

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

**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.  333-235951

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.

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 Registration Statement shall become effective upon filing in accordance with Rule 462(b) promulgated under the Securities Act of 1933, as amended.**

**CALCULATION OF REGISTRATION FEE**

<b>Title of Each Class of Securities to be Registered</b>	<b>Proposed Maximum Aggregate Offering Price(1)</b>	<b>Amount of Registration Fee(2)</b>
Common Stock, par value \$0.001 per share	\$3,450,000	\$448
<p>(1) In accordance with Rule 462(b) promulgated under the Securities Act of 1933, as amended, the Registrant is registering an additional amount of securities having a proposed maximum offering price of no more than 20% of the maximum aggregate offering price of the securities eligible to be sold under the related Registration Statement on Form S-1, as amended (File No. 333-235951). Includes the aggregate offering price of shares that may be purchased by the underwriters pursuant to an option to purchase additional shares to cover over-allotments, if any.</p> <p>(2) Estimated solely for the purpose of calculating the registration fee in accordance with Rule 457(o) of the Securities Act of 1933, as amended. Includes the aggregate offering price of shares that may be purchased by the underwriters pursuant to an option to purchase additional shares to cover over-allotments, if any.</p>		

## EXPLANATORY NOTE

This Registration Statement is being filed pursuant to Rule 462(b) under the Securities Act of 1933, as amended (the "Securities Act"). The contents of the Registration Statement on Form S-1 (File No. 333-235951) filed by aTyr Pharma, Inc. with the Securities and Exchange Commission (the "Commission") pursuant to the Securities Act, which was declared effective by the Commission on February 5, 2020, are incorporated by reference into this Registration Statement.

The required opinion and consents are listed on an Exhibit Index attached hereto and filed herewith.

---

**EXHIBIT INDEX**

Exhibit Number	Exhibit Title	Form	Incorporated by Reference File No. Exhibit	Filing Date
5.1	<a href="#">Opinion of Cooley LLP</a>			Filed herewith
23.1	<a href="#">Consent of Independent Registered Public Accounting Firm</a>			Filed herewith
23.2	<a href="#">Consent of Cooley LLP (included in Exhibit 5.1 hereto)</a>			Filed herewith
24.1	<a href="#">Powers of Attorney</a>	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 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 on Form S-1 (the "**Registration Statement**") with the Securities and Exchange Commission, pursuant to Rule 462(b) promulgated under the Securities Act of 1933, as amended, covering an underwritten public offering of up to 4,870,588 shares (the "**Shares**") of the Company's common stock, par value \$0.001. The Registration Statement incorporates by reference the registration statement on Form S-1 (No. 333-235951), which was declared effective on February 5, 2020 (the "**Prior Registration Statement**"), including the prospectus which forms a part of the Prior Registration Statement (the "**Prospectus**").

In connection with this opinion, we have examined and relied upon (a) the Registration Statement 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 undertaken no independent verification with respect to such matters. 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 authorization, execution and delivery of all documents by all persons other than the Company, where due authorization, 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 Statement 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 Prior Registration Statement and to the filing of this opinion as an exhibit to the Registration Statement.

Sincerely,

Cooley LLP

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

**Consent of Independent Registered Public Accounting Firm**

We consent to the incorporation by reference in the Registration Statement on Form S-1 filed pursuant to Rule 462(b) of the Securities Act of 1933 of the reference to our firm under the caption “Experts” and to the incorporation by reference of our report dated March 26, 2019 (except for the fourth paragraph of Note 1, as to which the date is January 17, 2020), with respect to the consolidated financial statements of aTyr Pharma, Inc. incorporated by reference in Amendment No. 1 to the Registration Statement on Form S-1 (No. 333-235951) and the related Prospectus of aTyr Pharma, Inc. for the registration of shares of its common stock.

/s/ Ernst & Young LLP

San Diego, California  
February 5, 2020