Filed by Lantheus Holdings, Inc.
Pursuant to Rule 425 of the Securities Act of 1933
and deemed filed pursuant to Rule 14a-12
of the Securities Exchange Act of 1934
Subject Company: Progenics Pharmaceuticals, Inc.
Commission File No.: 000 – 23143

The following is a slide deck relating to the proposed transaction involving Lantheus Holdings, Inc. and Progenics Pharmaceuticals, Inc. available at www.lantheusprogenics.transactionannouncement.com.


Lantheus
Holdings
Progenics
Pharmaceuticals
Combination Creates a Leading Precision Diagnostics
and Therapeutics Company
October 2, 2019

Safe Harbor Statements

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 transaction, Lantheus Holdings 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 Holdings and Progenics that also constitutes a prospectus of Lantheus Holdings. Each of Lantheus Holdings and Progenics also plans 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 Holdings and Progenics. INVESTORS AND SECURITY HOLDERS OF LANTHEUS HOLDINGS 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 Holdings or Progenics through the website maintained by the SEC at https://www.sec.gov.

Copies of the documents filed with the SEC by Lantheus Holdings will also be available free of charge on Lantheus Holdings' website at https://www.lantheus.com/ or by contacting Lantheus Holdings' 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 Holdings, 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 Holdings 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 Holdings 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 Holdings or Progenics as described above.

Compelling Strategic Rationale

Robust portfolio and pipeline of precision diagnostic and therapeutic products

Driving strategic pipeline investments to capitalize on market opportunities and maximize returns

Sustainable and diversified revenue growth with focus on commercial execution excellence

Attractive financial profile and strengthened cash flow generation, with attention to cost synergy opportunities that support enhanced stockholder returns

Leadership with strong commercial, operational and financial expertise; aligned with stockholder interests

Transaction Summary

Transaction Structure	▪ Lantheus Holdings to acquire 100% of Progenics' common shares structured in a tax-free all-stock transaction ▪ Progenics stockholders to receive 0.2502 Lantheus Holdings shares for each Progenics share ▪ Implies 21.5% premium to Progenics' 30-day volume weighted average closing stock price for the period ended October 1, 2019
Ownership	▪ Lantheus stockholders to own approximately 65% of the combined company ▪ Progenics stockholders to own approximately 35% of the combined company
Governance & Leadership	▪ Mary Anne Heino to remain Chief Executive Officer, Robert J. Marshall Jr. to remain Chief Financial Officer, and John Bolla to remain Chief Operations Officer ▪ Following the closing, Bradley Campbell, currently a member of Progenics' Board of Directors, will be added to the Board of Directors of Lantheus Holdings ▪ Continue to align Lantheus' compensation / accountability policies and programs with stockholders' interests
Compelling Financial Rationale	▪ Diversifies revenue streams with additional marketed products, bolsters cash flow generation and positions company for sustainable long-term growth ▪ Approximately $15 – $20 million in run-rate cost savings by 2022 related primarily to public company costs and G&A expense ▪ Accretive to Adjusted and Reported EPS by 2022 and 2023, respectively
Timing and Approvals	▪ Transaction unanimously approved by Board of Directors of both companies ▪ Closing expected in the first quarter of 2020 ▪ Transaction close subject to satisfaction of customary closing conditions, including receipt of regulatory and Lantheus and Progenics stockholder approvals

Lantheus' Three Growth Pillars to Enhance Long-Term Stockholder Value

Enhance Core

Enhance growth trajectory of core microbubble business

Invest in Pipeline

Invest in emerging technologies within our pipeline

Grow Externally

Pursue selective transactions to support our growth

Lantheus – Extensive Presence in the Radiopharmaceutical Industry

Radiopharmaceutical Business Requires Unique Capabilities and Expertise

Compelling Strategic Fit in Radiopharmaceuticals

Lantheus Medical Imaging

- 60 Year History of Innovation
- A Radiopharmaceutical Leader
- Supply Chain and Manufacturing Expertise
- Proven Commercial Excellence
- Long-Standing Channel Relationships
- Regulatory and Compliance Track Record

Lantheus Medical Imaging

- ✓ **Diversifies across oncology, cardiology, neurology and pulmonology**
- ✓ **Broadens suite of precision diagnostics and disease targets**
- ✓ **Brings together proven track record of managing clinical trials and R&D prioritization with enhanced pipeline**
- ✓ **Isotope expertise can be leveraged for in-house development, in-licensing and manufacturing**
- ✓ **Partner-of-choice for emerging use of isotopes as biomarkers for innovative immuno-oncology therapies**

Progenics Pharmaceuticals

- First and Only FDA Approved Product for Ultra-Orphan Indications in Pheo and Para
- Additional Life Cycle Opportunties to Treat Other Neuroendocrine Tumor Types
- Late Stage PSMA Diagnostic Candidate and Promising Therapeutic Product Candidates
- Integrated PSMA Product Platform, Including AI, Addressing Prostate Cancer

Combined company positioned for long-term, sustainable revenue growth, margin expansion and FCF acceleration

Well-balanced Portfolio of Marketed Assets Spanning Diagnostics to Therapeutics

Precision Diagnostics

DEFINITY (Perflutren Lipid Microsphere) Injectable Suspension

TechneLite Technetium Tc 99m Generator

NEUROLITE Kit for the Preparation of Technetium TC99m Bicisate for Injection

Cardiolite Kit for the Preparation of Technetium T99m Sestamibi for Injection

Xenon Xe 133 Gas

Thallium
Thallous Chloride
Tl 201 Injection

Gallium
Gallium Citrate
Ga 67 Injection

Fludeoxyglucose
F 18 Injection
(FDG F 18)

DEFINITY

- Benefits from unparalleled market and brand position
- Dedicated salesforce that drives advocacy and awareness
- Long-standing relationships with sonographers/echocardiologists
- New formulation has patent protection to 2035

Radiopharmaceuticals

- Cardiolite recognized as most widely-used diagnostic product launched in the U.S. to date
- Wide range of diagnostic imaging for cardiac perfusion, pulmonary function, and cerebral blood flow
- Radiopharmaceutical business requires unique expertise including complex supply chain logistics

Oncology

AZEDRA

QUADRAMET (SAMARIUM SM 153 LEXIDRONAM INJECTION)

RELISTOR methylnaltrexone bromide

aBSI AUTOMATED BONE SCAN INDEX

AZEDRA

- First/only FDA-approved treatment for adults and pediatric patients 12 and older with iobenguane scan positive, unresectable, locally advanced or metastatic pheo/para who require systemic anticancer therapy

RELISTOR

- Only treatment with oral and subcutaneous formulations to treat opioid-induced constipation (OIC) in adults with chronic pain – targeted action treats the cause of OIC
- Licensed to Bausch Health

QUADRAMET

- Injectable radiopharmaceutical primarily used to treat pain associated with osteoblastic and mixed bone metastases confirmed on radionuclide bone scan

Automated Bone Scan Index

- Software as a medical device, is designed to quantify the disease burden in bone scans of metastatic prostate cancer patients

Complementary products position the combined company to better serve patients

Near-Term Value Creation Opportunities From this Transaction

AZEDRA®
iobenguane I 131 solution for intravenous use

Ultra-Orphan radiotherapeutic

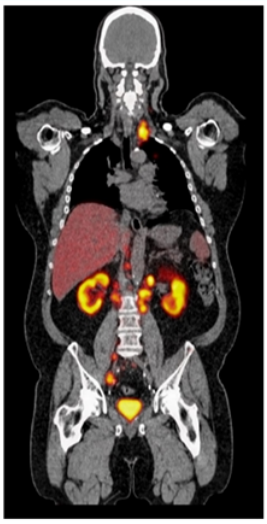
Shown to help address the dual goals of treating advanced pheo / para: tumor reduction and symptom control

PyL™

PSMA-targeted imaging agent

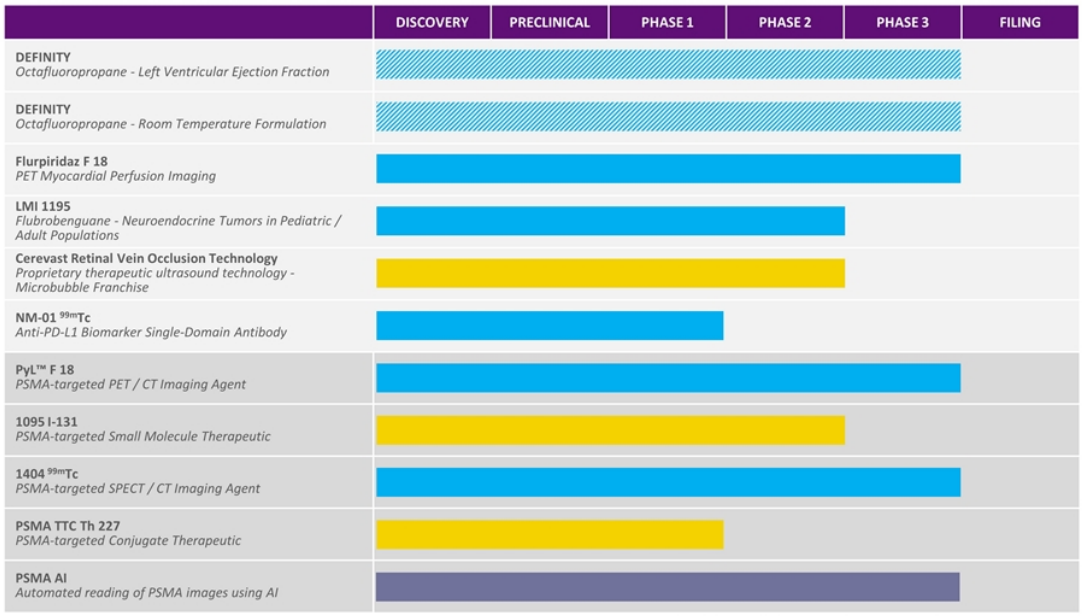
Potential to detect locally advanced prostate cancer, biochemically recurrent prostate cancer, and metastatic disease

Image from OSPREY study



Focused on delivering targeted solutions to address patients' needs while creating significant value for stockholders

Robust Combined Pipeline with Clear Value Drivers



Development Partners
▪ Lantheus developing
▪ Lantheus developing
▪ Lantheus in partnership with GE Healthcare[1]
▪ Lantheus developing
▪ Lantheus partnership with Cerevast[2]
▪ Lantheus partnership with NanoMab[3]
▪ Progenics developing ▪ Licensed in Europe by Curium
▪ Progenics developing
▪ Licensed in Europe by ROTOP
▪ Progenics partnership with Bayer[4]
▪ Progenics developing

Legend: NCE Precision Diagnostic; Life Cycle Management; NCE Therapeutic; Digital Solution

NCE: New Chemical Entity

1. GE Healthcare is conducting the second phase 3 study.
2. Clinical development program conducted by Cerevast.
3. Ongoing Phase 1 clinical development conducted by NanoMab.
4. Clinical development program conducted by Bayer.

Strong Financial Outlook

Gross Margins	▪ Gross margin improvement potential through enhanced revenue growth and realizable cost savings and efficiencies ▪ Additional longer-term opportunities from diversified revenue / product mix
EPS	▪ Complementary portfolio of assets and realizable cost savings – expect to achieve approximately $15 – $20 million in run-rate cost savings by 2022 ▪ Accretion expected to be achieved in reasonable timeframe as high-value pipeline is commercialized ▪ Accretive to Adjusted and Reported EPS by 2022 and 2023, respectively
Cash Flow	▪ Enhanced free cash flow with improved top line growth, operational execution and expected synergy opportunities ▪ Strong liquidity position supports disciplined capital deployment
Pro Forma ROIC	▪ Strong and increasingly attractive ROIC metrics ▪ ROIC reaching double digits in year 2 and ≥ 20% thereafter
Balance Sheet	▪ Committed to returning to a leverage ratio of approximately 2.5x – 1.5x within two years ▪ Strong balance sheet provides financial flexibility

Combination Highlights

- Robust portfolio and pipeline of precision diagnostic and therapeutic products
- Driving strategic pipeline investments to capitalize on market opportunities and maximize returns
- Sustainable and diversified revenue growth with focus on commercial execution excellence
- Attractive financial profile and strengthened cash flow generation, with attention to cost synergy opportunities that support enhanced stockholder returns
- Leadership with strong commercial, operational and financial expertise; aligned with stockholder interests

APPENDIX

Progenics
Pharmaceuticals

Lantheus Overview

Company Overview

- Global leader in the development, manufacture and commercialization of innovative medical diagnostics
- Portfolio of precision diagnostic products that help healthcare professionals identify disease and improve patient management
- DEFINITY® is the leading product in the ultrasound contrast market globally
  - Developing expanded indication (LVEF) and room temperature (RT) formulation
  - Pursuing additional applications of microbubbles outside of traditional contrast imaging
- Recognized innovator in the field of radiopharmaceutical diagnostics
  - Original innovator with first planar and SPECT radiopharmaceutical products, currently developing next-generation PET products

#1 in Ultrasound Contrast Agents

Innovating in Microbubble applications

Leader in Radio-pharmaceuticals

Pioneer in Radiopharmaceutical Diagnostics

Dynamic Pipeline

Across Microbubble and Radiopharmaceuticals

Operational Excellence

Manufacturing, Supply Chain and Commercial Expertise

Progenics Overview

Company Overview

- Oncology company developing innovative medicines and artificial intelligence to find, fight and follow cancer
- Promising key pipeline products have potential to fuel long-term growth
  - Therapeutic agents designed to precisely target cancer (1095 and PSMA TTC)
  - PSMA-targeted diagnostic agents for prostate cancer: PyL and 1404
  - aBSI imaging analysis software
- Three commercial products:
  - **AZEDRA®** - First FDA-approved treatment for adults and pediatric patients 12 years and older with iobenguane scan positive, unresectable, locally advanced or metastatic pheochromocytoma or paraganglioma who require systemic anticancer therapy
  - **Oral** and **subcutaneous formulations** of **RELISTOR®** for opioid-induced constipation

Find, Fight and Follow®

Developing Radiopharmaceuticals to Detect and Treat Cancer

AZEDRA® (iobenguane I 131) for Ultra-Orphan neuroendocrine tumors (NET)

- Addresses ultra rare diseases with devastating patient burden
- Leading causes of death in advanced pheo/para are tumor progression and symptoms related to catecholamine secretion
- AZEDRA® delivers radiation directly to pheo/para tumors
- New technology add-on payment (NTAP) approved by CMS

Prostate-specific membrane antigen (PSMA) Portfolio for Prostate Cancer

- PSMA-targeted diagnostic and therapy has potential across the course of prostate cancer
- Robust product pipeline of diagnostics and therapeutics agents designed to improve diagnosis, treatment and monitoring of prostate cancer
- PyL: PSMA-targeted PET/CT imaging agent
- PSMA Artificial Intelligence (AI) promises faster, more accurate image analysis compared to a human reader alone

Safe Harbor Statements

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 Holdings' and Progenics' plans, estimates or expectations could include, but are not limited to: (i) Lantheus Holdings 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 Holdings or Progenics to retain and hire key personnel and maintain relationships with customers, suppliers and others with whom Lantheus Holdings or Progenics does business, or on Lantheus Holdings' or Progenics' operating results and business generally; (v) Lantheus Holdings' 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 Holdings 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 Holdings 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 Holdings and Progenics are set forth in their respective filings with the SEC, including each of Lantheus Holdings' 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 Holdings 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 Holdings 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.


Lantheus
Holdings
Progenics
Pharmaceuticals