UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 8-K

CURRENT REPORT
Pursuant to Section 13 or 15(d)
of the Securities Exchange Act of 1934

July 27, 2018
Date of Report (Date of earliest event reported)

ATYR PHARMA, INC.
(Exact name of registrant as specified in its charter)

Delaware	**001-37378**	**20-3435077**
(State or other jurisdiction of incorporation)	**(Commission File Number)**	**(IRS Employer Identification No.)**

3545 John Hopkins Court, Suite #250
San Diego, California 92121

(Address of principal executive offices, including zip code)

(858) 731-8389

(Registrant's telephone number, including area code)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligations of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 or Rule 12b-2 of the Securities Exchange Act of 1934.

Emerging growth company ☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☒

Item 7.01 Regulation FD Disclosure.

aTyr Pharma, Inc. (the "Company") is participating at the Scleroderma Foundation National Patient Education Conference held in Philadelphia, Pennsylvania from July 27 – 29, 2018. During the conference, the Company is presenting a poster presentation entitled, "ATYR1923 Ameliorates Dermal and Pulmonary Fibrosis in a Murine Model of Sclerodermatous Chronic Graft vs. Host Disease." The press release related to this announcement is attached hereto as Exhibit 99.1.

The information under this Item 7.01, including Exhibit 99.1 hereto, is being furnished and shall not be deemed "filed" for the purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or otherwise subject to the liabilities of that section, nor shall such information be deemed incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Exchange Act, except as expressly set forth by specific reference in such filing.

Item 8.01 Other Events.

The poster referenced above is titled "ATYR1923 Ameliorates Dermal and Pulmonary Fibrosis in a Murine Model of Sclerodermatous Chronic Graft vs. Host Disease," and is filed as Exhibit 99.2 and incorporated by reference herein.

The poster presentation reviews the positive lung and skin results of a recently completed murine experiment evaluating low doses of ATYR1923 in a chronic graft versus host disease model of systemic sclerosis. The Company believes these data demonstrate ATYR1923 is efficacious in a murine model of sclerodermatous chronic graft versus host disease and are compatible with aTyr's hypothesis that ATYR1923 modulates immune responses and inflammation following tissue injury.

Forward-Looking Statements

This Current Report on Form 8-K contains forward-looking statements within the meaning of the Private Litigation Reform Act. Forward-looking statements are usually identified by the use of words such as "anticipates," "believes," "estimates," "expects," "intends," "may," "plans," "projects," "seeks," "should," "will," and variations of such words or similar expressions. We intend these forward-looking statements to be covered by such safe harbor provisions for forward-looking statements and are making this statement for purposes of complying with those safe harbor provisions. These forward-looking statements, including statements regarding the potential therapeutic benefits and applications of our product candidates; our ability to successfully advance our pipeline or product candidates, undertake certain development activities (such as the initiation of clinical trials, clinical trial enrollment, the conduct of clinical trials and the announcement of top-line results) and accomplish certain development goals, and the timing of such events; and the scope and strength of our intellectual property portfolio. These forward-looking statements also reflect our current views about our plans, intentions, expectations, strategies and prospects, which are based on the information currently available to us and on assumptions we have made. Although we believe that our plans, intentions, expectations, strategies and prospects, as reflected in or suggested by these forward-looking statements, are reasonable, we can give no assurance that the plans, intentions, expectations or strategies will be attained or achieved. Furthermore, actual results may differ materially from those described in these forward-looking statements and will be affected by a variety of risks and factors that are beyond our control including, without limitation, risks associated with the discovery, development and regulation of our product candidates, the risk that we may cease or delay preclinical or clinical development activities for any of our existing or future product candidates for a variety of reasons (including difficulties or delays in patient enrollment in planned clinical trials), and the risk that we may not be able to raise the additional funding required for our business and product development plans, as well as those risks set forth in our most recent Annual Report on Form10-K, Quarterly Reports on Form 10-Q and in our other SEC filings. Except as required by law, we assume no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise.

Item 9.01 Exhibits.

(d) Exhibits.

99.1	Press Release of aTyr Pharma, Inc. dated July 26, 2018.
99.2	Poster presentation titled "ATYR1923 Ameliorates Dermal and Pulmonary Fibrosis in a Murine Model of Sclerodermatous Chronic Graft vs. Host Disease."

SIGNATURE

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

ATYR PHARMA, INC.

By: /s/ Sanjay S. Shukla
Sanjay S. Shukla, M.D., M.S.
President and Chief Executive Officer

Date: July 27, 2018

Exhibit 99.1

IMMEDIATE RELEASE

Contact:
Mark Johnson
Sr. Director, Investor Relations
mjohnson@atyrpharma.com
858-223-1163

aTyr Pharma Presents Positive Lung and Skin Findings with ATYR1923 in a Translational Animal Model

at the Scleroderma Foundation National Patient Education Conference

SAN DIEGO – July 26, 2018 – aTyr Pharma, Inc. (Nasdaq: LIFE), a biotherapeutics company engaged in the discovery and development of innovative medicines based on novel immunological pathways, today announced a poster presentation at the Scleroderma Foundation National Patient Education Conference to be held in Philadelphia, PA from July 27 – 29, 2018. The presentation reviews the positive lung and skin results of a recently completed murine experiment evaluating low doses of ATYR1923 in a chronic graft versus host disease model of systemic sclerosis.

“The data we are presenting tomorrow are part of our ongoing estate of translational animal models set to help inform and de-risk our upcoming clinical development of ATYR1923,” stated David King, Ph.D., aTyr’s Chief Scientific Officer. “The conclusions of this study support our hypothesis and mechanistic understanding that ATYR1923 may have therapeutic benefit as an earlier intervention for patients with interstitial lung disease characterized by inflammation.”

Poster Presentation: Friday July 27, 2018 from 5:00 – 7:15 PM (EDT)

Title: “*ATYR1923 Ameliorates Dermal and Pulmonary Fibrosis in a Murine Model of Sclerodermatous Chronic Graft vs. Host Disease”*
Presenter: Kathleen Ogilvie, Ph.D., aTyr Pharma, Inc.
Conclusions:

- Data demonstrate ATYR1923 is efficacious in a murine model of sclerodermatous chronic graft versus host disease when administered weekly at only 0.4 mg/kg.
- ATYR1923 has robust activity when treatment was initiated at Day 7.
- ATYR1923 activity did not reach significance when treatment was initiated at Day 21.
- Data are compatible with aTyr’s hypothesis that ATYR1923 modulates immune responses and inflammation following tissue injury.

About aTyr

aTyr is a clinical-stage biotechnology company engaged in the discovery and clinical development of innovative medicines using its knowledge of tRNA synthetase biology. aTyr is focused on the therapeutic translation of the Resokine pathway, comprised of extracellular proteins derived from the histidyl tRNA synthetase (HARS) gene family. aTyr’s clinical stage ATYR1923 candidate augments the Resokine pathway and is designed to temper immune engagement in interstitial lung diseases. aTyr has built an intellectual property estate, to protect its pipeline, comprising over 250 issued patents or

allowed patent applications that are owned or exclusively licensed, including over 300 potential protein compositions derived from tRNA synthetase genes. For more information, please visit http://www.atyrpharma.com.

Forward-Looking Statements

This press release contains forward-looking statements within the meaning of the Private Litigation Reform Act. Forward-looking statements are usually identified by the use of words such as “anticipates,” “believes,” “estimates,” “expects,” “intends,” “may,” “plans,” “projects,” “seeks,” “should,” “will,” and variations of such words or similar expressions. We intend these forward-looking statements to be covered by such safe harbor provisions for forward-looking statements and are making this statement for purposes of complying with those safe harbor provisions. These forward-looking statements, including statements regarding the potential therapeutic benefits and applications of our product candidates; our ability to successfully advance our pipeline or product candidates, undertake certain development activities (such as the initiation of clinical trials, clinical trial enrollment, the conduct of clinical trials and the announcement of top-line results) and accomplish certain development goals, and the timing of such events; and the scope and strength of our intellectual property portfolio. These forward-looking statements also reflect our current views about our plans, intentions, expectations, strategies and prospects, which are based on the information currently available to us and on assumptions we have made. Although we believe that our plans, intentions, expectations, strategies and prospects, as reflected in or suggested by these forward-looking statements, are reasonable, we can give no assurance that the plans, intentions, expectations or strategies will be attained or achieved. Furthermore, actual results may differ materially from those described in these forward-looking statements and will be affected by a variety of risks and factors that are beyond our control including, without limitation, risks associated with the discovery, development and regulation of our product candidates, the risk that we may cease or delay preclinical or clinical development activities for any of our existing or future product candidates for a variety of reasons (including difficulties or delays in patient enrollment in planned clinical trials), and the risk that we may not be able to raise the additional funding required for our business and product development plans, as well as those risks set forth in our most recent Annual Report on Form 10-K, Quarterly Reports on Form 10-Q and in our other SEC filings. Except as required by law, we assume no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise.

ATYR1923 Ameliorates Dermal and F Sclerodermatous Chronic Graft vs. H

K. Ogilvie, S. Rosengren, C. Burkart, D. King

aTyr Pharma, San Diego, CA

Abstract

INTRODUCTION: During the evolution of complex organisms, aminoacyl-tRNA synthetase genes evolved to incorporate new sequences and generate multiple splice variants which have novel functions. Histidyl-tRNA synthetase and its splice variants are secreted and modulate the activity of the immune system through a novel pathway, termed the Resokine pathway. We have shown that Resokine proteins containing the N-terminal immunomodulatory (iMod) domain were effective in reducing bleomycin-induced lung fibrosis in rodents, demonstrating the functional significance of the Resokine pathway in the lung. ATYR1923 is a potential therapeutic comprised of the Resokine iMod domain fused to a human IgG1 Fc, which extends the circulating half-life of the molecule, resulting in a longer duration of action.

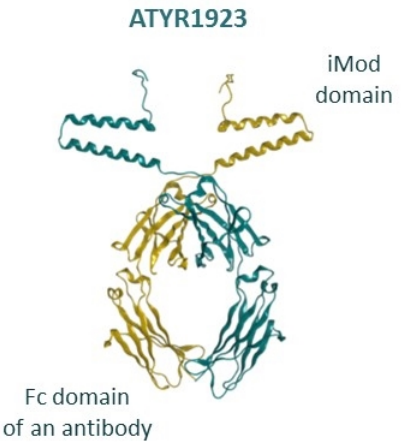
RATIONALE: Based on its effects on immune cell activity and its efficacy in rodent bleomycin-induced lung injury experiments, we hypothesized that administration of ATYR1923 might modulate immune responses in multiple organs, including lung and skin. We tested this hypothesis in a sclerodermatous chronic graft vs. host disease (scl cGvHD) murine model of systemic sclerosis.

METHODS: ATYR1923 was expressed in *E. coli* and purified to homogeneity in a GMP-compliant facility. We employed a minor histocompatibility antigen-mismatched model which has been reported to mimic the pathological symptoms of human scl cGvHD. Briefly, bone marrow and splenocytes from B10.D2 mice were transplanted into whole body irradiated recipient Balb/c mice. Treatment with ATYR1923 (0.4 mg/kg, intravenously once a week) was compared with nintedanib, (60 mg/kg, orally daily), with administration beginning at Day 7 (early intervention) or at Day 21 (late intervention). Scheduled euthanasia was conducted 8 weeks after transplantation to collect lungs and skin for histological evaluation and collagen content.

RESULTS: As expected, nintedanib decreased lung and skin fibrosis in murine scl cGvHD, qualifying the data obtained in this experiment. ATYR1923 at 0.4 mg/kg weekly beginning on Day 7 in murine scl cGvHD exerted therapeutic activity in both skin and lung as revealed by significantly decreased dermal thickness in the skin and histological fibrosis (Ashcroft score) in the lungs in comparison to untreated controls. The number of myofibroblasts and hydroxyproline (i.e., collagen) content was also significantly reduced in both organs. Observed effects with weekly dosing of ATYR1923 were similar to those observed with daily dosing of nintedanib. Late intervention with ATYR1923 was not significantly effective with this dosing paradigm.

CONCLUSIONS: ATYR1923 is efficacious in a murine model of scl cGvHD when administered weekly at 0.4 mg/kg. ATYR1923 had robust activity when treatment was commenced early in the model and no significant activity when intervention commenced late. These observations are compatible with our hypothesis that the iMod domain's primary effect is via modulation of immune response rather than fibrotic pathways. Based on the pre-clinical data, including *in vitro, in vivo* and toxicological experiments, clinical testing of ATYR1923 is ongoing.

Introduction



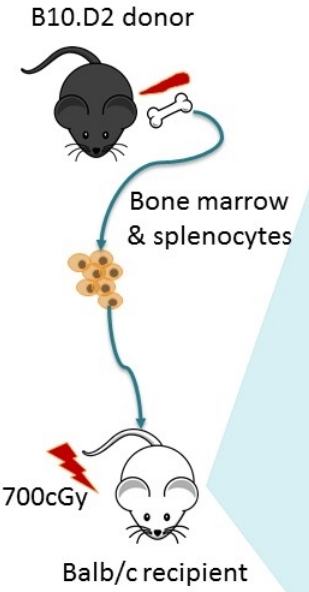
ATYR1923

iMod domain of HARS:

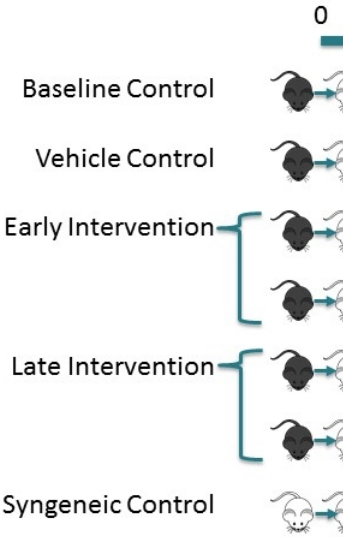
- Encoded by a splice variant that is enriched in human lung.
- Inhibits human T cell activation
- Exogenous administration reduces fibrosis in rodent bleomycin-induced lung fibrosis model

Fc domain: Used to extend *in vivo* half-life in many FDA-approved biologic medicines

Sclerod



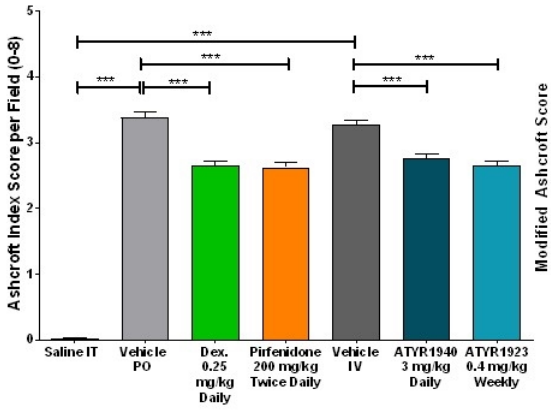
Experim



ATYR1923 administered on
Nintedanib administered o
Skin and lung tissues co

Presented

Mouse Bleomycin

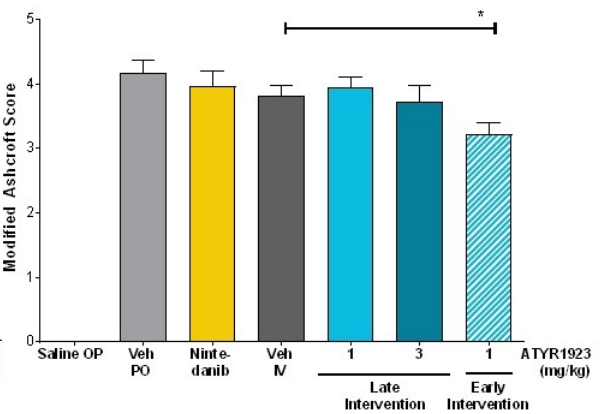


Oral vehicle: 1x PBS, BID D8-D21
Intravenous (IV) vehicle: 50 mM L-His, 140 mM NaCl, QD D8-D21
Pirfenidone: 200 mg/kg PO BID D8-D21
Dexamethasone (Dex): 0.25 mg/kg D0-D21

ATYR1940: 3 mg/kg IV QD D8-D21
ATYR1923: 0.4 mg/kg IV QW D8, D15

***p< 0.001 vs respective vehicle

Rat Bleomycin



Oral vehicle: 1x PBS, BID D8-D21
Intravenous (IV) vehicle: 20 mM L-His, 150 mM NaCl, QD D8-D21
Nintedanib: 60 mg/kg PO D8-D21

ATYR1923: 1 or 3 mg/kg QW
Early intervention D2, D9, D16; Late intervention D9, D16

*p< 0.05 vs IV vehicle