/or new product development may be determined by third parties and out of the control of Company management.
- **Limited stock liquidity** – Trading volume in OPGN stock is comparatively light and these shares have a relatively limited history of trading compared with other healthcare stocks. As such, news regarding OPGN, its target market, partners and/or competitors could lead to significant volatility in the stock price.
- **Competitive Markets** – The Company and its partners compete in its target diagnostic markets with a number of companies, many of which are considerably larger than the Company. There can be no assurance that the Company and its partners will be able to successfully compete and launch new products into these competitive markets in the future.
- **FDA and regulatory risks** – OPGN and its partners are subject to regulatory review for ongoing diagnostic tests and information products, principally the US Food and Drug Administration's approval and laboratory review processes. In addition, the quality assurance and manufacture of the Company's diagnostic products are subject to ongoing oversight and regulation, and any negative correspondence from the FDA or other regulatory agencies could have an adverse effect on the ongoing operations of the Company.

- **Lack of historic profitability** - OPGN has not achieved operating profitability since its founding, and according to our forecasts may not be expected to do so in the near future. Although the Company maintains adequate cash reserves at the present time, there can be no assurance the Company will not need to raise additional working capital in the future should operating losses continue.
- **Need to defend patents and other intellectual property** – OPGN currently holds approximately 170 US and International patents on its products and information services, some of which expire in the near future. The Company may be required to defend its patents in the US and overseas in the future, and there can be no assurance these defenses will be successful.

Robert M. Wasserman

**OpGen, Inc.**  
**Consolidated Statements of Income**  
 (In 000s, except per share data)

FYE December	2014	2015	1Q16	2Q16	3Q16	4Q16	2016	1Q17	2Q17	3Q17	4Q17	2017	2018E
			March	June	September	December		March	June	September	December		
Revenue													
Product sales	\$1,236	\$2,701	\$947	\$1,028	\$730	\$818	\$3,524	\$735	\$681	\$730	\$626	\$2,772	\$2,750
Laboratory services	479	121	129	30	23	47	229	16	16	9	1	42	50
Collaboration revenue	2,411	336	0	125	6	141	273	21	6	6	363	397	800
Total revenue	\$4,126	\$3,158	\$1,077	\$1,183	\$760	\$1,007	\$4,026	\$772	\$703	\$745	\$991	\$3,211	\$3,600
Expenses													
Cost of products sold	426	1,180	439	431	400	389	1,659	425	393	448	347	1,613	1,510
Cost of services	326	368	316	161	52	103	631	100	79	49	292	520	0
Research and development	4,368	6,003	1,860	2,240	2,179	2,334	8,613	2,123	1,762	1,513	1,485	6,883	5,000
General and administrative	2,313	5,835	1,538	1,777	1,640	1,648	6,603	1,969	1,750	1,601	1,366	6,686	7,200
Sales and marketing	2,058	4,305	1,399	1,589	1,295	1,247	5,529	1,106	909	330	402	2,748	1,600
Total operating expenses	9,691	17,691	5,553	6,197	5,565	5,720	23,035	5,723	4,893	3,942	3,893	18,450	15,310
Income (loss) from operations	(5,565)	(14,533)	(4,476)	(5,015)	(4,806)	(4,713)	(19,009)	(4,951)	(4,190)	(3,196)	(2,902)	(15,239)	(11,710)
Other income (expense)	(734)	(3,065)	(37)	(369)	(41)	(41)	(489)	(31)	(18)	(72)	(36)	(157)	(300)
Income (loss) before tax	(6,299)	(17,598)	(4,513)	(5,384)	(4,847)	(4,754)	(19,499)	(4,982)	(4,208)	(3,269)	(2,938)	(15,397)	(12,010)
Income tax benefit (expense)													
Net income (loss)	(6,299)	(17,598)	(4,513)	(5,384)	(4,847)	(4,754)	(19,499)	(4,982)	(4,208)	(3,269)	(2,938)	(15,397)	(12,010)
Basic income per share	(\$406.27)	(\$55.12)	(\$8.98)	(\$9.27)	(\$5.79)	(\$5.27)	(\$27.59)	(\$4.78)	(\$3.73)	(\$1.74)	(\$1.33)	(\$9.81)	(\$2.00)
Diluted income per share	(\$406.27)	(\$55.12)	(\$8.98)	(\$9.27)	(\$5.79)	(\$5.27)	(\$27.59)	(\$4.78)	(\$3.73)	(\$1.74)	(\$1.33)	(\$9.81)	(\$2.00)
Basic shares outstanding	16	319	503	581	838	902	707	1,043	1,128	1,883	2,211	1,570	6,000
Diluted shares outstanding	16	319	503	581	838	902	707	1,043	1,128	1,883	2,211	1,570	6,000
Key ratios:													
Revenue growth		-23.5%	128.0%	215.3%	-22.5%	-24.3%	27.5%	-28.3%	-40.5%	-1.9%	-1.6%	-20.2%	12.1%
Product gross margin	65.6%	56.3%	53.6%	58.1%	45.2%	52.5%	52.9%	42.1%	42.3%	38.6%	44.7%	41.8%	45.0%
Service gross margin	-9.9%	-205.0%	-143.9%	-443.3%	-124.9%	-119.4%	-175.8%	-522.4%	-396.9%	-441.6%	-31153.8%	-1140.1%	138.9%
R&D/revenue	105.9%	190.1%	172.8%	189.4%	286.8%	231.9%	214.0%	275.0%	250.6%	203.1%	149.9%	214.4%	138.9%
G & A/revenue	56.1%	184.8%	142.9%	150.2%	215.9%	163.7%	164.0%	255.2%	248.9%	214.8%	137.9%	208.2%	200.0%
Sales/revenue	49.9%	136.3%	130.0%	134.3%	170.4%	123.9%	137.3%	143.3%	129.3%	44.3%	40.6%	85.6%	44.4%
Tax Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Deprec, amort & non-cash comp.	2,277	4,200	250	600	450	425	1,725	400	400	450	500	1,750	2,000
Cash Flow/share	(\$259.40)	(\$41.97)	(\$8.48)	(\$8.24)	(\$5.25)	(\$4.80)	(\$25.15)	(\$4.39)	(\$3.37)	(\$1.50)	(\$1.10)	(\$8.69)	(\$1.67)
EBITDA/share	(\$261.98)	(\$42.09)	(\$8.56)	(\$8.30)	(\$5.30)	(\$4.84)	(\$25.21)	(\$4.43)	(\$3.41)	(\$1.52)	(\$1.12)	(\$8.72)	(\$1.68)

**Balance Sheets**

(\$000s)

Assets:	12/31/17	6/30/18
Cash and equivalents	\$1,847	\$7,429
Accounts receivable, net	810	516
Inventory, net	533	614
Prepaid expenses & other	312	525
Total current	3,502	9,085
Property, plant & equip., net	836	932
Goodwill and intangible assets, net	1,954	1,820
Other noncurrent assets	329	289
TOTAL ASSETS	\$6,620	\$12,127
Liabilities:		
Accounts payable	\$1,692	\$1,283
Accrued expenses	1,908	2,246
Deferred revenue	24	14
Short-term notes payable	1,011	477
Other	155	248
Total current	4,790	4,268
Note payable	0	826
Deferred rent and other long-term	429	634
Total liabilities	5,219	5,728
Stockholders' equity	1,401	6,399
TOTAL LIAB & EQ	\$6,620	\$12,127

**Quarterly Earnings Comparisons**

	March	June	September	December	Total
<b>Revenues (in \$Mill)</b>					
2014					\$4,126
2015	472	375	981	1,330	3,158
2016	1,077	1,183	760	1,007	4,026
2017	772	703	745	991	3,211
2018E	846	789			3,600
<b>Earnings per Share (diluted)</b>					
2014					(406.27)
2015	(140.18)	(21.05)	(9.52)	(9.43)	(55.12)
2016	(8.98)	(9.27)	(5.79)	(5.27)	(27.59)
2017	(4.78)	(3.73)	(1.74)	(1.33)	(9.81)
2018E	(0.75)	(0.57)			(2.00)

Source: Dawson James Securities, Inc. estimates; Company documents

**Important Disclosures:**

**Price Chart:**



Price target and ratings changes over the past 3 years:

Initiated – Buy - June 19, 2017 – Price Target \$2.00  
 Updated – Buy – August 6, 2018 – Price Target \$3.20 (reverse stock split)

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	# of Companies	% of Total	# of Companies	% of Totals
Market Outperform (Buy)	23	88%	7	30%
Market Perform (Neutral)	3	12%	0	0%
Market Underperform (Sell)	0	0%	0	0%
<b>Total</b>	<b>26</b>	<b>100%</b>	<b>7</b>	<b>27%</b>

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