

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

**FORM S-1
REGISTRATION STATEMENT**

*Under
The Securities Act of 1933*

DECIPHERA PHARMACEUTICALS, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

2834
(Primary Standard Industrial
Classification Code Number)

30-1003521
(I.R.S. Employer
Identification Number)

**500 Totten Pond Road
Waltham, MA 02451
(781) 209-6400**
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Michael D. Taylor, Ph.D.
President & Chief Executive Officer
500 Totten Pond Road
Waltham, MA 02451
(781) 209-6400
(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Richard A. Hoffman, Esq.
Edwin M. O'Connor, Esq.
Goodwin Procter LLP
100 Northern Avenue
Boston, Massachusetts 02210
(617) 570-1000

Richard D. Truesdell Jr., Esq.
Marcel R. Fausten, Esq.
Davis Polk & Wardwell LLP
450 Lexington Avenue
New York, New York
(212) 450-4000

**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, as amended, 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. File No. 333-220299

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 Accelerated filer
Non-accelerated filer (Do not check if a smaller reporting company) 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.

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to be Registered	Amount to be Registered(1)	Proposed Maximum Offering Price Per Share	Proposed Maximum Aggregate Offering Price(2)	Amount of Registration Fee
Common Stock, par value \$0.01 per share	1,437,500	\$ 17.00	\$ 24,437,500	\$ 2,833

- (1) Represents only the additional number of shares being registered and includes 187,500 shares of common stock issuable upon exercise of the underwriters' option to purchase additional shares. Does not include the securities that the registrant previously registered on the Registration Statement on Form S-1 (File No. 333-220299).
- (2) The registration fee is calculated in accordance with Rule 457(a) under the Securities Act of 1933, as amended, based on the proposed maximum aggregate offering price. The registrant previously registered securities at an aggregate offering price not to exceed \$122,187,500 on a Registration Statement on Form S-1 (File No. 333-220299), which was declared effective by the Securities and Exchange Commission on September 27, 2017. In accordance with Rule 462(b) under the Securities Act, an additional amount of securities having a proposed maximum aggregate offering price of \$24,437,500 is hereby registered, which includes shares issuable upon the exercise of the underwriters' option to purchase additional shares.

This Registration Statement shall become effective upon filing with the Securities and Exchange Commission in accordance with Rule 462(b) promulgated under the Securities Act.

EXPLANATORY NOTE AND INCORPORATION BY REFERENCE

This registration statement is being filed with respect to the registration of additional shares of common stock, par value \$0.01 per share, of Deciphera Pharmaceuticals, Inc., a Delaware corporation, pursuant to Rule 462(b) under the Securities Act of 1933, as amended. The contents of the earlier registration statement on Form S-1 (File No. 333-220299), which was declared effective by the Commission on September 27, 2017, are incorporated in this registration statement by reference.

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

EXHIBIT INDEX

<u>Exhibit No.</u>	<u>Exhibit Index</u>
5.1	<u>Opinion of Goodwin Procter LLP</u>
23.1	<u>Consent of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm</u>
23.2	<u>Consent of Goodwin Procter LLP (included in Exhibit 5.1)</u>
24.1**	<u>Power of Attorney</u>

** Previously filed.



Goodwin Procter LLP
100 Northern Avenue
Boston, MA 02210
goodwinlaw.com
+1 617 570 1000

September 27, 2017

Deciphera Pharmaceuticals, Inc.
500 Totten Pond Road
Waltham, MA 02451

Re: Securities Registered under Registration Statement on Form S-1

Ladies and Gentlemen:

We have acted as counsel to you in connection with your filing of (i) a Registration Statement on Form S-1 (File No. 333-220299) (as amended or supplemented, the "Initial Registration Statement") pursuant to the Securities Act of 1933, as amended (the "Securities Act") and (ii) a second Registration Statement on Form S-1 filed pursuant to Rule 462(b) promulgated under the Securities Act (the "462(b) Registration Statement," and together with the Initial Registration Statement, the "Registration Statement"). This opinion letter is furnished to you in connection with your filing of the 462(b) Registration Statement, relating to the registration of the offering by Deciphera Pharmaceuticals, Inc., a Delaware corporation (the "Company") of up to 1,437,500 shares (the "Shares") of the Company's Common Stock, \$0.01 par value per share, including Shares purchasable by the underwriters upon their exercise of an option granted to the underwriters by the Company. The Shares are being sold to the several underwriters named in, and pursuant to, an underwriting agreement among the Company and such underwriters (the "Underwriting Agreement").

We have reviewed such documents and made such examination of law as we have deemed appropriate to give the opinions set forth below. We have relied, without independent verification, on certificates of public officials and, as to matters of fact material to the opinions set forth below, on certificates of officers of the Company.

The opinion set forth below is limited to the Delaware General Corporation Law.

Based on the foregoing, we are of the opinion that the Shares have been duly authorized and, upon issuance and delivery against payment therefor in accordance with the terms of the Underwriting Agreement, the Shares will be validly issued, fully paid and non-assessable.

We hereby consent to the inclusion of this opinion as Exhibit 5.1 to the 462(b) Registration Statement and to the references to our firm under the caption "Legal Matters" in the Initial Registration Statement. In giving our consent, we do not admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations thereunder.

Very truly yours,

/s/ Goodwin Procter LLP

GOODWIN PROCTER LLP

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in this Registration Statement on Form S-1 of Deciphera Pharmaceuticals, Inc. of our report dated August 15, 2017 relating to the balance sheet of Deciphera Pharmaceuticals, Inc. and our report dated June 23, 2017 relating to the financial statements of Deciphera Pharmaceuticals, LLC, which appear in Amendment No. 2 to the Registration Statement on Form S-1 (No. 333-220299). We also consent to the reference to us under the heading "Experts" in Amendment No. 2 to the Registration Statement on Form S-1 (No. 333-220299).

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts
September 27, 2017