

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

**POST-EFFECTIVE AMENDMENT NO. 1
TO
FORM S-1
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933**

aTyr Pharma, Inc.

(Exact name of Registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

2836
(Primary Standard Industrial
Classification Code Number)

20-3435077
(I.R.S. Employer
Identification Number)

3545 John Hopkins Court, Suite 250
San Diego, CA 92121
(858) 731-8389
(Address, including zip code, and telephone number, including area code, of Registrant's principal executive offices)

Sanjay S. Shukla, M.D., M.S.
President and Chief Executive Officer
aTyr Pharma, Inc.
3545 John Hopkins Court, Suite 250
San Diego, CA 92121
(858) 731-8389

(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Sean M. Clayton
Alexa M. Ekman
Cooley LLP
4401 Eastgate Mall
San Diego, CA 92121
(858) 550-6000

Ivan Blumenthal, Esq.
Cliff M. Silverman, Esq.
Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.
Chrysler Center, 666 3rd Avenue
New York, NY
(212) 935-1300

Approximate date of commencement of proposed sale to the public: As soon as practicable after the effective date of this Registration Statement.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box:

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. 333-235951

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer
Non-accelerated filer

Accelerated filer
Smaller reporting company
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 7(a)(2)(B) of the Securities Act.

This post-effective amendment shall become effective upon filing with the Securities and Exchange Commission in accordance with Rule 462(d) under the Securities Act of 1933, as amended.

EXPLANATORY NOTE

This Post-Effective Amendment No. 1 (this "Amendment") relates to the Registrant's Registration Statement on Form S-1 (File No. 333-235951), as amended, declared effective on February 5, 2020 by the Securities and Exchange Commission. The Registrant is filing this Amendment for the sole purpose of replacing Exhibit 5.1 to the Registration Statement. This Amendment does not modify any provision of Part I or Part II of the Registration Statement other than Item 16(a) of Part II as set forth below.

PART II
INFORMATION NOT REQUIRED IN PROSPECTUS

Item 16. Exhibits and Financial Statement Schedules.

(a) Exhibits.

| Exhibit Number | Exhibit Title | Form | Incorporated by Reference File No. | Reference Exhibit | Filing Date |
|-----------------------|--|-------------|---|--------------------------|--------------------|
| 5.1 | Opinion of Cooley LLP | | | | Filed herewith |
| 23.2 | Consent of Cooley LLP (included in Exhibit 5.1 hereto) | | | | Filed herewith |
| 24.1 | Powers of Attorney | S-1 | 333-235951 | 24.1 | January 17, 2020 |

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant has duly caused this Post-Effective Amendment No. 1 to Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of San Diego, State of California, on February 5, 2020.

ATYR PHARMA, INC.

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

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the dates indicated.

| <u>Signature</u> | <u>Title</u> | <u>Date</u> |
|---|---|------------------|
| <u>/s/ Sanjay S. Shukla, M.D., M.S.</u> Sanjay S. Shukla, M.D., M.S. | President, Chief Executive Officer and Director (Principal Executive Officer) | February 5, 2020 |
| <u>/s/ Jill M. Broadfoot</u> Jill M. Broadfoot | Chief Financial Officer (Principal Financial and Accounting Officer) | February 5, 2020 |
| <u>/s/ *</u> John K. Clarke | Chairman of the Board and Director | February 5, 2020 |
| <u>/s/ *</u> James C. Blair, Ph.D. | Director | February 5, 2020 |
| <u>/s/ *</u> Timothy P. Coughlin | Director | February 5, 2020 |
| <u>/s/ *</u> Jane A. Gross, Ph.D. | Director | February 5, 2020 |
| <u>/s/ *</u> Jeffrey S. Hatfield | Director | February 5, 2020 |
| <u>/s/ *</u> Svetlana Lucas, Ph.D. | Director | February 5, 2020 |
| <u>/s/ *</u> Paul Schimmel, Ph.D. | Director | February 5, 2020 |

* By: /s/ Sanjay S. Shukla, M.D., M.S.
Sanjay S. Shukla, M.D., M.S.
Attorney-in-fact



Sean M. Clayton
+1 858 550 6034
sclayton@cooley.com

Exhibit 5.1

February 5, 2020

aTyr Pharma, Inc.
3545 John Hopkins Court, Suite 250
San Diego, California 92121

Ladies and Gentlemen:

We have represented aTyr Pharma, Inc., a Delaware corporation (the "**Company**"), in connection with the filing by the Company of a registration statement (No. 333-235951) on Form S-1 (the "**Initial Registration Statement**") with the Securities and Exchange Commission, including a related prospectus filed with the Initial Registration Statement (the "**Prospectus**"), and a Registration Statement on Form S-1 related thereto filed with the Commission pursuant to Rule 462(b) promulgated under the Act (together with the Initial Registration Statement, the "**Registration Statements**"), covering an underwritten public offering of up to 4,058,823 shares (the "**Shares**") of the Company's common stock, par value \$0.001, which includes up to 529,411 shares that may be sold pursuant to the exercise of an option to purchase additional shares.

In connection with this opinion, we have examined and relied upon (a) the Registration Statements and the Prospectus, (b) the Company's Certificate of Incorporation and Bylaws, each as currently in effect, and (c) originals or copies certified to our satisfaction of such records, documents, certificates, memoranda and other instruments as in our judgment are necessary or appropriate to enable us to render the opinion expressed below.

We have assumed the genuineness and authenticity of all documents submitted to us as originals, and the conformity to originals of all documents submitted to us as copies and the due execution and delivery of all documents by all persons other than by the Company, where due execution and delivery are a prerequisite to the effectiveness thereof. As to certain factual matters, we have relied upon a certificate of an officer of the Company and have not sought independently to verify such matters.

Our opinion is expressed only with respect to the General Corporation Law of the State of Delaware. We express no opinion to the extent that any other laws are applicable to the subject matter hereof and express no opinion and provide no assurance as to compliance with any federal or state securities law, rule or regulation.

On the basis of the foregoing, and in reliance thereon, we are of the opinion that the Shares, when sold and issued against payment therefor as described in the Registration Statements and the Prospectus, will be validly issued, fully paid and non-assessable.

Cooley

We consent to the reference to our firm under the caption "Legal Matters" in the Prospectus included in the Initial Registration Statement and to the filing of this opinion as an exhibit to an amendment to the Initial Registration Statement filed pursuant to Rule 462(d).

Sincerely,

Cooley LLP

By: /s/ Sean M. Clayton
Sean M. Clayton