

SECURITIES AND EXCHANGE COMMISSION
Washington D.C. 20549

FORM S-3
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

Lantheus Holdings, Inc.

(Exact Name of Registrant as Specified in Its Charter)

Delaware
(State or Other Jurisdiction of
Incorporation or Organization)

35-2318913
(I.R.S. Employer
Identification Number)

331 Treble Cove Road
North Billerica, Massachusetts 01862
(978) 671-8001
(Address, Including Zip Code, and Telephone Number, Including Area Code, of Registrant's Principal Executive Offices)

Michael P. Duffy
Senior Vice President, Strategy & Business Development,
General Counsel and Secretary
331 Treble Cove Road, Building 600-2
North Billerica, Massachusetts 01862
(978) 671-8001
(Name, Address, Including Zip Code, and Telephone Number, Including Area Code, of Agent For Service)

Copy to:

Craig E. Marcus
Ropes & Gray LLP
Prudential Tower
800 Boylston Street
Boston, MA 02199-3600
(617) 951-7000 (Phone)
(617) 951-7050 (Fax)

Approximate date of commencement of proposed sale to the public: From time to time after this registration statement becomes effective.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box.

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

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

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box.

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box.

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

Large accelerated filer

Accelerated filer

Non-accelerated filer (Do not check if a smaller reporting company)

Smaller reporting company

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to be Registered	Amount to be Registered	Proposed Maximum Offering Price per Unit	Proposed Maximum Aggregate Offering Price	Amount of registration fee
Primary Offering:				
Common Stock, par value \$0.01 per share	(1)(2)	(1)(2)	(3)	—
Preferred Stock, par value \$0.01 per share	(1)(2)	(1)(2)	(3)	—
Warrants	(1)	(1)	(3)	—
Units	(1)	(1)	(3)	—
Total Primary Offering			\$50,000,000(4)	\$5,035(5)
Secondary Offering:				
Common Stock, par value \$0.01 per share	17,793,599(2)	(2)(6)	\$64,412,828.38(7)	\$6,487(8)
Total Registration Fee (Primary and Secondary)			\$114,412,828.38	\$11,522

- There is being registered hereunder an indeterminate number of shares of common stock, \$0.01 par value (the "Common Stock"), and preferred stock, \$0.01 par value (the "Preferred Stock") that may be issued by the registrant at various times and at indeterminate prices, and an indeterminate principal amount of warrants and units that may be issued by the registrant at various times and at indeterminate prices. The proposed amount to be registered and the maximum aggregate offering price per unit of Common Stock, Preferred Stock, warrants and units will be determined from time to time by the registrant in connection with the issuance by the registrant.
- Pursuant to Rule 416 under the Securities Act of 1933, as amended (the "Securities Act"), the shares of Common Stock and Preferred Stock being registered hereunder include such indeterminate number of shares of Common Stock and Preferred Stock as may be issuable by the registrant with respect to the shares being registered hereunder as a result of stock splits, stock dividends or similar transactions.
- With respect to the primary offering, the proposed maximum aggregate offering price for each class of securities to be registered is not specified pursuant to General Instruction II.D. of Form S-3.
- With respect to the primary offering, in no event will the aggregate initial offering price of all securities offered from time to time pursuant to the prospectus included as a part of this registration statement exceed \$50,000,000.
- Calculated in accordance with Rule 457(o) under the Securities Act.
- With respect to the secondary offering, the proposed maximum offering price per share of Common Stock will be determined from time to time in connection with, and at the time of, the sale by the holder of such securities.
- Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(c) under the Securities Act on the basis of the average of the high and low sales prices of the shares of Common Stock on August 3, 2016 of \$3.62, as reported on the NASDAQ Global Market.

(8) Calculated in accordance with Rule 457(a) under the Securities Act.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

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The information in this prospectus is not complete and may be changed. We or the selling stockholders may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

Subject to completion, dated August 5, 2016

PROSPECTUS



Lantheus Holdings, Inc.

\$50,000,000

**Common Stock
Preferred Stock
Warrants
Units**

Selling Stockholders

17,793,599 Shares of Common Stock

We, Lantheus Holdings, Inc., may from time to time, in one or more offerings, offer and sell (i) common stock, (ii) preferred stock, (iii) warrants and (iv) units or any combination of these securities. Specific terms of these securities will be provided in supplements to this prospectus. The aggregate offering price of all securities sold by Lantheus Holdings, Inc. under this prospectus will not exceed \$50,000,000.

In addition, the selling stockholders named in this prospectus may from time to time, in one or more offerings, offer and sell up to 17,793,599 shares of common stock. We will not receive any proceeds from the sale of our common stock by the selling stockholders.

Our common stock is listed on NASDAQ Global Market under the symbol "LNTH." On August 4, 2016, the closing price of our common stock was \$3.89 per share. We have not yet determined whether the other securities that may be offered by this prospectus will be listed on any exchange, interdealer quotation system or over-the-counter market. If we decide to seek the listing of any such securities upon issuance, the prospectus supplement relating to those securities will disclose the exchange, quotation system or market on which those securities will be listed.

We or the selling stockholders may offer and sell these securities to or through one or more underwriters, dealers and agents, or directly to investors, in amounts, at prices and on terms to be determined by market conditions and other factors at the time of the offering. This prospectus describes only the general terms of these securities and the general manner in which we or the selling stockholders will offer the securities. The specific terms of any securities we or the selling stockholders offer will be included in a supplement to this prospectus. The prospectus supplement will also describe the specific manner in which we or the selling stockholders will offer the securities. Any prospectus supplement may also add, update or change information contained in this prospectus.

You should carefully read this prospectus and any accompanying prospectus supplement, together with the documents we incorporate by reference, before you invest in our securities.

Investing in these securities involves risks that are described in "Item 1A. Risk Factors" of our Annual Report on Form 10-K for the year ended December 31, 2015 and our Quarterly Reports on Form 10-Q for the quarterly periods ended March 31, 2016 and June 30, 2016, which are incorporated by reference herein.

Neither the Securities and Exchange Commission nor any other state securities commission has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

The date of this prospectus is _____, 2016

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You should rely only on the information contained in this prospectus or in any free-writing prospectus we may authorize to be delivered or made available to you. Neither we, nor the selling stockholders nor the underwriters (or any of our or their respective affiliates) have authorized anyone to provide any information other than that contained or incorporated by reference in this prospectus or in any free writing prospectus prepared by or on behalf of us or to which we have referred you. Neither we, nor the selling stockholders nor the underwriters (or any of our or their respective affiliates) take any responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We, the selling stockholders and the underwriters (or any of our or their respective affiliates) are not making an offer to sell these securities in any jurisdiction where the offer or sale is not permitted. The information contained in this prospectus is only accurate as of the date on the front cover page of this prospectus. Our business, financial condition, results of operations and prospectus may have changed since that date.

Unless the context otherwise indicates, the terms “Lantheus,” the “Company,” “we,” “us” and “our” used in this prospectus refer to Lantheus Holdings, Inc. and all of its subsidiaries, and the phrase “this prospectus” refers to this prospectus and any applicable prospectus supplement(s).

ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the Securities and Exchange Commission (the “SEC”) utilizing a “shelf” registration process. Under this shelf registration process, we may, over time, offer and sell up to \$50,000,000 in total aggregate offering price of any combination of the securities described in this prospectus, in one or more offerings and at prices and on terms that we determine at the time of the offering. In addition, the selling stockholders may offer and sell, from time to time, in one or more offerings, up to 17,793,599 shares of our common stock. This prospectus provides you with a general description of the securities we or a selling stockholder may offer. Each time we or the selling stockholders offer and sell any of the securities described in this prospectus, we will provide a prospectus supplement along with this prospectus that will contain specific information about the terms of that particular offering by us or the selling stockholders. The accompanying prospectus supplement may also add, update or change information contained in this prospectus. If the information varies between this prospectus and the accompanying prospectus supplement, you should rely on the information in the accompanying prospectus supplement. You should read both this prospectus and the accompanying prospectus supplement together with the additional information described under “Where You Can Find More Information.” You should also carefully consider, among other things, the matters discussed in the section entitled “Risk Factors.”

THIS PROSPECTUS MAY NOT BE USED TO SELL ANY SECURITIES UNLESS ACCOMPANIED BY A PROSPECTUS SUPPLEMENT.

FORWARD-LOOKING STATEMENTS

Some of the statements contained in this prospectus are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. We may also make forward-looking statements in other reports filed with the SEC, in materials delivered to stockholders and in press releases. In addition, our representatives may from time to time make oral forward-looking statements. These forward-looking statements, including, in particular, statements about our plans, strategies, prospects and industry estimates are subject to risks and uncertainties. These statements identify prospective information and include words such as “anticipates,” “intends,” “plans,” “seeks,” “believes,” “estimates,” “expects,” “should,” “could,” “predicts,” “targets,” “hopes” and similar expressions. Examples of forward-looking statements include, but are not limited to, statements we make regarding: (i) our outlook and expectations including, without limitation, in connection with continued market expansion and penetration for our commercial products, particularly DEFINITY, in the face of increased competition; (ii) our outlook and expectations in connection with future performance of Xenon in the face of increased competition; (iii) our outlook and expectations related to products manufactured at Jubilant HollisterStier, or JHS, and Pharmeducence and global isotope supply; (iv) our outlook and expectations related to our engagement of strategic partners to assist in developing and potentially commercializing development candidates; and (v) our liquidity, including our belief that our existing cash, cash equivalents, anticipated revenues and availability under our revolving facility, are sufficient to fund our existing operating expenses, capital expenditures and liquidity requirements for at least the next twelve months.

Forward-looking statements are based on our current expectations and assumptions regarding our business, the economy and other future conditions. Because forward-looking statements relate to the future, they are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict. Our actual results may differ materially from those contemplated by the forward-looking statements. They are neither statements of historical fact nor guarantees or assurances of future performance. The matters referred to in the forward-looking statements contained or incorporated by reference in this prospectus may not in fact occur. We caution you therefore against relying on any of these forward-looking statements.

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Important factors that could cause actual results to differ materially from those in the forward-looking statements include regional, national or global political, economic, business, competitive, market and regulatory conditions and the following:

- our ability to continue to increase segment penetration for DEFINITY in suboptimal echocardiograms and the increased segment competition from other echocardiography contrast agents;
- risks associated with revenues and unit volumes for Xenon in pulmonary studies with increased segment competition resulting from Mallinckrodt's recent re-launch of their Xenon product;
- our dependence on key customers and group purchasing organization arrangements for our medical imaging products, and our ability to maintain and profitably renew our contracts and relationships with those key customers and group purchasing organizations;
- our dependence upon third parties for the manufacture and supply of a substantial portion of our products, including for DEFINITY at JHS;
- risks associated with the technology transfer programs to secure production of our products at alternate contract manufacturer sites, including for DEFINITY at Pharamalucence where activities have been significantly delayed;
- risks associated with the manufacturing and distribution of our products and the regulatory requirements related thereto;
- the instability of the global Molybdenum-99, or Moly, supply;
- the dependence of certain of our customers upon third party healthcare payors and the uncertainty of third party coverage and reimbursement rates;
- uncertainties regarding the impact of U.S. healthcare reform on our business, including related reimbursements for our current and potential future products;
- our being subject to extensive government regulation and our potential inability to comply with those regulations;
- potential liability associated with our marketing and sales practices;
- the occurrence of any side effects with our products;
- our exposure to potential product liability claims and environmental liability;
- risks associated with our lead agent in development, flurpiridaz F 18, including our ability to:
 - attract strategic partners to successfully complete the Phase 3 clinical program and possibly commercialize the agent;
 - obtain Food and Drug Administration, or FDA, approval; and
 - gain post-approval market acceptance and adequate reimbursement;
- risks associated with being able to negotiate in a timely manner relationships with potential strategic partners to advance our other development programs on acceptable terms, or at all;
- the extensive costs, time and uncertainty associated with new product development, including further product development relying on external development partners, all against an evolving diagnostic landscape;
- our inability to protect our intellectual property and the risk of claims that we have infringed on the intellectual property of others;
- risks associated with prevailing economic conditions and financial, business and other factors beyond our control;
- risks associated with our international operations;
- our inability to adequately protect our facilities, equipment and technology infrastructure;

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- our inability to hire or retain skilled employees and key personnel;
- risks related to our outstanding indebtedness and our ability to satisfy those obligations;
- costs and other risks associated with the Sarbanes-Oxley Act and the Dodd-Frank Act;
- our inability to utilize, or limitations in our ability to utilize, net operating loss carryforwards to reduce our future tax liability; and
- risks related to the ownership of our common stock.

Factors that could cause or contribute to such differences include, but are not limited to, those that are discussed in other documents we file with the SEC. Any forward-looking statement made by us in or through incorporation by reference in this prospectus speaks only as of the date on which it is made. Factors or events that could cause our actual results to differ may emerge from time to time, and it is not possible for us to predict all of them. We undertake no obligation to publicly update any forward-looking statement, whether as a result of new information, future developments or otherwise, except as may be required by law.

WHERE YOU CAN FIND MORE INFORMATION

We are required to file annual, quarterly and current reports, proxy statements, and other information with the SEC. We make these documents publicly available, free of charge, on our website at www.lantheus.com as soon as reasonably practicable after filing such documents with the SEC. You may also read and copy any document that we file at the Public Reference Room of the SEC located at 100 F Street, N.E., Washington, D.C. 20549. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. In addition, the SEC maintains an Internet site at <http://www.sec.gov>, from which interested persons can electronically access our SEC filings, including the registration statement and the exhibits and schedules thereto.

The SEC allows us to “incorporate by reference” the information we file with them, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is an important part of this prospectus. We incorporate by reference the documents listed below and all documents we file pursuant to Section 13(a), 13(c), 14, or 15(d) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), (i) on or after the date of this prospectus and prior to the termination of the offering under this prospectus and any prospectus supplement and (ii) after the date of the filing of this registration statement and prior to its effectiveness (other than, in each case, documents or information deemed to have been “furnished” and not “filed” in accordance with SEC rules).

- Annual Report on Form 10-K for the year ended December 31, 2015, which was filed with the SEC on March 2, 2016;
- Definitive Proxy Statement on Schedule 14A for our 2016 Annual Meeting of Stockholders which was filed with the SEC on March 28, 2016 (but only the information set forth therein that is incorporated by reference into Part III of our Annual Report on Form 10-K for the year ended December 31, 2015);
- Quarterly Reports on Form 10-Q for the quarterly periods ended March 31, 2016 and June 30, 2016 which were filed with the SEC on May 3, 2016 and August 4, 2016, respectively;
- Current Reports on Form 8-K which were filed with the SEC on January 13, 2016, March 8, 2016, March 28, 2016 and April 28, 2016; and
- The description of our common stock contained in the registration statement on Form 8-A which was filed with the SEC on July 25, 2014, and any amendment or report we may file with the SEC for the purpose of updating such description.

Any statement in a document incorporated by reference into this prospectus will be deemed to be modified or superseded for purposes of this prospectus to the extent a statement contained in this or any other subsequently

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filed document that is incorporated by reference into this prospectus modifies or supersedes such statement. Any statement so modified or superseded will be not deemed, except as so modified or superseded, to constitute a part of this prospectus.

You may request, and we will provide, a copy of these filings at no cost by writing or telephoning us at:

Lantheus Holdings, Inc.
331 Treble Cove Road
North Billerica, Massachusetts 01862
(978) 671-8001
Attn: Investor Relations

THE COMPANY

We are a global leader in the development, manufacture and commercialization of innovative diagnostic medical imaging agents and products that assist clinicians in the diagnosis and treatment of cardiovascular and other diseases. Our agents are routinely used to diagnose coronary artery disease, congestive heart failure, pulmonary issues, stroke and other diseases. Clinicians use our imaging agents and products across a range of imaging modalities, including echocardiography and nuclear imaging. We believe that the resulting improved diagnostic information enables healthcare providers to better detect and characterize, or rule out, disease, potentially achieving improved patient outcomes, reducing patient risk and limiting overall costs for payers and the entire healthcare system.

Our commercial products are used by cardiologists, nuclear physicians, radiologists, internal medicine physicians, sonographers and technologists working in a variety of clinical settings. We sell our products to radiopharmacies, hospitals, clinics, group practices, integrated delivery networks and group purchasing organizations.

We sell our products globally and have operations in the United States, Puerto Rico, Canada and Australia and third-party distribution relationships in Europe, Asia Pacific and Latin America.

We were founded in 1956 as New England Nuclear Corporation, and our medical imaging business was purchased by E. I. du Pont de Nemours and Company ("DuPont") in 1981. Bristol-Myers Squibb Company ("BMS") subsequently acquired our medical imaging business from DuPont as part of its acquisition of DuPont Pharmaceuticals in 2001. In January 2008, Avista Capital Partners, L.P., Avista Capital Partners (Offshore), L.P. and ACP-Lantern Co-Invest, LLC (collectively, "Avista") acquired our medical imaging business from BMS through Lantheus Holdings, Inc. Lantheus Holdings, Inc. is a Delaware corporation, which was incorporated in 2007 for purposes of acquiring our medical imaging business and operating it through its wholly owned subsidiary, Lantheus Medical Imaging, Inc., and is headquartered in North Billerica, Massachusetts. Our principal executive offices are located at 331 Treble Cove Road, North Billerica, Massachusetts 01862, and our telephone number at that address is (978) 671-8001. Our corporate website is www.lantheus.com. The information on our web site is not part of, and is not incorporated by reference into, this prospectus.

RISK FACTORS

Investment in our securities involves a high degree of risk. You should consider carefully the risk factors discussed in the sections entitled "Risk Factors" contained in our Annual Report on Form 10-K for the year ended December 31, 2015, and in our most recent Quarterly Reports on Form 10-Q filed with the SEC and in any Quarterly Report on Form 10-Q filed subsequent hereto and other filings we make with the SEC from time to time, each of which is incorporated herein by reference in its entirety, as well as other information in or incorporated by reference in this prospectus and the "Risk Factors" section in the applicable prospectus supplement, before purchasing any of our securities. Each of these risk factors, as well as any additional risks and uncertainties not known to us or currently deemed immaterial, could adversely affect our business, operating results and financial condition, as well as adversely affect the value of an investment in our securities. In that event, the trading price of our common stock could decline, and you could lose all or part of your investment.

USE OF PROCEEDS

Unless otherwise indicated in a prospectus supplement, the net proceeds from the sale of the securities offered by us in this prospectus will be used for general corporate purposes, including working capital, paydown of then-existing debt, acquisitions and other business purposes. We may also invest the proceeds in certificates of deposit, United States government securities, certain other interest-bearing securities or money market securities. If we decide to use the net proceeds from a particular offering of securities for a specific purpose other than as set forth above, we will describe that in the related prospectus supplement.

We will not receive any proceeds from the sale of our common stock by the selling stockholders.

RATIO OF COMBINED FIXED CHARGES AND PREFERENCE DIVIDENDS TO EARNINGS

If we offer preferred stock under this prospectus, then we will, at that time, provide a ratio of combined fixed charges and preference dividends to earnings in the applicable prospectus supplement for such offering.

SELLING STOCKHOLDERS

The selling stockholders indicated below may resell from time to time up to 17,793,599 shares of our common stock (plus an indeterminate number of shares of our common stock that may be issued upon stock splits, stock dividends or similar transactions in accordance with Rule 416 under the Securities Act). Unless the context otherwise requires, as used in this prospectus, “selling stockholders” includes the selling stockholders named in the table below and donees, pledgees, transferees or other successors-in-interest selling shares received from the selling stockholders as a gift, pledge, partnership distribution or other transfer after the date of this prospectus, and any such persons will be named in the applicable prospectus supplement.

The following table, based upon information currently known by us, sets forth as of August 4, 2016: (i) the number of shares of common stock held of record or beneficially by the selling stockholders as of such date (as determined below) and (ii) the number of shares that may be offered under this prospectus by the selling stockholders. The beneficial ownership of the common stock set forth in the following table is determined in accordance with Rule 13d-3 under the Exchange Act, and the information is not necessarily indicative of beneficial ownership for any other purpose.

<u>Name of Selling Stockholders</u>	<u>Common Stock</u>		<u>Beneficially Owned upon Completion of this Offering(1)</u>	<u>Percentage Of Common Stock Beneficially Owned upon Completion of this Offering(1)</u>
	<u>Beneficially Owned as of August 4, 2016(1)</u>	<u>Offered Pursuant to this Prospectus(1)</u>		
Avista Capital Partners, L.P. and related funds(2)	17,793,599	17,793,599	—	—

- (1) We do not know when or in what amounts the selling stockholders may offer shares of common stock for sale. The selling stockholders may decide not to sell any or all of the shares offered by this prospectus. Because the selling stockholders may offer all or some of the shares pursuant to this offering, we cannot estimate the number of the shares that will be held by the selling stockholders after completion of the offering. However, for purposes of this table, we have assumed that, after completion of the offering, none of the shares covered by this prospectus will be held by the selling stockholders.
- (2) The shares included in the table consist of: 10,138,072 shares held by Avista Capital Partners, L.P., 2,673,319 shares held by Avista Capital Partners (Offshore), L.P. and 4,982,208 shares held by ACP-Lantern Co-Invest, LLC (collectively, the “Avista Funds”). Avista Capital Partners GP, LLC (“ACP GP”) serves as the general partner of Avista Capital Partners, L.P. and Avista Capital Partners (Offshore), L.P. and as the managing member of ACP-Lantern Co-Invest, LLC. By virtue of the relationships described above, ACP GP may be deemed to share beneficial ownership of the shares held by the Avista Funds. Voting and disposition decisions at ACP GP with respect to the shares held by the Avista Funds are made by an investment committee, the members of which include David Burgstahler and Sriram Venkataraman, each of whom serves as a director of the Company. Each of the members of the investment committee disclaims beneficial ownership of the shares held by the Avista Funds. The address for each of these entities is c/o Avista Capital Holdings, LP, 65 East 55th Street, 18th Floor, New York, NY 10022.

DESCRIPTION OF CAPITAL STOCK

The following is a description of the material terms of our amended and restated certificate of incorporation, bylaws and other rights of holders of our capital stock, including our Shareholders Agreements (defined herein) as currently in effect. We refer you to our amended and restated certificate of incorporation, bylaws and Shareholders Agreements, copies of which are incorporated by reference herein.

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Authorized Capitalization

Our authorized capital stock consists of 250,000,000 shares of common stock, par value \$0.01 per share, and 25,000,000 shares of preferred stock, par value \$0.01 per share, of which 30,387,768 shares of common stock and no shares of preferred stock are issued and outstanding as of August 1, 2016.

Common Stock

Holders of our common stock are entitled to the following rights.

Voting Rights

Each share of common stock entitles the holder to one vote with respect to each matter presented to our stockholders on which the holders of common stock are entitled to vote; provided, however, that the Board of Directors may issue or grant shares of common stock that are subject to vesting or forfeiture and that restrict or eliminate voting rights with respect to such shares until any such vesting criteria is satisfied or such forfeiture provisions lapse. Our common stock votes as a single class on all matters relating to the election and removal of directors on our Board of Directors and as provided by law. Holders of our common stock do not have cumulative voting rights. Except as otherwise provided in our amended and restated certificate of incorporation or our bylaws or required by law, all matters to be voted on by our stockholders must be approved by a majority of the shares present in person or by proxy at the meeting and entitled to vote on the subject matter.

Dividend Rights

Holders of common stock will share equally on a per share basis in any dividend declared by our Board of Directors, subject to any preferential rights of the holders of any outstanding preferred stock.

Liquidation Rights

In the event of any voluntary or involuntary liquidation, dissolution or winding up of our affairs, holders of our common stock would be entitled to share ratably in our assets that are legally available for distribution to stockholders after payment of liabilities. If we have any preferred stock outstanding at that time, holders of the preferred stock may be entitled to distribution and/or liquidation preferences. In either case, we must pay the applicable distribution to the holders of our preferred stock before we may pay distributions to the holders of our common stock.

Other Rights

Our stockholders have no subscription privileges. Our common stock does not entitle its holders to preemptive rights for additional shares. All of the outstanding shares of our common stock are fully paid and nonassessable. The rights, preferences and privileges of the holders of our common stock are subject to the rights of the holders of shares of any series of preferred stock which we may issue.

Preferred Stock

Our Board of Directors is authorized to provide for the issuance of preferred stock in one or more series and to fix the preferences, powers and relative, participating, optional or other special rights, and qualifications, limitations or restrictions thereof, including the dividend rate, conversion rights, voting rights, redemption rights and liquidation preference and to fix the number of shares to be included in any such series without any further vote or action by our stockholders. Any preferred stock so issued may rank senior to our common stock with respect to the payment of dividends or amounts upon liquidation, dissolution or winding up, or both. In addition, any such shares of preferred stock may have class or series voting rights. The issuance of preferred stock may have the effect of delaying, deferring or preventing a change in control of our Company without further action by the stockholders and may adversely affect the voting and other rights of the holders of our common stock.

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Registration Rights

Avista and certain of our stockholders have certain registration rights with respect to our common stock pursuant to our Shareholders Agreements, described below.

Shareholders Agreements

In connection with Avista's original acquisition of the Company's business, the Company entered into (i) a Shareholders Agreement with Avista and certain management stockholders, dated January 8, 2008 and subsequently amended and restated on February 26, 2008 and further amended on June 25, 2015 in connection with the consummation of our initial public offering (the "Initial Shareholders Agreement"), and (ii) an Employee Shareholders Agreement with Avista and certain employee stockholders named therein, dated as of May 30, 2008 and subsequently amended on June 25, 2015 in connection with the consummation of our initial public offering (the "Employee Shareholders Agreement," and, collectively with the Initial Shareholders Agreement, the "Shareholders Agreements"). Certain current directors, including Brian Markison and Samuel Leno are management stockholder parties to the Initial Shareholders Agreement, and our executive officers are parties to the Employee Shareholders Agreement.

The Shareholders Agreements govern the parties' respective rights, duties and obligations with respect to the ownership of Company securities. The Initial Shareholders Agreement currently provides demand registration rights in favor of Avista and piggy-back registration rights in favor of Avista and the management stockholders. Pursuant to certain option award agreements granted prior to the completion of our initial public offering between the Company and its options holders, as a condition to a valid exercise of any such options, the optionee is obligated to join either the Initial Shareholders Agreement or the Employee Shareholders Agreement, as applicable, with respect to the shares of common stock received upon exercise of any such option. The Initial Shareholders Agreement also provides Avista with the right to nominate two directors to the Board of Directors for so long as it beneficially owns 25% or more of our issued and outstanding shares of common stock, and the right to nominate one director for election to our Board of Directors for so long as it beneficially owns 10% or more, but less than 25%, of our issued and outstanding shares of common stock.

Anti-takeover Provisions

Our amended and restated certificate of incorporation and bylaws contain provisions that delay, defer or discourage transactions involving an actual or potential change in control of us or change in our management. We expect that these provisions, which are summarized below, will discourage coercive takeover practices or inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our Board of Directors, which we believe may result in an improvement of the terms of any such acquisition in favor of our stockholders. However, they also give our board the power to discourage transactions that some stockholders may favor, including transactions in which stockholders might otherwise receive a premium for their shares or transactions that our stockholders might otherwise deem to be in their best interests. Accordingly, these provisions could adversely affect the price of our common stock.

Classified Board

Our amended and restated certificate of incorporation provides that our board is comprised of such number of directors as may be fixed from time to time by resolution of at least a majority of our Board of Directors then in office and that our board is divided into three classes, with one class being elected at each annual meeting of stockholders. Each director serves a three-year term, with termination staggered according to class. Class I currently consists of three directors, Class II currently consists of three directors and Class III currently consists of two directors. Our board currently consists of eight directors.

The classification of our board could make it more difficult for a third-party to acquire, or discourage a third party from seeking to acquire, control of our Company.

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Requirements for Advance Notification of Stockholder Meetings, Nominations and Proposals

Our bylaws provide that special meetings of the stockholders may be called only upon the request of a majority of our board or upon the request of the chairman of our Board of Directors or our Chief Executive Officer. In addition, for so long as, and only if, Avista beneficially owns at least 50.1% of the then outstanding shares of our common stock, stockholders may call a special meeting of the stockholders.

Our bylaws establish advance notice procedures with respect to stockholder proposals and the nomination of candidates for election as directors, other than nominations made by or at the direction of our board or a committee of our board. In order for any matter to be “properly brought” before a meeting, a stockholder will have to comply with the advance notice requirements of directors. Our bylaws allow our Board of Directors to adopt such rules and regulations for the conduct of the meetings as they may deem proper, which may be delegated to a chairperson of the meeting and which may have the effect of precluding the conduct of certain business at a meeting if the rules and regulations are not followed. These provisions may also defer, delay or discourage a potential acquirer from conducting a solicitation of proxies to elect the acquirer’s own slate of directors or otherwise attempting to obtain control of our Company.

No Stockholder Action by Written Consent

Our amended and restated certificate of incorporation provides that, subject to the rights of any holders of preferred stock to act by written consent instead of a meeting, stockholder action may be taken only at an annual meeting or special meeting of stockholders and may not be taken by written consent instead of a meeting, unless Avista owns at least a majority of our outstanding common stock, or the action to be taken by written consent of stockholders and the taking of this action by written consent has been unanimously approved in advance by our board. Failure to satisfy any of the requirements for a stockholder meeting could delay, prevent or invalidate stockholder action.

Section 203 of the Delaware General Corporation Law, as amended (“DGCL”)

Our amended and restated certificate of incorporation provides that the provisions of Section 203 of the DGCL, which relate to business combinations with interested stockholders, do not apply to us. Section 203 of the DGCL prohibits a publicly held Delaware corporation from engaging in a business combination transaction with an interested stockholder (a stockholder who owns more than 15% of our common stock) for a period of three years after the interested stockholder became such unless the transaction fits within an applicable exemption, such as board approval of the business combination or the transaction that resulted in such stockholder becoming an interested stockholder. These provisions would apply even if the business combination could be considered beneficial by some stockholders. Although we have elected to opt out of the statute’s provisions, we could elect to be subject to Section 203 in the future.

Exclusive Forum

Our amended and restated certificate of incorporation provides that, unless we consent in writing in advance to the selection of an alternative forum, the Delaware Court of Chancery shall, to the fullest extent permitted by law, be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by, or any wrongdoing by, any of our directors, officers or employees to our stockholders, (iii) any action asserting a claim arising pursuant to any provision of the DGCL, our amended and restated certificate of incorporation (including as it may be amended from time to time) or our bylaws, (iv) any action to interpret, apply, enforce or determine the validity of our amended and restated certificate of incorporation or our bylaws, or (v) any action asserting a claim governed by the internal affairs doctrine. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions of our amended and restated certificate of incorporation described above. This choice of forum provision may limit a stockholder’s ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage lawsuits with respect to such claims. However, it is possible that a court could rule that this provision is unenforceable or inapplicable.

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Corporate Opportunities

Our amended and restated certificate of incorporation provides that Avista and its affiliates have no obligation to offer us an opportunity to participate in business opportunities presented to Avista or its affiliates even if the opportunity is one that we might reasonably have pursued (and therefore may be free to compete with us in the same business or similar businesses), and that neither Avista nor its affiliates will be liable to us or our stockholders for breach of any duty by reason of any of those activities unless, in the case of any person who is a director or officer of our Company, such business opportunity is expressly offered to such director or officer in writing solely in his or her capacity as an officer or director of our Company.

Listing

Our common stock is listed on the NASDAQ Global Market under the symbol “LNTH.”

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Computershare Trust Company, N.A.

DESCRIPTION OF WARRANTS

The following description of the warrant agreements summarizes certain general terms that will apply to the warrants that we may issue. The description is not complete, and we refer you to the warrant agreements, which will be filed with the SEC promptly after the offering of any warrants and will be available as described under the heading “Where You Can Find More Information” in this prospectus.

We may issue warrants to purchase common stock, preferred stock or other securities. We may issue warrants independently or as part of a unit with other securities. Warrants sold with other securities as a unit may be attached to or separate from the other securities. We will issue warrants under one or more warrant agreements between us and a warrant agent that we will name in the applicable prospectus supplement.

The prospectus supplement relating to any warrants we are offering will include specific terms relating to the offering, including a description of any other securities sold together with the warrants. These terms will include some or all of the following:

- the title of warrants;
- the aggregate number of warrants offered;
- the price or prices at which the warrants will be issued;
- the currency or currencies, including composite currencies, in which the prices of the warrants may be payable;
- the designation, number and terms of the common stock, preferred stock or other securities or rights, including rights to receive payment in cash or securities based on the value, rate or price of one or more specified commodities, currencies or indices, purchasable upon exercise of the warrants and procedures by which those numbers may be adjusted;
- the dates or periods during which the warrants are exercisable;
- the designation and terms of any securities with which the warrants are issued as a unit;
- if the warrants are issued as a unit with another security, the date on and after which the warrants and the other security will be separately transferable;
- if the exercise price is not payable in U.S. dollars, the foreign currency, currency unit or composite currency in which the exercise price is denominated;
- any minimum or maximum amount of warrants that may be exercised at any one time;

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- any terms relating to the modification of the warrants; and
- any other terms of the warrants, including terms, procedures and limitations relating to the transferability, exchange, exercise or redemption of the warrants.

Holders of equity warrants will not be entitled to:

- vote, consent or receive dividends;
- receive notice as stockholders with respect to any meeting of stockholders for the election of our directors or any other matter; or
- exercise any rights as stockholders of Lantheus.

Each warrant will entitle its holder to purchase the principal amount of the number of shares of preferred stock or common stock at the exercise price set forth in, or calculable as set forth in, the applicable prospectus supplement. Unless we otherwise specify in the applicable prospectus supplement, holders of the warrants may exercise the warrants at any time up to the specified time on the expiration date that we set forth in the applicable prospectus supplement. After the close of business on the expiration date, unexercised warrants will become void.

A holder of warrant certificates may exchange them for new warrant certificates of different denominations, present them for registration of transfer and exercise them at the corporate trust office of the warrant agent or any other office indicated in the applicable prospectus supplement. Until any warrants to purchase common stock or preferred stock are exercised, the holders of the warrants will not have any rights of holders of the underlying common stock or preferred stock.

DESCRIPTION OF UNITS

The following description of the units and any applicable underlying security or pledge or depository arrangements summarizes certain general terms that will apply to the applicable agreements. The description is not complete, and we refer you to the applicable agreements, which will be filed with the SEC promptly after the offering of any units and will be available as described under the heading “Where You Can Find More Information” in this prospectus.

We may issue units comprised of one or more of the other securities described in this prospectus in any combination. Each unit may also include debt obligations of third parties, such as U.S. Treasury securities. Each unit will be issued so that the holder of the unit is also the holder of each security included in the unit. Thus, the holder of a unit will have the rights and obligations of a holder of each included security. The prospectus supplement relating to any units we are offering will include specific terms relating to the offering, including a description of any other securities sold together with the units. These terms will include some or all of the following:

- the title of the series of units;
- identification and description of the separate constituent securities comprising the units;
- the price or prices at which the units will be issued;
- the date, if any, on and after which the constituent securities comprising the units will be separately transferable;
- a discussion of certain U.S. federal income tax considerations applicable to the units; and
- any other terms of the units and their constituent securities.

PLAN OF DISTRIBUTION

We are registering securities, with an aggregate offering price not to exceed \$50.0 million, to be sold by us under a “shelf” registration process.

In addition, on behalf of the selling stockholders, we are registering 17,793,599 shares of our common stock for resale by the selling stockholders. If we or a selling stockholder offer any securities under this prospectus, we will amend or supplement this prospectus by means of an accompanying prospectus supplement setting forth the specific terms and conditions and other information about that offering as is required or necessary.

We and/or a selling stockholder may sell the securities in any of the following ways (or in any combination) from time to time:

- to or through underwriters, brokers or dealers;
- directly to one or more purchasers;
- through agents; or
- any other method permitted pursuant to applicable law and described in an applicable prospectus supplement.

The prospectus supplement will set forth the terms of the offering of such securities, including:

- the name or names of any underwriters, dealers or agents and the amounts of securities underwritten or purchased by each of them;
- the public offering price of the securities and the proceeds to us and/or to the selling stockholders, as the case may be, and any discounts, commissions or concessions allowed or reallocated or paid to dealers; and
- information about the selling stockholders, including the relationship between the selling stockholders and us.

Any public offering price and any discounts or concessions allowed or reallocated or paid to dealers may be changed from time to time.

We and/or the selling stockholders may effect the distribution of the securities from time to time in one or more transactions either:

- at a fixed price or prices, which may be changed from time to time;
- at market prices prevailing at the time of sale;
- at prices relating to the prevailing market prices; or
- at negotiated prices.

The selling stockholders may act independently of us in making decisions with respect to the timing, manner and size of each of their sales.

Offers to purchase securities may be solicited directly by us and the sale thereof may be made by us directly to institutional investors or others. In this case, no underwriters or agents would be involved. We may use electronic media, including the Internet, to sell offered securities directly.

If underwriters are used in the sale of any securities, the securities will be acquired by the underwriters for their own account and may be resold from time to time in one or more transactions, including negotiated

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transactions, at a fixed public offering price or at varying prices determined at the time of sale. The securities may be either offered to the public through underwriting syndicates represented by managing underwriters, or directly by underwriters. Generally, the underwriters' obligations to purchase the securities will be subject to certain conditions precedent. Depending on the type of offering, the underwriters may be obligated to purchase all of the securities if they purchase any of the securities (other than any securities purchased upon exercise of any over-allotment option).

We or the selling stockholders may offer the securities covered by this prospectus into an existing trading market on the terms described in the prospectus supplement relating thereto. Underwriters, dealers and agents who participate in any at-the-market offerings will be described in the prospectus supplement relating thereto. To the extent that we make sales through one or more underwriters or agents in at-the-market offerings, we will do so pursuant to the terms of a sales agency financing agreement or other at-the-market offering arrangement between us and the underwriters or agents. If we engage in at-the-market sales pursuant to any such agreement, we will issue and sell our securities through one or more underwriters or agents, which may act on an agency basis or on a principal basis. During the term of any such agreement, we may sell our securities on a daily basis in exchange transactions or otherwise as we agree with the underwriters or agents. The agreement will provide that any common stock sold will be sold at prices related to the then-prevailing market prices for our securities. Therefore, exact figures regarding proceeds that will be raised or commissions to be paid cannot be determined at this time. Pursuant to the terms of the agreement, we also may agree to sell, and the relevant underwriters or agents may agree to solicit offers to purchase, blocks of our securities. The terms of each such agreement will be set forth in more detail in the applicable prospectus supplement.

We or the selling stockholders may sell the securities through agents from time to time. The prospectus supplement will name any agent involved in the offer or sale of the securities and any commissions paid to them. Generally, any agent will be acting on a best efforts basis for the period of its appointment.

If we or the selling stockholders utilize a dealer in the sale of the securities in respect of which this prospectus is delivered, we or the selling stockholders, as applicable, may sell those securities to the dealer, as principal. The dealer may then resell those securities to the public at varying prices to be determined by the dealer at the time of resale.

In effecting sales, broker-dealers or agents engaged by us or the selling stockholders may arrange for other broker-dealers to participate. Broker-dealers or agents may receive commissions, discounts, or concessions from us or the selling stockholders in amounts to be negotiated immediately prior to the sale.

In connection with the sale of the securities or otherwise, we or the selling stockholders may enter into hedging transactions with broker-dealers, which may in turn engage in short sales of the securities covered by this prospectus in the course of hedging the positions they assume. We or the selling stockholders may also sell short the securities covered by this prospectus and deliver the securities to close out short positions, or loan or pledge the securities covered by this prospectus to broker-dealers that in turn may sell these securities.

Any underwriter, broker-dealer, or agent that participates in the distribution of the securities may be deemed to be an "underwriter" as defined in the Securities Act. Any commissions paid or any discounts or concessions allowed to any such persons, and any profits they receive on resale of the securities, may be deemed to be underwriting discounts and commissions under the Securities Act. We will identify any underwriters or agents and describe their compensation in a prospectus supplement. Any compensation paid to underwriters, dealers or agents in connection with the offering of the securities, and any discounts, concessions or commissions allowed by underwriters to participating dealers will be provided in the applicable prospectus supplement.

The aggregate proceeds to us and the selling stockholders from the sale of the securities will be the purchase price of the securities less discounts and commissions, if any.

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Underwriters or agents may purchase and sell the securities in the open market. These transactions may include over-allotment, stabilizing transactions, syndicate covering transactions and penalty bids. Over-allotment involves sales in excess of the offering size, which creates a short position. Stabilizing transactions consist of bids or purchases for the purpose of preventing or retarding a decline in the market price of the securities and are permitted so long as the stabilizing bids do not exceed a specified maximum. Syndicate covering transactions involve the placing of any bid on behalf of the underwriting syndicate or the effecting of any purchase to reduce a short position created in connection with the offering. The underwriters or agents also may impose a penalty bid, which permits them to reclaim selling concessions allowed to syndicate members or certain dealers if they repurchase the securities in stabilizing or covering transactions. These activities may stabilize, maintain or otherwise affect the market price of the securities, which may be higher than the price that might otherwise prevail in the open market. These activities, if begun, may be discontinued at any time. These transactions may be effected on any exchange on which the securities are traded, in the over-the-counter market or otherwise.

Our common stock is listed on the NASDAQ Global Market under the symbol "LNTH."

Agents, broker-dealers and underwriters may be entitled to indemnification by us and, if applicable, the selling stockholders, against certain civil liabilities, including liabilities under the Securities Act, or to contribution with respect to payments which the agents or underwriters may be required to make in respect thereof.

Agents, broker-dealers and underwriters or their affiliates may be customers of, engage in transactions with, or perform services for, us or the selling stockholders (or their affiliates) in the ordinary course of business. We and the selling stockholders may also use underwriters or other third parties with whom we or such selling stockholders have a material relationship. We and the selling stockholders (or their affiliates) will describe the nature of any such relationship in the applicable prospectus supplement.

We and the selling stockholders are subject to the applicable provisions of the Exchange Act and the rules and regulations under the Exchange Act, including Regulation M, which may limit the timing of purchases and sales of any of the securities offered in this prospectus by the selling stockholders and any other person. The anti-manipulation rules under the Exchange Act may apply to sales of securities in the market and to the actions of the Company, the selling stockholders and their respective affiliates.

In order to comply with the securities laws of certain states, if applicable, the securities must be sold in such jurisdictions only through registered or licensed brokers or dealers. In addition, in certain states the securities may not be sold unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

To the extent required, this prospectus may be amended and/or supplemented from time to time to describe a specific plan of distribution. Instead of selling securities under this prospectus, we and/or the selling stockholder may sell the securities offered, including shares of common stock, in compliance with the provisions of Rule 144 or Rule 144A under the Securities Act, if available, or pursuant to other available exemptions from the registration requirements of the Securities Act.

LEGAL MATTERS

Certain legal matters relating to the issuance and sale of the securities offered hereby will be passed upon for us and the selling stockholders by Ropes & Gray LLP, Boston, Massachusetts. Additional legal matters may be passed upon for us, the selling stockholders or any underwriters, dealers or agents, by counsel that we will name in the applicable prospectus supplement.

Experts

The consolidated financial statements, incorporated in this prospectus by reference from the Company's Annual Report on Form 10-K, have been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report, which is incorporated herein by reference. Such consolidated financial statements have been so incorporated in reliance upon the report of such firm given upon their authority as experts in accounting and auditing.

PART II
INFORMATION NOT REQUIRED IN PROSPECTUS

Item 14. Other Expenses of Issuance and Distribution

The following table sets forth the costs and expenses payable by the registrant in connection with the sale of the securities being registered hereby.

	Amount to be Paid
Registration fee	\$11,522
FINRA filing fee	*
Printing	*
Legal fees and expenses	*
Accounting fees and expenses	*
Transfer agent and registrar fees	*
Miscellaneous	*
Total	\$ *

* These fees are calculated based upon the number of issuances in applicable offerings and amount of securities offered and, accordingly, cannot be estimated at this time.

In connection with any offering under this registration by a selling stockholder, all or a portion of the foregoing expenses may be paid by the registrant or reimbursed to the selling stockholder by the registrant, as described in the applicable prospectus supplement.

Item 15. Indemnification of Directors and Officers

The registrant is governed by the Delaware General Corporation Law, or DGCL. Section 145 of the DGCL provides that a corporation may indemnify any person, including an officer or director, who was or is, or is threatened to be made, a party to any threatened, pending or completed legal action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of such corporation), by reason of the fact that such person was or is an officer, director, employee or agent of such corporation or is or was serving at the request of such corporation as a director, officer, employee or agent of another corporation or enterprise. The indemnity may include expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding, provided such officer, director, employee or agent acted in good faith and in a manner such person reasonably believed to be in, or not opposed to, the corporation's best interest and, for criminal proceedings, had no reasonable cause to believe that such person's conduct was unlawful. A Delaware corporation may indemnify any person, including an officer or director, who was or is, or is threatened to be made, a party to any threatened, pending or contemplated action or suit by or in the right of such corporation, under the same conditions, except that such indemnification is limited to expenses (including attorneys' fees) actually and reasonably incurred by such person, and except that no indemnification is permitted without judicial approval if such person is adjudged to be liable to such corporation. Where an officer or director of a corporation is successful, on the merits or otherwise, in the defense of any action, suit or proceeding referred to above, or any claim, issue or matter therein, the corporation must indemnify that person against the expenses (including attorneys' fees) which such officer or director actually and reasonably incurred in connection therewith.

The registrant's amended and restated certificate of incorporation authorizes the indemnification of its officers and directors, consistent with Section 145 of the DGCL. Reference is made to Section 102(b)(7) of the DGCL, which enables a corporation in its original certificate of incorporation or an amendment thereto to eliminate or limit the personal liability of a director for violations of the director's fiduciary duty, except (i) for any breach of the director's duty of loyalty to the corporation or its stockholders, (ii) for acts or omissions not in

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good faith or which involve intentional misconduct or a knowing violation of law, (iii) pursuant to Section 174 of the DGCL, which provides for liability of directors for unlawful payments of dividends of unlawful stock purchase or redemptions or (iv) for any transaction from which a director derived an improper personal benefit. As permitted by the DGCL, we have included in our amended and restated certificate of incorporation a provision to eliminate the personal liability of our directors for monetary damages for breach of their fiduciary duties as directors, subject to certain exceptions. In addition, our amended and restated certificate of incorporation and bylaws provide that we are required to indemnify our officers and directors under certain circumstances, including those circumstances in which indemnification would otherwise be discretionary, and we are required to advance expenses to our officers and directors as incurred in connection with proceedings against them for which they may be indemnified.

The registrant has entered into indemnification agreements with each of its directors. These agreements, among other things, require the registrant to indemnify each director to the fullest extent permitted by Delaware law, including indemnification of expenses such as attorneys' fees, judgments, fines and settlement amounts incurred by the director in any action or proceeding, including any action or proceeding by or in right of the registrant, arising out of the person's services as a director. The registrant maintains standard directors' and officers' liability insurance for the benefit of its directors and officers.

Any underwriting agreement that the registrant may enter into in connection with the sale of any securities registered hereunder may provide for indemnification to the registrant's directors and officers by the underwriters against certain liabilities.

Item 16. Exhibits and Financial Statement Schedules

(a) The following exhibits are filed as part of this registration statement:

<u>EXHIBIT NUMBER</u>	<u>DESCRIPTION OF EXHIBITS</u>	<u>FORM</u>	<u>INCORPORATED BY REFERENCE</u>		<u>FILING DATE</u>
			<u>FILE NUMBER</u>	<u>EXHIBIT</u>	
*1.1	Form of Underwriting Agreement.	—	—	—	—
4.1	Amended and Restated Certificate of Incorporation of Lantheus Holdings, Inc.	8-K	001-36569	3.1	June 30, 2015
4.2	Bylaws of Lantheus Holdings, Inc.	8-K	001-36569	3.2	June 30, 2015
4.3	Form of Common Stock Certificate.	S-1/A	333-196998	4.1	June 30, 2015
4.4	Amended and Restated Shareholders Agreement, dated as of February 26, 2008 among Lantheus Holdings, Inc., Avista Capital Partners, L.P., Avista Capital Partners (Offshore), L.P., ACP-Lantern Co-Invest, LLC and certain management shareholders named therein.	S-4	333-196998	10.4	October 6, 2010
4.5	Amendment, dated June 25, 2015, to Amended and Restated Shareholders Agreement, among Lantheus Holdings, Inc., Avista Capital Partners, L.P., Avista Capital Partners (Offshore), L.P., ACP-Lantern Co-Invest, LLC and certain management shareholders named therein.	8-K	001-36569	10.2	June 30, 2015

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EXHIBIT NUMBER	DESCRIPTION OF EXHIBITS	FORM	INCORPORATED BY REFERENCE		FILING DATE
			FILE NUMBER	EXHIBIT	
4.6	Employee Shareholders Agreement, dated as of May 8, 2008, among Lantheus Holdings, Inc., Avista Capital Partners, L.P., Avista Capital Partners (Offshore), L.P., ACP-Lantern Co-Invest, LLC and certain employee shareholders named therein.	S-4	333-196998	10.5	October 6, 2010
4.7	Amendment, dated June 25, 2015, to Employee Shareholders Agreement, among Lantheus Holdings, Inc., Avista Capital Partners, L.P., Avista Capital Partners (Offshore), L.P., ACP-Lantern Co-Invest, LLC and certain employee shareholders named therein.	8-K	001-36569	10.3	June 30, 2015
*4.8	Form of Warrant.	—	—	—	—
*4.9	Form of Warrant Agreement.	—	—	—	—
*4.10	Form of Unit Agreement.	—	—	—	—
*4.11	Form of Preferred Stock Certificate.	—	—	—	—
*4.12	Form of Certificate of Designations for Preferred Stock.	—	—	—	—
5.1	Opinion of Ropes & Gray LLP.	—	—	—	—
*12.1	Statement of Computation of Ratio Combined Fixed Charges and Preference Dividends to Earnings.	—	—	—	—
21.1	Subsidiaries of the registrant.	10-K	001-36569	21.1	March 2, 2016
23.1	Consent of Deloitte & Touche LLP, an independent registered public accounting firm.	—	—	—	—
23.2	Consent of Ropes & Gray LLP (included in Exhibit 5.1).	—	—	—	—
24.1	Powers of Attorney (included in the signature pages).	—	—	—	—

(*) To be filed, if necessary, by amendment or on a Current Report on Form 8-K prior to or concurrently with the issuance of the applicable securities.

Item 17. Undertakings

The undersigned registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) To include any prospectus required by Section 10(a)(3) of the Securities Act of 1933;

(ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total

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dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20 percent change in the maximum aggregate offering price set forth in the “Calculation of Registration Fee” table in the effective registration statement;

(iii) To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement;

provided, however, that paragraphs (a)(1)(i), (a)(1)(ii) and (a)(1)(iii) above do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement.

(2) That, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(4) That, for the purpose of determining liability under the Securities Act of 1933 to any purchaser:

(A) Each prospectus filed by the registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in the registration statement; and

(B) Each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii), or (x) for the purpose of providing the information required by Section 10(a) of the Securities Act of 1933 shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof. *Provided, however*, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such effective date.

(5) That, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities, the undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

(i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;

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(ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;

(iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrants; and

(iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

(6) The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(7) The undersigned registrant hereby undertakes to supplement the prospectus, after the expiration of the subscription period, to set forth the results of the subscription offer, the transactions by the underwriters during the subscription period, the amount of unsubscribed securities to be purchased by the underwriters, and the terms of any subsequent reoffering thereof. If any public offering by the underwriters is to be made on terms differing from those set forth on the cover page of the prospectus, a post-effective amendment will be filed to set forth the terms of such offering.

(8) The undersigned registrant hereby undertakes to deliver or cause to be delivered with the prospectus, to each person to whom the prospectus is sent or given, the latest annual report to security holders that is incorporated by reference in the prospectus and furnished pursuant to and meeting the requirements of Rule 14a-3 or Rule 14c-3 under the Securities Exchange Act of 1934; and, where interim financial information required to be presented by Article 3 of Regulation S-X are not set forth in the prospectus, to deliver, or cause to be delivered to each person to whom the prospectus is sent or given, the latest quarterly report that is specifically incorporated by reference in the prospectus to provide such interim financial information.

(9) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer, or controlling person of the registrant in the successful defense of any action, suit, or proceeding) is asserted by such director, officer, or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of North Billerica, Commonwealth of Massachusetts, on August 5, 2016.

Lantheus Holdings, Inc.

By: /s/ Mary Anne Heino
Name: Mary Anne Heino
Title: President and Chief Executive Officer

POWER OF ATTORNEY

The undersigned directors and officers of Lantheus Holdings, Inc., hereby appoint each of Mary Anne Heino, John Crowley and Michael P. Duffy, or any of them, each acting alone, as attorney-in-fact for the undersigned, with full power of substitution for, and in the name, place and stead of the undersigned, to sign and file with the Securities and Exchange Commission under the Securities Act, any and all amendments (including post-effective amendments) and exhibits to this registration statement on Form S-3, any related 462(b) registration statement or amendment thereto, and any and all applications and other documents to be filed with the Securities and Exchange Commission pertaining to the registration of the securities covered hereby, with full power and authority to do and perform any and all acts and things whatsoever requisite and necessary or desirable, hereby ratifying and confirming all that said attorney-in-fact, or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the date indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Mary Anne Heino</u> Mary Anne Heino	President, Chief Executive Officer and Director (Principal Executive Officer)	August 5, 2016
<u>/s/ John Crowley</u> John Crowley	Chief Financial Officer and Treasurer (Principal Financial Officer and Principal Accounting Officer)	August 5, 2016
<u>/s/ Brian Markison</u> Brian Markison	Non-Executive Chairman of the Board of Directors	August 5, 2016
<u>/s/ David Burgstahler</u> David Burgstahler	Director	August 5, 2016
<u>/s/ James C. Clemmer</u> James C. Clemmer	Director	August 5, 2016
<u>/s/ Samuel Leno</u> Samuel Leno	Director	August 5, 2016
<u>/s/ Frederick Robertson</u> Frederick Robertson	Director	August 5, 2016

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<u>Signature</u>	<u>Title</u>	<u>Date</u>
<hr/> /s/ Derace Schaffer Derace Schaffer	Director	August 5, 2016
<hr/> /s/ Sriram Venkataraman Sriram Venkataraman	Director	August 5, 2016

EXHIBIT INDEX

EXHIBIT NUMBER	DESCRIPTION OF EXHIBITS	FORM	INCORPORATED BY REFERENCE		FILING DATE
			FILE NUMBER	EXHIBIT	
*1.1	Form of Underwriting Agreement.	—	—	—	—
4.1	Amended and Restated Certificate of Incorporation of Lantheus Holdings, Inc.	8-K	001-36569	3.1	June 30, 2015
4.2	Bylaws of Lantheus Holdings, Inc.	8-K	001-36569	3.2	June 30, 2015
4.3	Form of Common Stock Certificate.	S-1/A	333-196998	4.1	June 30, 2015
4.4	Amended and Restated Shareholders Agreement, dated as of February 26, 2008 among Lantheus Holdings, Inc., Avista Capital Partners, L.P., Avista Capital Partners (Offshore), L.P., ACP-Lantern Co-Invest, LLC and certain management shareholders named therein.	S-4	333-196998	10.4	October 6, 2010
4.5	Amendment, dated June 25, 2015, to Amended and Restated Shareholders Agreement, among Lantheus Holdings, Inc., Avista Capital Partners, L.P., Avista Capital Partners (Offshore), L.P., ACP-Lantern Co-Invest, LLC and certain management shareholders named therein.	8-K	001-36569	10.2	June 30, 2015
4.6	Employee Shareholders Agreement, dated as of May 8, 2008, among Lantheus Holdings, Inc., Avista Capital Partners, L.P., Avista Capital Partners (Offshore), L.P., ACP-Lantern Co-Invest, LLC and certain employee shareholders named therein.	S-4	333-196998	10.5	October 6, 2010
4.7	Amendment, dated June 25, 2015, to Employee Shareholders Agreement, among Lantheus Holdings, Inc., Avista Capital Partners, L.P., Avista Capital Partners (Offshore), L.P., ACP-Lantern Co-Invest, LLC and certain employee shareholders named therein.	8-K	001-36569	10.3	June 30, 2015
*4.8	Form of Warrant.	—	—	—	—
*4.9	Form of Warrant Agreement.	—	—	—	—
*4.10	Form of Unit Agreement.	—	—	—	—
*4.11	Form of Preferred Stock Certificate.	—	—	—	—
*4.12	Form of Certificate of Designations for Preferred Stock.	—	—	—	—
5.1	Opinion of Ropes & Gray LLP.	—	—	—	—
*12.1	Statement of Computation of Ratio Combined Fixed Charges and Preference Dividends to Earnings.	—	—	—	—

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<u>EXHIBIT NUMBER</u>	<u>DESCRIPTION OF EXHIBITS</u>	<u>FORM</u>	<u>INCORPORATED BY REFERENCE</u>		
			<u>FILE NUMBER</u>	<u>EXHIBIT</u>	<u>FILING DATE</u>
21.1	Subsidiaries of the registrant.	10-K	001-36569	21.1	March 2, 2016
23.1	Consent of Deloitte & Touche LLP, an independent registered public accounting firm.	—	—	—	—
23.2	Consent of Ropes & Gray LLP (included in Exhibit 5.1).	—	—	—	—
24.1	Powers of Attorney (included in the signature pages).	—	—	—	—

(*) To be filed, if necessary, by amendment or on a Current Report on Form 8-K prior to or concurrently with the issuance of the applicable securities.



ROPES & GRAY LLP
PRUDENTIAL TOWER
800 BOYLSTON STREET
BOSTON, MA 02199-3600
WWW.ROPESGRAY.COM

August 5, 2016

Lantheus Holdings, Inc.
331 Treble Cove Road
North Billerica, MA 01862

Re: Registration of Securities by Lantheus Holdings, Inc.

Ladies and Gentlemen:

We have acted as counsel to Lantheus Holdings, Inc., a Delaware corporation (the "Company"), in connection with the registration statement on Form S-3 (the "Registration Statement") filed on the date hereof by the Company with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), relating to the registration under the Securities Act and the proposed issuance and sale from time to time pursuant to Rule 415 under the Securities Act of:

- (i) shares of the Company's common stock, \$0.01 par value per share ("Common Stock");
- (ii) warrants representing the right to receive or the obligation to sell, upon exercise, an amount of shares of Common Stock or shares of Preferred Stock (as defined below) ("Warrants");
- (iii) shares of preferred stock of the Company, \$0.01 par value per share ("Preferred Stock");
- (iv) units ("Units"), each representing ownership of any combination of Common Stock, Warrants and/or Preferred Stock; and
- (v) 17,793,599 shares of Common Stock (the "Reoffer Shares") beneficially owned by certain stockholders of the Company.

The Common Stock, the Warrants, the Preferred Stock, the Units and the Reoffer Shares are referred to herein collectively as the "Securities."

In connection with this opinion letter, we have examined such certificates, documents and records and have made such investigation of fact and such examination of law as we have deemed appropriate in order to enable us to render the opinions set forth herein. In conducting such investigation, we have relied, without independent verification, upon certificates of officers of the Company, public officials and other appropriate persons.

The opinions expressed below are limited to the laws of the State of New York and the Delaware General Corporation Law.

Based upon and subject to the foregoing and the assumptions, qualifications and limitations set forth below, we are of the opinion that:

1. When (i) the issuance and sale of any shares of Common Stock have been duly authorized by all necessary corporate action of the Company and (ii) such shares have been issued and delivered against payment of the purchase price therefor (in an amount in excess of the par value thereof) in accordance with the applicable purchase, underwriting or other agreement, and as contemplated by the Registration Statement, such shares of Common Stock will be validly issued, fully paid and nonassessable. The Common Stock covered in the opinion in this paragraph includes any shares of Common Stock that may be issued upon exercise, conversion or exchange pursuant to the terms of any other Securities.

2. When (i) the terms of any Warrants and their issuance and sale have been duly authorized by all necessary corporate action of the Company and (ii) such Warrants have been duly executed, countersigned and delivered in accordance with the applicable warrant agreement and against payment of the purchase price therefor in accordance with the applicable purchase, underwriting or other agreement, and as contemplated by the Registration Statement, such Warrants will constitute valid and binding obligations of the Company enforceable against the Company in accordance with their terms.

3. When (i) the terms of any Preferred Stock of a particular series and their issuance and sale have been duly authorized by all necessary corporate action of the Company, (ii) a certificate of designations with respect to such series of Preferred Stock has been duly adopted by the Company and filed with the Secretary of State of the State of Delaware, and (iii) such shares of Preferred Stock have been issued and delivered against payment of the purchase price therefor (in an amount in excess of the par value thereof) in accordance with the applicable purchase, underwriting or other agreement, and as contemplated by the Registration Statement, such shares of Preferred Stock will be validly issued, fully paid, and nonassessable. The Preferred Stock covered in the opinion in this paragraph includes any shares of Preferred Stock that may be issued upon exercise, conversion or exchange pursuant to the terms of any other Securities.

4. When the issuance and terms of any Units and their issuance and sale have been duly authorized by all necessary corporate action of the Company and (ii) such Units have been duly executed and delivered in accordance with the applicable purchase, underwriting or other agreement, and as contemplated by the Registration Statement, such Units will constitute valid and binding obligations of the Company enforceable against the Company in accordance with their respective terms.

5. The Reoffer Shares have been duly authorized and are validly issued, fully paid and nonassessable.

In rendering the opinions set forth above, we have assumed that (i) the Registration Statement will have become effective under the Securities Act, a prospectus supplement will have been prepared and filed with the Commission describing the Securities offered thereby and such Securities will have been issued and sold in accordance with the terms of such prospectus

supplement; (ii) a definitive purchase, underwriting, or similar agreement, and any applicable indenture (including any supplemental indenture) or warrant agreement, pursuant to which such Securities may be issued, will have been duly authorized, executed and delivered by the Company and the other parties thereto, and the specific terms of such Securities will have been duly established in conformity with the applicable agreement and the certificate of incorporation and by-laws of the Company (if applicable); (iii) at the time of the issuance of any Securities, the Company will be a validly existing corporation under the law of its jurisdiction of incorporation; (iv) the number of shares of Common Stock sold pursuant to the Registration Statement, together with the number of shares outstanding or reserved at the time of issuance, will not exceed the respective number of shares authorized by the Company's certificate of incorporation in effect at the time of such issuance; (v) the number of shares of Preferred Stock issued pursuant to the Registration Statement, together with the number of shares outstanding or reserved at the time of issuance, will not exceed the respective number of shares authorized by the Company's certificate of incorporation in effect at the time of such issuance; and (vi) all the foregoing actions to be taken by the Company will have been taken so as not to violate any applicable law and so as to comply with all requirements and restrictions imposed by any court or governmental or regulatory body having jurisdiction over the Company or any of its property.

Our opinions set forth above are subject to (i) bankruptcy, insolvency, reorganization, moratorium, fraudulent conveyance and similar laws affecting the rights and remedies of creditors generally and (ii) general principles of equity.

We hereby consent to the filing of this opinion letter as an exhibit to the Registration Statement and to the use of our name therein and in the related prospectus under the caption "Legal Matters." In giving such consent, we do not thereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission thereunder.

Very truly yours,

/s/ Ropes & Gray LLP

Ropes & Gray LLP

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in this Registration Statement on Form S-3 of our report dated March 2, 2016, relating to the consolidated financial statements of Lantheus Holdings, Inc. appearing in the Annual Report on Form 10-K of Lantheus Holdings, Inc. for the year ended December 31, 2015, and to the reference to us under the heading "Experts" in the Prospectus, which is part of this Registration Statement.

/s/ Deloitte & Touche LLP

August 5, 2016
Boston, Massachusetts