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

October 5, 2017
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 8.01 Other Events

On October 5, 2017, aTyr Pharma, Inc. (the "Company") presented a poster presentation at the 22nd International Annual Congress of the World Muscle Society (WMS) in Saint Malo, France, which provides further detail on the previously announced clinical data from the Company's Phase 1b/2 Trial (003) in patients with early-onset facioscapulohumeral muscular dystrophy (FSHD). The poster is titled "Results of a Phase 1b/2 Study of ATYR1940 in Adolescents and Young Adults with Early-onset Facioscapulohumeral Muscular Dystrophy (FSHD) (ATYR1940-C-003)," and is filed as Exhibit 99.1 and incorporated herein by reference.

The poster presentation provides further detail on the previously announced results from the completed Phase 1b/2 open-label, intra-patient dose escalation 003 trial testing doses of Resolaris (*ATYR1940*) of up to 3.0 mg/kg weekly in patients with early-onset FSHD. In this study, Resolaris was generally well tolerated at doses up to 3.0 mg/kg once weekly in patients ages 16 to 20 years with early-onset FSHD. 63% of patients (5 of 8) had increases from baseline in their Manual Muscle Test (MMT), a validated assessment tool that measures muscle strength, with a mean change from baseline of +3.8%. In addition, 67% of patients measured (4 of 6) had improvement in their Individualized Neuromuscular Quality of Life (INQoL) score, a validated patient reported outcome measuring a patient's level of disease burden. On average, patients did not have a worsening of their disease burden as measured by INQoL. No signs of general immunosuppression were observed, and low-level ADA signals did not result in clinical symptoms. The Company believes these data are supportive of further advancement of Resolaris.

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. The Company intends these forward-looking statements to be covered by such safe harbor provisions for forward-looking statements and is making this statement for purposes of complying with those safe harbor provisions. These forward-looking statements, including statements regarding the potential and potential therapeutic benefits of Resolaris™, the ability of the Company to successfully advance its pipeline or product candidates, undertake certain development activities (such as clinical trial enrollment and the conduct of clinical trials) and accomplish certain development goals and the timing of such activities and development goals, the timing of initiation of additional clinical trials and of reporting results from the Company's clinical trials, the scope and strength of the Company's intellectual property portfolio, the Company's ability to receive regulatory approvals for, and commercialize, its product candidates and reflect the Company's current views about its plans, intentions, expectations, strategies and prospects, which are based on the information currently available to it and on assumptions the Company has made. Although the Company believes that its plans, intentions, expectations, strategies and prospects as reflected in or suggested by those forward-looking statements are reasonable, the Company 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 the forward-looking statements and will be affected by a variety of risks and factors that are beyond the Company's control including, without limitation, risks associated with the discovery, development and regulation of the Company's product candidates, as well as those set forth in the Company's most recent Annual Report on Form 10-K for the year ended December 31, 2016 and in the Company's other SEC filings. Except as required by law, the Company assumes 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	Poster presentation titled “Results of a Phase 1b/2 Study of ATYR1940 in Adolescents and Young Adults with Early-onset Facioscapulohumeral Muscular Dystrophy (FSHD) (ATYR1940-C-003).”

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/ John T. Blake
John T. Blake
Senior Vice President, Finance

Date: October 5, 2017

Results of a Phase 1b/2 Study of ATYR1940 in Adolescents and Young Adults With Early-onset Facioscapulohumeral Muscular Dystrophy (FSHD) (ATYR1940-C-003)

Gennyne Walker[1], Russell J. Butterfield[2], Katherine Mathews[3], Laurent Servais[4], John Day[5], Teresa Gidaro[4], Sanjay Shukla[1], Lorenzo Ma

[1]aTyr Pharma, Inc., San Diego, CA, USA; [2]Utah Program for Inherited Neuromuscular Disorders, Salt Lake City, UT, USA; [3]University of Iowa, ICTS Clinical Research Un
[4]Institute of Myology, I-Motion Pediatric Clinical Trials, Paris, France; [5]Stanford University, Palo Alto, CA, USA; [6]Foundation IRCCS Neurological Institute Carlo Besta, M

Introduction

Early-onset Facioscapulohumeral Muscular Dystrophy (FSHD)

- FSHD is a rare genetic autosomal dominant muscular dystrophy that results in significant disability. Patients diagnosed with FSHD typically present with symptoms in late adolescence or early adulthood.[1]
- Early-onset FSHD refers to patients who present with symptoms before the age of 18 years. Within this early-onset population are individuals who had symptoms before the age of 5 years and disease progression before the age of 10 years, often defined as "infantile-onset" FSHD.[2] These patients typically have more severe, rapidly progressive, muscle involvement, as well as extramuscular conditions such as hearing loss and retinal vascular abnormalities.[3]
- Inflammatory cell infiltration of skeletal muscles in patients with FSHD is observed and may be involved in the pathophysiology of FSHD.[4,5]
- No targeted pharmacological interventions are available for FSHD.

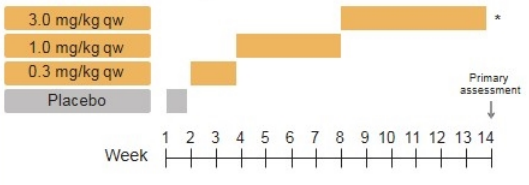
ATYR1940 for the Treatment of FSHD

- ATYR1940 (Resolaris™) is a slightly truncated form of human histidyl tRNA synthetase (HARS).
- HARS may have extracellular roles, including modulation of immune responses in skeletal muscle,[6] in addition to its established intracellular function in protein synthesis.
- In preclinical experiments using a rat model of statin-induced myopathy, ATYR1940 reduced skeletal-muscle degeneration and necrosis, reduced the number of immune cells in muscle, and downregulated immune regulatory proteins in diseased tissue in a dose-dependent manner.[7]
- Because the immune component may play a role in FSHD pathophysiology, ATYR1940, a novel noncorticosteroid immunomodulator, is being investigated as a potential therapy.

Study Design

- This was a phase 1b/2, multicenter, open-label, intrapatient, placebo run-in, dose-escalation study that evaluated the safety, tolerability, immunogenicity, and exploratory clinical assessments of intravenous (IV) ATYR1940 administered once weekly (qw).
- Study population:
  - 16–25 years old
  - Genetically established FSHD1
  - Signs or symptoms of FSHD before 10 years old
- Patients received 1 dose of placebo, then 12 doses of ATYR1940 starting at 0.3 mg/kg qw and increasing to 3 mg/kg qw (**Figure 1**).

Figure 1. Study Design



*Patients who completed this study could enter a long-term extension study.
qw = once weekly.

- Clinical activity was assessed by a change from baseline to Week 14 using:
  - Manual Muscle Testing (MMT), a validated assessment of muscle strength. Assessments were graded using a modified Medical Research Council scale.[7]
    - Ordinal scores were converted to numeric scores, and results across 14 muscle groups were used to calculate a total MMT score.
  - Individualized Neuromuscular Quality-of-Life (INQoL) questionnaire, a validated self-administered, muscle-disease–specific measure of quality of life.
- Other endpoints included magnetic resonance imaging (MRI) parameters, eye and hearing assessments, and analysis of circulating biomarkers.

Results

- 8 Patients ages 16 to 20 years were enrolled; all had FSHD1.
- All patients completed the study:
  - 1 Patient did not receive all doses of study drug due to an infusion-related reaction (IRR).
  - Individual demographics and baseline characteristics are shown in **Table 1**.

Table 1. Demographics and Baseline Characteristics

Characteristic	Early-onset FSHD, Mean (N = 8)
Age, years	17.9
Disease duration, years	13.1
Age of onset, years	6.1
Clinical severity score*	3.1
D4Z4 repeat	3.6

*FSHD-specific clinical severity score with a scale of 0.5 (facial weakness) to 5.0 (wheelchair bound).
FSHD, facioscapulohumeral muscular dystrophy.

Safety and Tolerability

- All 8 (100%) patients reported at least 1 treatment-emergent AE (TEAE) (**Table 2**).
  - All TEAEs were mild or moderate.
  - 1 Patient had a grade 2 (moderate) nonserious IRR that resolved the day of drug discontinuation.
  - No serious AEs were reported.
- No signals or trends were observed during the study regarding results from vital signs, electrocardiograms, or pulmonary functional tests.
- No evidence of general immunosuppression was noted on review of hematology and TEAEs (ie, no neutropenia, leukopenia, or serious infections).
- No clinically significant changes in indirect ophthalmoscopy, fundus findings, or optical coherence tomography.

Table 2. TEAEs in ≥ 2 patients

Preferred Term	Early-onset FSHD (N = 8) n (%)
Myalgia	3 (37.5%)
Paresthesia	3 (37.5%)
Headache	2 (25.0%)
Nasopharyngitis	2 (25.0%)
Nausea	2 (25.0%)

Clinical Activity

MMT

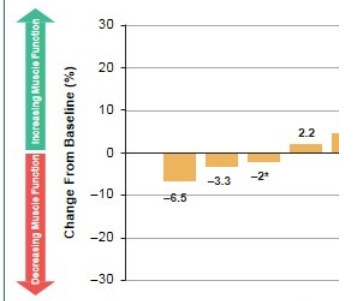
- Mean total MMT score increased
  range –6.5% to 19.3%).
- 5 (63%) of 8 patients had increas
  total MMT scores (**Figure 2**).

INQoL

- Mean overall INQol score change
  range –17.3% to 13.4%).
- 4 (67%) of 6 patients with comple
  improvements (decreases) in INQ

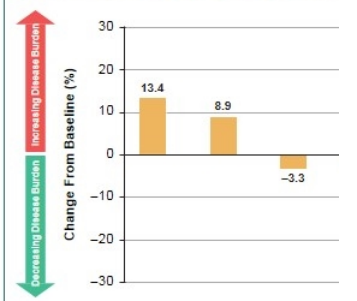
No consistent changes during the st
for MRI parameters or circulating bio

**Figure 2. Percentage Change Fro
Week 14 in MMT Total Scores for**



*Patient received only 4 doses of ATYR1940, discont
insulin-related reaction.
MMT, Manual Muscle Testing.

**Figure 3. Change From Baseline
Overall QoL Score for Individual**



n = 6: Only 6 of 8 patients had INQoL results at both
INQoL; Individualized Neuromuscular Quality of Life;

Conclusio

- In this exploratory, open-label stu
  (Resolaris™) was generally well t
  to 3.0 mg/kg once weekly in patie
  years with early-onset FSHD.
- No signs of general immunosuppr
  observed, and low-level ADA sign
  clinical symptoms.
- Although this study was not desig
  assess clinical activity, a mean in
  MMT scores was observed after
- Mean overall INQoL score did not
- These results support further inve
  ATYR1940 for early-onset FSHD.

References

1. Tawil R and Van Der Maarel SM. *Muscle Nerve*. 20
2. Brouwer OF et al. *Arch Neurol*. 1994;51(4):387-39

Key Study Endpoints

- Safety and tolerability were assessed by:
  - Incidence of adverse events (AEs), and anti-drug antibody (ADA) titer and Jo-1 (anti-HARS) antibody levels.
  - Standard clinical evaluations (ie, electrocardiograms, pulmonary function tests, laboratory investigations).

FSHD, facioscapulohumeral muscular dystrophy; TEAE, treatment-emergent adverse event.

Immunogenicity

- 4 of 8 patients receiving ATYR1940 had positive test results for ADA signals; these titer levels were low and did not result in clinical symptoms.
- No patients had Jo-1 antibody levels that were considered positive or equivocal for antisynthetase syndrome.

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Acknowledgments

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Corresponding author contact: gwalker@atyrpharm

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