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

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FORM S-8  
REGISTRATION STATEMENT

Under The Securities Act of 1933

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**DECIPHERA PHARMACEUTICALS, INC.**

(Exact name of registrant as specified in its charter)

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Delaware  
(State or other jurisdiction of  
incorporation or organization)

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

500 Totten Pond Road  
Waltham, MA 02451  
(781) 209-6400  
(Address of Principal Executive Offices)

Deciphera Pharmaceuticals, Inc. 2017 Stock Option and Incentive Plan  
Deciphera Pharmaceuticals, Inc. 2017 Employee Stock Purchase Plan  
(Full Title of the Plans)

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Michael D. Taylor, Ph.D.  
President & Chief Executive Officer  
Deciphera Pharmaceuticals, Inc.  
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)

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*Copies to:*

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

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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  (Do not check if a smaller reporting company)

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.

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**CALCULATION OF REGISTRATION FEE**

<b>Title of securities to be registered</b>	<b>Amount to be registered<sup>(1)</sup></b>	<b>Proposed maximum offering price per share<sup>(2)</sup></b>	<b>Proposed maximum aggregate offering price<sup>(2)</sup></b>	<b>Amount of registration fee<sup>(2)</sup></b>
<b>2017 Stock Option and Incentive Plan</b> Common Stock, \$0.01 par value per share	1,303,667 shares <sup>(3)</sup>	\$21.66	\$28,237,427.22	\$3,515.56
<b>2017 Employee Stock Purchase Plan</b> Common Stock, \$0.01 par value per share	325,916 shares <sup>(4)</sup>	\$21.66	\$7,059,340.56	\$878.89
Total	1,629,583 shares			\$4,394.45

- (1) Pursuant to Rule 416 under the Securities Act of 1933, as amended (the "Securities Act"), this Registration Statement shall also cover any additional shares of common stock which become issuable under the above-named plans by reason of any stock dividend, stock split, recapitalization or any other similar transaction effected without the receipt of consideration which results in an increase in the number of our outstanding shares of common stock. Pursuant to Rule 416(c) under the Securities Act, this Registration Statement shall also cover an indeterminate amount of interests to be offered or sold pursuant to the employee benefit plans described herein.
- (2) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(h) of the Securities Act, and based on \$21.66, the average of the high and low sale prices of the Registrant's common stock as reported on the Nasdaq Global Select Market on March 26, 2018.
- (3) Represents an automatic increase to the number of shares available for issuance under the Registrant's 2017 Stock Option and Incentive Plan (the "Plan"), effective as of January 1, 2018. Shares available for issuance under the Plan were previously registered on Form S-8 filed with the Securities and Exchange Commission on October 6, 2017 (Registration No. 333-220866).
- (4) Represents an automatic increase to the number of shares available for issuance under the Registrant's 2017 Employee Stock Purchase Plan (the "ESPP"), effective as of January 1, 2018. Shares available for issuance under the ESPP were previously registered on Form S-8 filed with the Securities and Exchange Commission on October 6, 2017 (Registration No. 333-220866).

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## EXPLANATORY NOTE

This Registration Statement on Form S-8 registers additional shares of Common Stock under the Registrant's 2017 Stock Option and Incentive Plan (the "Plan") and the Registrant's 2017 Employee Stock Purchase Plan (the "ESPP"). The number of shares of Common Stock reserved and available for issuance under the Plan is subject to an automatic annual increase on each January 1, beginning in 2018, by an amount equal to four percent of the number of shares of Common Stock issued and outstanding on the immediately preceding December 31 or such lesser number of shares of Common Stock as determined by the Administrator (as defined in the Plan). Accordingly, on January 1, 2018, the number of shares of Common Stock reserved and available for issuance under the Plan increased by 1,303,667 shares. The number of shares of Common Stock reserved and available for issuance under the ESPP is subject to an automatic annual increase on each January 1, beginning in 2018, by the lesser of 400,000 shares, one percent of the number of shares of Common Stock issued and outstanding on the immediately preceding December 31 or such lesser number of shares of Common Stock as determined by the Administrator (as defined in the ESPP). Accordingly, on January 1, 2018, the number of shares of Common Stock reserved and available for issuance under the ESPP increased by 325,916 shares. This Registration Statement registers these additional 1,629,583 shares of Common Stock. The additional shares are of the same class as other securities relating to the Plans for which the Registrant's Registration Statements filed on Form S-8 (Registration No. 333-220866) on October 6, 2017 is effective. The information contained in the Registrant's registration statement on Form S-8 (Registration No. 333-220866) is hereby incorporated by reference pursuant to General Instruction E.

## Part II

### INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

#### **Item 8. Exhibits.**

See the Exhibit Index on the page immediately preceding the exhibits for a list of exhibits filed as part of this Registration Statement, which Exhibit Index is incorporated herein by reference.

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## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Waltham, Commonwealth of Massachusetts, on the 28th day of March, 2018.

### DECIPHERA PHARMACEUTICALS, INC.

By: /s/ Michael D. Taylor  
Michael D. Taylor, Ph.D.  
President and Chief Executive Officer

### POWER OF ATTORNEY AND SIGNATURES

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Michael D. Taylor and Thomas P. Kelly his or her true and lawful attorney-in-fact and agent with full power of substitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this Registration Statement on Form S-8, and to file the same, with all exhibits thereto and all documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming that all said attorneys-in-fact and agents or any of them, or his, her or their substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement has been signed by the following persons in the capacities and on the date indicated.

<u>Name</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Michael D. Taylor</u> Michael D. Taylor, Ph.D.	President, Chief Executive Officer and Director (Principal Executive Officer)	March 28, 2018
<u>/s/ Thomas P. Kelly</u> Thomas P. Kelly	Chief Financial Officer (Principal Financial and Accounting Officer)	March 28, 2018
<u>/s/ Patricia L. Allen</u> Patricia L. Allen	Director	March 28, 2018
<u>/s/ James A. Bristol</u> James A. Bristol, Ph.D.	Director	March 28, 2018
<u>/s/ Edward J. Benz, Jr.</u> Edward J. Benz, Jr., M.D.	Director	March 28, 2018
<u>/s/ John R. Martin</u> John R. Martin	Director	March 28, 2018

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<u>/s/ Liam Ratcliffe</u> Liam Ratcliffe, M.D., Ph.D.	Director	March 28, 2018
<u>/s/ Michael Ross</u> Michael Ross, Ph.D.	Director	March 28, 2018
<u>/s/ Dennis L. Walsh</u> Dennis L. Walsh	Director	March 28, 2018

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## EXHIBIT INDEX

<u>Exhibit No.</u>	<u>Description</u>
3.1	<a href="#"><u>Amended and Restated Certificate of Incorporation of the Registrant (Incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed on October 5, 2017 (File No. 001-38219)).</u></a>
3.2	<a href="#"><u>Amended and Restated Bylaws of the Registrant (Incorporated by reference to Exhibit 3.2 to the Registrant's Current Report on Form 8-K filed on October 5, 2017 (File No. 001-38219)).</u></a>
4.1	<a href="#"><u>Specimen Common Stock Certificate (Incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-1, as amended (File No. 333-220299)).</u></a>
4.2	<a href="#"><u>Second Amended and Restated Investors' Rights Agreement among Deciphera Pharmaceuticals, LLC and certain of its shareholders, dated May 26, 2017 (Incorporated by reference to Exhibit 4.2 to the Registrant's Registration Statement on Form S-1, as amended (File No. 333-220299)).</u></a>
4.3	<a href="#"><u>Registration Rights Agreement by and among the Registrant and certain of its stockholders, dated October 2, 2017 (Incorporated by reference to Exhibit 4.1 to the Registrant's Quarterly Report on Form 10-Q filed on November 14, 2017 (File No. 001-38219)).</u></a>
5.1*	<a href="#"><u>Opinion of Goodwin Procter LLP.</u></a>
23.1*	<a href="#"><u>Consent of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm.</u></a>
23.2*	<a href="#"><u>Consent of Goodwin Procter LLP (included in Exhibit 5.1).</u></a>
24.1*	<a href="#"><u>Power of Attorney (included on signature page).</u></a>
99.1	<a href="#"><u>2017 Stock Option and Incentive Plan and form of award agreements thereunder (Incorporated by reference to Exhibit 10.2 to the Registrant's Registration Statement on Form S-1, as amended (File No. 333-220299)).</u></a>
99.2	<a href="#"><u>2017 Employee Stock Purchase Plan (Incorporated by reference to Exhibit 10.3 to the Registrant's Registration Statement on Form S-1, as amended (File No. 333-220299)).</u></a>

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\* Filed herewith.



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

March 28, 2018

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

Re: Securities Being Registered under Registration Statement on Form S-8

Ladies and Gentlemen:

We have acted as counsel to you in connection with your filing of a Registration Statement on Form S-8 (the "Registration Statement") pursuant to the Securities Act of 1933, as amended (the "Securities Act"), on or about the date hereof relating to an aggregate of 1,629,583 shares (the "Shares") of Common Stock, \$0.01 par value per share, of Deciphera Pharmaceuticals, Inc., a Delaware corporation (the "Company"), that may be issued pursuant to the Company's 2017 Stock Option and Incentive Plan and 2017 Employee Stock Purchase Plan (collectively, the "Plans").

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 opinion set forth below, on certificates of officers of the Company.

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

For purposes of the opinion set forth below, we have assumed that a sufficient number of authorized but unissued shares of the Company's Common Stock will be available for issuance when the Shares are issued.

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 Plans, will be validly issued, fully paid and nonassessable.

We hereby consent to the inclusion of this opinion as Exhibit 5.1 to the 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-8 of our report dated March 28, 2018 relating to the financial statements, which appears in Deciphera Pharmaceuticals, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2017.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts  
March 28, 2018