

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

**FORM S-8
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933**

ZAFGEN, INC.

(Exact Name of Registrant as Specified in its Charter)

Delaware
(State or Other Jurisdiction of
Incorporation or Organization)

20-3857670
(I.R.S. Employer
Identification No.)

Zafgen, Inc.
175 Portland Street, 4th Floor
Boston, Massachusetts 02114
(617) 622-4003
(Address of Principal Executive Offices)

Zafgen, Inc. 2014 Stock Option and Incentive Plan
(Full Title of the Plans)

Thomas E. Hughes, Ph.D.
President and
Chief Executive Officer
Zafgen, Inc.
175 Portland Street, 4th Floor
Boston, Massachusetts 02114
(Name and Address of Agent For Service)

Copy to:

Mitchell S. Bloom, Esq.
Laurie A. Burlingame, Esq.
Goodwin Procter LLP
100 Northern Avenue
Boston, Massachusetts 02210
(617) 570-1000

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting 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

CALCULATION OF REGISTRATION FEE

Title of Securities to be Registered	Amount to be Registered (1)	Proposed Maximum Offering Price per Share	Proposed Maximum Aggregate Offering Price	Amount of Registration Fee
Common Stock, \$0.001 par value per share	1,093,302 shares (2)	\$3.86 (3)	\$4,220,145.72	\$489.12

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- (1) Pursuant to Rule 416 under the Securities Act of 1933, as amended (the “Securities Act”), this registration statement on Form S-8 (this “Registration Statement”) shall also cover any additional shares of common stock, par value \$0.001 per share (the “Common Stock”), of Zafgen, Inc. (the “Registrant”), which become issuable under the Registrant’s 2014 Stock Option and Incentive Plan (the “Plan”) 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 the Registrant’s outstanding shares of Common Stock.
 - (2) Represents an automatic increase to the number of shares available for issuance under the Plan, effective January 1, 2017. Shares available for issuance under the Plan were previously registered on registration statements on Form S-8 filed with the Securities and Exchange Commission on June 19, 2014 (Registration No. 333-196900), June 12, 2015 (Registration No. 333-204931) and March 15, 2016 (Registration No. 333-210216).
 - (3) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(h) of the Securities Act, and based on the average of the high and low sale prices of the Registrant’s Common Stock, as quoted on the Nasdaq Global Select Market, on March 8, 2017.
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EXPLANATORY NOTE

This Registration Statement on Form S-8 registers additional shares of Common Stock under the Registrant's 2014 Stock Option and Incentive Plan (the "Plan"). 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 2015, 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 Compensation Committee of the Registrant's Board of Directors. Accordingly, on January 1, 2017, the number of shares of Common Stock reserved and available for issuance under the plan increased by 1,093,302. This Registration Statement registers these additional 1,093,302 shares of Common Stock. The additional shares are of the same class as other securities relating to the Plan for which the Registrant's registration statement filed on Form S-8 (Registration Nos. 333-196900, 333-204931 and 333-210216) on June 19, 2014, June 12, 2015 and March 15, 2016 are effective. The information contained in the Registrant's registration statements on Form S-8 (Registration Nos. 333-196900, 333-204931 and 333-210216) 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.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, 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 Boston, Commonwealth of Massachusetts, on the 10th day of March, 2017.

ZAFGEN, INC.

By: /s/ Thomas E. Hughes, Ph.D.
Thomas E. Hughes, Ph.D.
President and Chief Executive Officer

POWER OF ATTORNEY AND SIGNATURES

KNOW ALL BY THESE PRESENT, that each individual whose signature appears below hereby constitutes and appoints each of Thomas E. Hughes, Ph.D. and Patricia L. Allen as such person's true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for such person in such person's 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 each 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 such person might or could do in person, hereby ratifying and confirming all that any said attorney-in-fact and agent, or any substitute or substitutes of any of them, 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 person in the capacities and on the date indicated.

Name	Title	Date
<u>/s/Thomas E. Hughes, Ph.D.</u> Thomas E. Hughes, Ph.D.	President, Chief Executive Officer, and Director <i>(Principal Executive Officer)</i>	March 10, 2017
<u>/s/ Patricia L. Allen</u> Patricia L. Allen	Chief Financial Officer <i>(Principal Financial and Accounting Officer)</i>	March 10, 2017
<u>/s/ Peter Barrett, Ph.D.</u> Peter Barrett, Ph.D.	Chairman of the Board of Directors	March 10, 2017
<u>/s/ Bruce Booth, Ph.D.</u> Bruce Booth, Ph.D.	Director	March 10, 2017
<u>/s/ Robert J. Perez</u> Robert J. Perez	Director	March 10, 2017
<u>/s/ Frances K. Heller</u> Frances K. Heller	Director	March 10, 2017
<u>/s/ John L. LaMattina, Ph.D.</u> John L. LaMattina, Ph.D.	Director	March 10, 2017
<u>/s/ Cameron Geoffrey McDonough, M.D.</u> Cameron Geoffrey McDonough, M.D.	Director	March 10, 2017
<u>/s/ Frank E. Thomas</u> Frank E. Thomas	Director	March 10, 2017
<u>/s/ Thomas O. Daniel, M.D.</u> Thomas O. Daniel, M.D.	Director	March 10, 2017

EXHIBIT INDEX

<u>Exhibit No.</u>	<u>Description</u>
4.1	Form of Common Stock certificate of the registrant (Incorporated by reference to Exhibit 4.1 to the registrant's Registration Statement on Form S-1, as amended (File No. 333-195391)).
4.2	Form of Amended and Restated Certificate of Incorporation (Incorporated by reference to Exhibit 3.2 to the registrant's Registration Statement on Form S-1, as amended (File No. 333-195391)).
4.3	Form of Amended and Restated By-laws (Incorporated by reference to Exhibit 3.4 to the registrant's Registration Statement on Form S-1, as amended (File No. 333-195391)).
4.4	Third Amended and Restated Investors' Rights Agreement by and among the registrant and certain of its stockholders, dated as of November 25, 2013 (Incorporated by reference to Exhibit 4.2 to the registrant's Registration Statement on Form S-1, as amended (File No. 333-195391)).
5.1*	Opinion of Goodwin Procter LLP.
23.1*	Consent of PricewaterhouseCoopers LLP, independent registered public accounting firm.
23.2*	Consent of Goodwin Procter LLP (included in Exhibit 5.1).
24.1*	Power of attorney (included on signature page).
99.1	2014 Stock Option and Incentive Plan and forms of agreements thereunder (Incorporated by reference to Exhibit 10.2 to the registrant's Registration Statement on Form S-1 (File No. 333-195391)).

* Filed herewith.

March 10, 2017

Zafgen, Inc.
175 Portland Street, 4th Floor
Boston, MA 02114

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 1,093,302 shares (the "Shares") of Common Stock, \$0.001 par value per share, of Zafgen, Inc., a Delaware corporation (the "Company"), that may be issued pursuant to the Company's 2014 Stock Option and Incentive Plan (the "Plan").

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 Plan, 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 10, 2017 relating to the financial statements, which appears in Zafgen, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2016.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
March 10, 2017