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**SECURITIES AND EXCHANGE COMMISSION**  
Washington D.C. 20549

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**FORM S-3**

**REGISTRATION STATEMENT**  
*UNDER*  
**THE SECURITIES ACT OF 1933**

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**Lantheus Holdings, Inc.**

(Exact Name of Registrant as Specified in Its Charter)

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**Delaware**  
(State or Other Jurisdiction of  
Incorporation or Organization)

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

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**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)

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**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)

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*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)**

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**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.  **333-212940**

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
Common Stock par value \$0.01 per share	(1)(2)	(1)(2)	\$1,680,000	\$195(3)

- (1) The Registrant previously registered such indeterminate number of shares of the Registrant's common stock having an aggregate offering price not to exceed \$50,000,000 on a Registration Statement on Form S-3 (File No. 333-212940), which was declared effective on August 31, 2016 (the "Registration Statement"). Pursuant to the Registration Statement, the Registrant has previously issued and sold \$41,600,000 of shares of common stock. In accordance with Rule 462(b) promulgated under the Securities Act of 1933, as amended, an additional indeterminate number of shares of the Registrant's securities as shall have an aggregate offering price not to exceed \$1,680,000 are being registered hereunder. The proposed maximum offering price per share will be determined, from time to time, by the Registrant in connection with the issuance by the Registrant of the securities registered hereunder.
- (2) Pursuant to Rule 416 under the Securities Act of 1933, as amended (the "Securities Act"), the shares of Common Stock being registered hereunder include such indeterminate number of shares of Common 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.
- (3) Calculated pursuant to Rule 457(o) under the Securities Act of 1933, as amended. Represents the registration fee only for the additional amount of shares of the Registrant's common stock being registered hereby. The Registrant previously registered shares of the Registrant's common stock pursuant to a Registration Statement on Form S-3 (File No. 333-212940), for which a fee of \$5,035 was paid with respect to the primary offering.

**This Registration Statement shall become effective upon filing with the Securities and Exchange Commission in accordance with Rule 462(b) of the Securities Act of 1933, as amended.**

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**EXPLANATORY NOTE AND INCORPORATION BY REFERENCE**

This Registration Statement is being filed pursuant to Rule 462(b) of the Securities Act of 1933, as amended (“Rule 462(b)”), and General Instruction IV.A. to Form S-3 to register the Registrant’s securities, with an aggregate initial offering price not to exceed \$1,680,000. In accordance with Rule 462(b), this Registration Statement incorporates by reference the contents of the Registrant’s Registration Statement on Form S-3 (File No. 333-212940), initially filed with the Securities and Exchange Commission (the “SEC”) on August 5, 2016 and declared effective by the SEC on August 31, 2016, including all exhibits thereto and all information incorporated by reference therein, other than the exhibits included herein.

The required opinion and consents are listed on the Exhibit Index attached to and filed with this Registration Statement.

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**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 November 15, 2016.

**Lantheus Holdings, Inc.**

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

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 dates indicated.

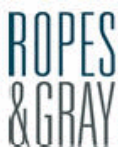
<u>Signatures</u>	<u>Title</u>	<u>Date</u>
<u>          /s/ Mary Anne Heino          </u> Mary Anne Heino	President, Chief Executive Officer and Director (Principal Executive Officer)	November 15, 2016
<u>          /s/ John Crowley          </u> John Crowley	Chief Financial Officer and Treasurer (Principal Financial and Principal Accounting Officer)	November 15, 2016
<u>  </u> * Brian Markison	Non-Executive Chairman of the Board of Directors	November 15, 2016
<u>  </u> * David Burgstahler	Director	November 15, 2016
<u>  </u> * James C. Clemmer	Director	November 15, 2016
<u>  </u> * Samuel Leno	Director	November 15, 2016
<u>  </u> * Frederick Robertson	Director	November 15, 2016
<u>  </u> * Derace Schaffer	Director	November 15, 2016
<u>  </u> * Sriram Venkataraman	Director	November 15, 2016

\*By:           /s/ Michael P. Duffy            
Michael P. Duffy  
Attorney-in-Fact

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**EXHIBIT INDEX**

<u>Exhibit</u>	<u>Description</u>
5.1	Opinion of Ropes & Gray LLP
23.1	Consent of Ropes & Gray LLP (included in Exhibit 5.1)
23.2	Consent of Deloitte & Touche LLP
24.1	Power of Attorney (incorporated by reference to Exhibit 24.1 to Registration Statement No. 333-212940 filed with the Securities and Exchange Commission on August 5, 2016)



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

November 15, 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") pursuant to Rule 462(b) under the Securities Act of 1933, as amended (the "Securities Act"), relating to the proposed issuance and sale from time to time pursuant to Rule 415 under the Securities Act of shares of the Company's common stock, \$0.01 par value per share (the "Common Stock"). The Registration Statement incorporates by reference the contents of the Company's registration statement on Form S-3 (File No. 333-212940), which was declared effective by the Commission on August 31, 2016, including the base prospectus dated August 5, 2016.

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 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 (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.

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 Common Stock offered thereby and such shares of Common Stock will have been issued and sold in accordance with the terms of such prospectus supplement; (ii) a definitive purchase, underwriting, or similar agreement pursuant to which such shares of Common Stock may be issued, will have been duly authorized, executed and delivered by the Company and the other parties thereto; (iii) at the time of the issuance of any shares of Common Stock, 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; and (v) 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.

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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 incorporated by reference in the Prospectus included in Registration Statement No. 333-212940.

/s/ Deloitte & Touche LLP

Boston, Massachusetts

November 15, 2016