Filed by Lantheus Holdings, Inc.
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and deemed filed pursuant to Rule 14a-12
of the Securities Exchange Act of 1934
Subject Company: Progenics Pharmaceuticals, Inc.
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The following is a document relating to the proposed transaction involving Lantheus Holdings, Inc. and Progenics Pharmaceuticals, Inc. available at www.lantheusprogenics.transactionannouncement.com.

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Lantheus Responds to Velan Misrepresentations

Lantheus Holdings, Inc. ("Lantheus" or the "Company") responds to certain claims made by Velan Capital L.P. ("Velan") in opposition of the proposed acquisition of Progenics Pharmaceuticals, Inc. ("Progenics") by Lantheus.

Lantheus strongly objects to Velan's misstatements and mischaracterizations of Lantheus, its management and business prospects. Contrary to Velan's assertions, a combination of Lantheus and Progenics will form an innovative company with a diversified diagnostic and therapeutics portfolio that will provide superior value to the stockholders of both companies by allowing them to participate in benefits that neither company would be able to achieve on its own.

In particular, Lantheus notes the following:

- Lantheus' management team is highly aligned with stockholder interests, and Lantheus' focus on creating shareholder value is irrefutable, as it has delivered a ~273% return since its initial public offering in June 2015.
- Lantheus management is highly qualified with extensive commercialization, operational and financial experience and discipline, and Lantheus has a long and successful history of radiopharmaceutical product development.
- Lantheus' commercial, manufacturing and development expertise will directly benefit the Progenics stockholders by unlocking value in Progenics' commercial and development product portfolio.

1) Velan's Claim: Lantheus management's stock sales mean Lantheus' stock is overvalued

Lantheus' response:

- Velan's statements related to Lantheus management's stock sales entirely mischaracterize the underlying facts.
- A significant portion of management's reported sales (including sales reflected in Velan's slides) are **sell-to-cover transactions,** the proceeds of which are used to satisfy **tax withholding obligations**. Lantheus specifically requires its executives to utilize sell-to-cover transactions (rather than have the Company withhold shares and then pay the withholding taxes out-of-pocket with Company cash) as a means of preserving Company cash.

- All Lantheus directors and officers are required to execute all voluntary sales under **10b5-1 trading plans** adopted only during an open trading window and at least 30 days in advance of the first sale specified under that trading plan.
- Earlier this year, the Company adopted **Stock Ownership and Retention Guidelines** for its directors and executives, the requirements of which Ms. Heino has already satisfied handily, even after the sales she has recently conducted (which were made pursuant to the 10b5-1 plan she entered into on March 8, 2019) to diversify her portfolio. In fact, Ms. Heino is the largest non-institutional investor in the Company, which is a testament to her direct alignment with the interests of our other shareholders.

2) Velan's Claim: Lantheus' stock is unattractive as deal consideration for the Progenics' shareholders

Lantheus' response:

- Lantheus' focus on creating shareholder value is irrefutable, as it has delivered a ~273% return since its initial public offering in June of 2015.[1]
- Lantheus has a diversified global isotope supply chain.
  - Lantheus is uniquely adept at managing through times of inconsistent isotope supply by coordinating shutdown schedules with multiple radioisotope processors, managing logistics and performing just-in-time manufacturing and distribution of radiopharmaceuticals to maximize available supply for its customers. Lantheus works very closely with its global isotope suppliers to ensure the most continuous and redundant radioisotope supply possible, including successfully managing the global supply chain for molybdenum-99, the radioisotope used in the manufacture of Lantheus' TechneLite® generators.
  - Lantheus' supply chain expertise will directly benefit the Progenics stockholders as the Lantheus team works to optimize Progenics' radiopharmaceutical operations. In fact, Lantheus is one of the largest customers of IRE (the supplier of I-131 to Progenics for use in Azedra and 1095 manufacturing) as well as other potential suppliers of I-131.
  - Contrary to Velan's assertion, Lantheus knows through its long term relationship with IRE in Belgium that IRE will not be shutting down its operations during its conversion from high enriched uranium ("HEU") to low enriched uranium ("LEU"). We foresee no interruption in radioisotope supply from IRE as a result of IRE's ongoing HEU-to-LEU conversion efforts.
  - Lantheus is also making a $30M+ investment to internalize the manufacturing of several important products rather than rely exclusively on contract manufacturing organizations.
- Lantheus has a long and successful history of product development, including radiopharmaceuticals.

1 Total shareholder return calculated as of LNTH's first trading date on 6/26/2015 (in reference to its IPO) to the transaction announcement on 10/1/2019.

- As a leader in innovation in the radiopharmaceutical space for over 60 years, including in connection with technetium generators, Thallium and Cardiolite®, to date the best-selling diagnostic radiopharmaceutical agent ever, Lantheus has a storied history of product development.
- In 2013, when Lantheus was more highly leveraged, a decision was made to reduce Lantheus' research and development investments. As a result, certain development activities were slowed, and Lantheus eventually out-licensed flurpiridaz F 18 to GE Healthcare in a very beneficial deal in which GEHC pays for the remaining global clinical development and regulatory work, giving Lantheus attractive economics upon approval, including a meaningful co-promotion arrangement.
- Now, with impressive free cash flow, Lantheus is again investing in its future with a robust clinical development plan, which seeks to:
  - Expand DEFINITY®'s current label to measure left ventricular ejection fraction, an indication that would significantly increase the addressable patient population for contrast-enhanced echocardiography.
  - Diagnose and manage neuroendocrine tumors in pediatric and adult populations with LMI-1195 PET imaging agent — FDA has already granted LMI-1195 an Orphan Drug designation and a notice of eligibility for a rare pediatric disease priority review voucher for a subsequent human drug application.

- Lantheus management's incentives are highly aligned with stockholder interests.
  - As disclosed in our Proxy Statement in connection with our 2019 Annual Meeting of Stockholders, our Board of Directors, in consultation with a leading outside compensation consultant, takes great care in designing compensation programs that best align management with stockholder interests. In particular, management's incentive compensation is based on objective corporate performance goals and individual performance goals and includes equity grants that vest based on relative total shareholder return over extended periods.
- Lantheus management is highly qualified and has deep experience with radiopharmaceuticals, including radiotherapeutics.
  - First, Lantheus and its management team members have demonstrated success with numerous launches of novel pharmaceuticals into complex healthcare environments that require new treatment paradigms for clinicians, payors and healthcare systems and the requisite pre- and post-market activities to ensure product uptake and adoption. These efforts have involved:
    - educating healthcare providers on disease state awareness and adoption, and appropriate use of novel pharmaceuticals and the medical art to deliver those pharmaceuticals;
    - proving out the business case for hospitals to invest in necessary enhancements to equipment, infrastructure and training required to introduce the product;
    - facilitating the adoption of procedures and protocols for patient identification, advocacy, communication with treating care facilities, dose delivery logistics, clinical treatment and post-discharge care; and

- coordinating the availability of patient benefit verification, advocating for commercial, Medicaid and Medicare insurer coverage, and negotiating appropriate relationships with all channel partners.

- We have successfully created, built and led pharmaceutical markets in the face of formidable, well-managed competition. Our Company's myocardial perfusion agent Cardiolite became the most successful radiopharmaceutical of all time, competing against GE Healthcare's Myoview®. Our Company's DEFINITY® is the leading ultrasound contrast agent worldwide, competing against GE Healthcare's Optison® and Bracco's Lumason®. Prior to Lantheus, our management team members have launched, built and led markets for blockbuster drugs. We will bring those experiences and the deep expertise for which Lantheus is world recognized in radiopharmaceuticals to the entire Progenics product portfolio.

- Second, among Mary Anne Heino, Bob Marshall and John Bolla, we have a best-in-class specialty pharmaceutical leadership team with extensive commercialization, operational and financial experience and discipline, as best demonstrated by the shareholder value created under Ms. Heino's leadership. This leadership team will be critical in maximizing the value of the Progenics portfolio that shareholders expect.

- Third, Lantheus has an expert and long-tenured team of employees skilled in all aspects of the radiopharmaceutical industry, including supply chain, manufacturing, quality, regulatory, distribution and commercialization. The day-to-day operational capability these individuals bring is not easily replicated. We believe there would be no better place for the value of the Progenics assets to be optimized than at Lantheus.

- Fourth, we believe that Velan is drawing a false distinction between diagnostic and therapeutic radiopharmaceutical products in an effort to discredit Lantheus' impressive team and experience, and this distinction is entirely without merit.

- Lastly, Velan points to Lantheus' product, QUADRAMET®, and its minimal sales. QUADRAMET® is a radiotherapeutic product that had been manufactured by Lantheus for a third party. When that third party discontinued its promotional efforts in 2013, Lantheus continued to offer the product as a service to the patient population, cancer patients with intractable bone pain. QUADRAMET® is not currently a promoted product, and its sales help absorb manufacturing overhead.

- Lantheus' category leadership in echocardiography is an asset.

  - Velan appears critical of Lantheus' very successful echocardiography contrast agent DEFINITY®, which it notes derisively is not even used by nuclear medicine physicians. The revenue and free cash flow generated by DEFINITY®, however, will be very valuable to the combined company in the near term as it funds from operations its on-going commercialization and development efforts.

- Lantheus' commitment to appropriate financial leverage benefits stockholders.

  - Lantheus has decreased its leverage since its IPO in June 2015 by approximately two-thirds, and currently has a net leverage ratio of approximately 1.5 times and an interest coverage ratio of approximately 6.5 times, both very healthy indicators of Lantheus' current modest leverage.

- Lantheus is prepared for potential generic competition.
    - As we have publicly disclosed, to date we have not received any notice from an ANDA applicant relating to DEFINITY®. If we were to (i) receive any such notice in the future, (ii) bring a patent infringement suit against the ANDA applicant within 45 days of receiving that notice, and (iii) successfully obtain the full 30 month stay, then the ANDA applicant would be precluded from commercializing a generic version of DEFINITY® prior to the expiration of that 30 month stay period and, potentially, thereafter, depending on how the patent dispute is resolved.
    - Solely by way of example and not based on any knowledge we currently have, if we received a notice from an ANDA applicant in November 2019 and the full 30 month stay was obtained, then the ANDA applicant would be precluded from commercialization until at least May 2022. If we received a notice some number of months in the future and the full 30 month stay was obtained, the commercialization date would roll forward in the future by the same calculation.

Important Information For Investors And Stockholders

This document does not constitute an offer to sell or the solicitation of an offer to buy any securities or a solicitation of any vote or approval in any jurisdiction in which such offer, solicitation or sale would be unlawful prior to appropriate registration or qualification under the securities laws of such jurisdiction. No offering of securities shall be made except by means of a prospectus meeting the requirements of Section 10 of the U.S. Securities Act of 1933, as amended.

In connection with the proposed merger between Lantheus and Progenics Pharmaceuticals, Inc. (NASDAQ: PGNX) ("Progenics"), as announced on October 2, 2019, Lantheus intends to file with the Securities and Exchange Commission ("SEC") a registration statement on Form S-4 that will include a joint proxy statement of Lantheus and Progenics that also constitutes a prospectus of Lantheus. Each of Lantheus and Progenics also plan to file other relevant documents with the SEC regarding the proposed transaction. Any definitive joint proxy statement/prospectus (if and when available) will be mailed to stockholders of Lantheus and Progenics. INVESTORS AND SECURITY HOLDERS OF LANTHEUS AND PROGENICS ARE STRONGLY ENCOURAGED TO READ THE JOINT PROXY STATEMENT/PROSPECTUS AND OTHER DOCUMENTS THAT WILL BE FILED WITH THE SEC CAREFULLY AND IN THEIR ENTIRETY WHEN THEY BECOME AVAILABLE BECAUSE THEY WILL CONTAIN IMPORTANT INFORMATION. Investors and security holders will be able to obtain free copies of the registration statement and the joint proxy statement/prospectus (if and when available) and other documents filed with the SEC by Lantheus or Progenics through the website maintained by the SEC at https://www.sec.gov.

Copies of the documents filed with the SEC by Lantheus will also be available free of charge on Lantheus' website at https://www.lantheus.com/ or by contacting Lantheus' Investor Relations Department by email at ir@lantheus.com or by phone at (978) 671-8001. Copies of the documents filed with the SEC by Progenics will also be available free of charge on Progenics' internet website at https://www.progenics.com/ or by contacting Progenics' Investor Relations Department by email at mdowns@progenics.com or by phone at (646) 975-2533.

Certain Information Regarding Participants

Lantheus, Progenics, and their respective directors and executive officers may be considered participants in the solicitation of proxies in connection with the proposed transaction. Information about the directors and executive officers of Lantheus is set forth in its Annual Report on Form 10-K for the year ended December 31, 2018, which was filed with the SEC on February 20, 2019, its definitive proxy statement for its 2019 annual meeting of stockholders, which was filed with the SEC on March 15, 2019, and its Current Report on Form 8-K, which was filed with the SEC on March 25, 2019. Other information regarding the participants of Lantheus in the proxy solicitation and a description of their direct and indirect interests, by security holdings or otherwise, will be contained in the joint proxy statement/prospectus and other relevant materials to be filed with the SEC regarding the proposed transaction when they become available.

Information about the directors and executive officers of Progenics is set forth in its Annual Report on Form 10-K for the year ended December 31, 2018, which was filed with the SEC on March 15, 2019 and amended on April 30, 2019, and its definitive proxy statement for its 2019 annual meeting of stockholders, which was filed with the SEC on May 30, 2019. Other information regarding the participants of Progenics in the proxy solicitations and a description of their direct and indirect interests, by security holdings or otherwise, will be contained in the joint proxy statement/prospectus and other relevant materials to be filed with the SEC regarding the proposed transaction when they become available. You may obtain these documents (when they become available) free of charge through the website maintained by the SEC at https://www.sec.gov and from Investor Relations at Lantheus or Progenics as described above.

Cautionary Statement Regarding Forward-Looking Statements

This document contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 that are subject to risks and uncertainties and are made pursuant to the safe harbor provisions of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Such statements are based upon current plans, estimates and expectations that are subject to various risks and uncertainties. The inclusion of forward-looking statements should not be regarded as a representation that such plans, estimates and expectations will be achieved. Words such as “anticipate,” “expect,” “project,” “intend,” “believe,” “may,” “will,” “should,” “plan,” “could,” “target,” “contemplate,” “estimate,” “predict,” “potential,” “opportunity,” “creates” and words and terms of similar substance used in connection with any discussion of future plans, actions or events identify forward-looking statements. All statements, other than historical facts, including the expected timing of the closing of the merger; the ability of the parties to complete the merger considering the various closing conditions; the expected benefits of the merger, such as efficiencies, cost savings, synergies, revenue growth, creating shareholder value, growth potential, market profile, enhanced competitive position, and financial strength and flexibility; the competitive ability and position of the combined company; and any assumptions underlying any of the foregoing, are forward-looking statements. Important factors that could cause actual results to differ materially from Lantheus’ and Progenics’ plans, estimates or expectations could include, but are not limited to: (i) Lantheus or Progenics may be unable to obtain stockholder approval as required for the merger; (ii) conditions to the closing of the merger may not be satisfied; (iii) the merger may involve unexpected costs, liabilities or delays; (iv) the effect of the announcement of the merger on the ability of Lantheus or Progenics to retain and hire key personnel and maintain relationships with customers, suppliers and others with whom Lantheus or Progenics does business, or on Lantheus’ or Progenics’ operating results and business generally; (v) Lantheus’ or Progenics’ respective businesses may suffer as a result of uncertainty surrounding the merger and disruption of management’s attention due to the merger; (vi) the outcome of any legal proceedings related to the merger; (vii) Lantheus or Progenics may be adversely affected by other economic, business, and/or competitive factors; (viii) the occurrence of any event, change or other circumstances that could give rise to the termination of the merger agreement; (ix) risks that the merger disrupts current plans and operations and the potential

difficulties in employee retention as a result of the merger; (x) the risk that Lantheus or Progenics may be unable to obtain governmental and regulatory approvals required for the transaction, or that required governmental and regulatory approvals may delay the transaction or result in the imposition of conditions that could reduce the anticipated benefits from the proposed transaction or cause the parties to abandon the proposed transaction; (xi) risks that the anticipated benefits of the merger or other commercial opportunities may otherwise not be fully realized or may take longer to realize than expected; (xii) the impact of legislative, regulatory, competitive and technological changes; (xiii) expectations for future clinical trials, the timing and potential outcomes of clinical studies and interactions with regulatory authorities; and (xiv) other risks to the consummation of the merger, including the risk that the merger will not be consummated within the expected time period or at all. Additional factors that may affect the future results of Lantheus and Progenics are set forth in their respective filings with the SEC, including each of Lantheus' and Progenics' most recently filed Annual Report on Form 10-K, subsequent Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and other filings with the SEC, which are available on the SEC's website at www.sec.gov. Readers are urged to consider these factors carefully in evaluating these forward-looking statements, and not to place undue reliance on any forward-looking statements. Readers should also carefully review the risk factors described in other documents that Lantheus and Progenics file from time to time with the SEC. The forward-looking statements in this document speak only as of the date of these materials. Except as required by law, Lantheus and Progenics assume no obligation to update or revise these forward-looking statements for any reason, even if new information becomes available in the future.