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

SCHEDULE 14A INFORMATION

Proxy Statement Pursuant to Section 14(a) of the Securities Exchange Act of 1934
(Amendment No.)

Filed by the Registrant Filed by a party other than the Registrant

Check the appropriate box:

- Preliminary Proxy Statement
- **Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))**
- Definitive Proxy Statement
- Definitive Additional Materials
- Soliciting Material under § 240.14a-12

ATYR PHARMA, INC.

(Name of Registrant as Specified In Its Charter)

(Name of Person(s) Filing Proxy Statement, if other than the Registrant)

Payment of Filing Fee (Check all boxes that apply):

- No fee required
- Fee paid previously with preliminary materials
- Fee computed on table in exhibit required by Item 25(b) per Exchange Act Rules 14a-6(i)(1) and 0-11

March 2023

To our stockholders,

Thank you for your continued support of aTyr Pharma, where we are working to develop a new class of medicines from our tRNA synthetase biology platform with a current focus on disease areas related to inflammation and fibrosis.

Our lead therapeutic candidate, efzofitimod, is a novel immunomodulator that downregulates immune responses in uncontrolled inflammatory diseases. We are developing efzofitimod as a potential transformative treatment for patients with interstitial lung disease (ILD), a group of rare immune-mediated fibrotic lung disorders, with the goal of resolving inflammation to prevent the progression of fibrosis in order to improve outcomes for patients.

2022 was an important year for aTyr as we advanced efzofitimod to the first global pivotal Phase 3 study in patients with pulmonary sarcoidosis, the most prevalent form of ILD, where there remains a dire need for safer and more effective treatments. This study, which is known as EFZO-FIT™, is currently enrolling at multiple centers in the U.S, Europe and Japan. We are conducting this study in collaboration with Kyorin Pharmaceutical, our partner for the development and commercialization of efzofitimod for ILD in Japan, and their initiation of the study in Japan in early 2023 triggered a $10.0 million milestone payment to aTyr.

Our strategy for efzofitimod includes investigating the role it may play as a potential treatment for other, more inflammatory forms of ILD, such as connective tissue disease related ILD (CTD-ILD) and chronic hypersensitivity pneumonitis. We plan to initiate a Phase 2 proof-of-concept study in patients with systemic sclerosis (SSc, or scleroderma)-associated ILD (SSc-ILD) in 2023. SSc-ILD is a major type of CTD-ILD that, like sarcoidosis, has limited standard of care. Current treatments for this serious condition are not disease modifying and do nothing to improve the quality of life of these patients. Experts support our rationale for expanding the efzofitimod clinical program to SSc-ILD, not only based on the clinical proof-of-concept demonstrated for efzofitimod in pulmonary sarcoidosis patients, but also the robust preclinical work that we conducted showing efzofitimod's potential in this debilitating condition.

This program expansion increases the potential market opportunity for efzofitimod in these multiple forms of ILD, which we believe is an untapped $2-3 billion dollar global market opportunity.

While our primary focus is our clinical program for efzofitimod, we continue to leverage our intellectual property estate covering fragments from all 20 human tRNA synthetases and utilize our platform as an engine to generate potential pipeline candidates and identify therapeutic targets. In 2022, we entered into a research collaboration with Dualsystems Biotech AG to leverage their advanced technology to increase productivity in our discovery engine and efficiently generate new therapeutics from our tRNA synthetase domain library.

We are very pleased with our accomplishments in 2022 and our start to 2023 as we work towards fulfilling our mission to harness the potential power of this advanced evolutionary biology and create novel breakthrough therapies.

Sincerely,

Sanjay S. Shukla, M.D., M.S.
President and Chief Executive Officer