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

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

bluebird bio, Inc.

(Exact Name of Registrant as Specified in its Charter)

Delaware

(State or Other Jurisdiction
of Incorporation or Organization)

13-3680878

(I.R.S. Employer Identification No.)

**bluebird bio, Inc.
150 Second Street
Cambridge, MA 02141
(339) 499-9300**

(Address of Principal Executive Offices)

2013 Stock Option and Incentive Plan
(Full Title of the Plan)

**Nick Leschly
President and Chief Executive Officer
bluebird bio, Inc.
150 Second Street
Cambridge, MA 02141
(339) 499-9300**

(Name and Address of Agent For Service)

Copy to:

**Michael H. Bison, 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

Smaller reporting company

(Do not check if a smaller reporting company)

CALCULATION OF REGISTRATION FEE

Title of Securities to be Registered	Amount to be Registered⁽¹⁾	Proposed Maximum Offering Price per Share⁽²⁾	Proposed Maximum Aggregate Offering Price	Amount of Registration Fee⁽³⁾
2013 Stock Option and Incentive Plan				
Common Stock, \$0.01 par value per share	1,627,676 shares (4)	\$76.33	\$124,232,371	\$14,399

- (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 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 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 plan described herein.
- (2) The price of \$76.33 per share, which is the average of the high and low sale prices of the common stock of the registrant on the NASDAQ Global Select Market on February 17, 2017, is set forth solely for purposes of calculating the registration fee pursuant to Rules 457(c) and (h) of the Securities Act and has been used as these shares are without a fixed price.
- (3) Calculated pursuant to Section 6(b) of the Securities Act.
- (4) Represents an automatic increase to the number of shares available for issuance under the registrant's 2013 Stock Option and Incentive Plan (the "Plan"), effective as of 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 February 25, 2016 (Registration No. 333-209715), February 25, 2015 (Registration No. 333-202283), March 5, 2014 (Registration No. 333-194340) and June 24, 2013 (Registration No. 333-189560).

This Registration Statement registers additional securities of the same class as other securities for which a registration statement filed on Form S-8 (SEC File No. 333-189560) of the Registrant is effective. The information contained in the Registrant's registration statement on Form S-8 (SEC File No. 333-189560) 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 Cambridge, Commonwealth of Massachusetts, on the 22nd day of February, 2017.

bluebird bio, Inc.

By: /s/ Nick Leschly
Nick Leschly
President and Chief Executive Officer

POWER OF ATTORNEY

We, the undersigned officers and directors of bluebird bio, Inc., hereby severally constitute and appoint Nick Leschly and Jeffrey Walsh, and each of them singly (with full power to each of them to act alone), our true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution in each of them for him and in his name, place and stead, and in any and all capacities, to sign for us and in our names in the capacities indicated below any and all amendments (including post-effective amendments) to this registration statement, and to file the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite or necessary to be done in and about the premises, as full to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents or any of them, or their or his 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 indicated below on the 22nd day of February, 2017.

Name	Title
<u>/s/ Nick Leschly</u> Nick Leschly	President, Chief Executive Officer and Director <i>(Principal Executive Officer)</i>
<u>/s/ Jeffrey Walsh</u> Jeffrey Walsh	Chief Financial and Strategy Officer <i>(Principal Financial Officer)</i>
<u>/s/ Eric Sullivan</u> Eric Sullivan	Vice President, Finance and Treasurer <i>(Principal Accounting Officer)</i>
<u>/s/ Wendy L. Dixon, Ph.D.</u> Wendy L. Dixon, Ph.D.	Director
<u>/s/ Daniel S. Lynch</u> Daniel S. Lynch	Director
<u>/s/ James Mandell, M.D.</u> James Mandell, M.D.	Director
<u>/s/ John M. Maraganore, Ph.D.</u> John M. Maraganore, Ph.D.	Director

/s/ David P. Schenkein, M.D.
David P. Schenkein, M.D.

Director

/s/ Mark Vachon
Mark Vachon

Director

EXHIBIT INDEX

Exhibit No.	Description
4.1	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. 333-188605)).
4.2	Amended and Restated Certificate of Incorporation (Incorporated by reference to Exhibit 3.1 to the registrant's Current Report on Form 8-K filed June 24, 2013 (File No. 001-35966)).
4.3	Amended and Restated Bylaws (Incorporated by reference to Exhibit 3.2 to the registrant's Current Report on Form 8-K filed June 24, 2013 (File No. 001-35966)).
4.4	Amendment No. 1 to Amended and Restated Bylaws (Incorporated by reference to Exhibit 3.1 to the registrant's Current Report on Form 8-K filed February 11, 2016 (File No. 001-35966)).
5.1*	Opinion of Goodwin Procter LLP.
23.1*	Consent of Goodwin Procter LLP (included in Exhibit 5.1).
23.2*	Consent of Ernst & Young LLP.
24.1	Power of attorney (included on signature page).
99.1	2013 Stock Option and Incentive Plan and forms of award agreement thereunder (Incorporated by reference to Exhibit 10.3 to the registrant's Registration Statement on Form S-1, as amended (File No. 333-188605)).

* Filed herewith.

February 22, 2017

bluebird bio, Inc.
150 Second Street
Cambridge, Massachusetts 02141

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 1,627,676 shares (the "Shares") of Common Stock, \$0.01 par value per share, of bluebird bio, Inc., a Delaware corporation (the "Company"), that may be issued pursuant to the Company's 2013 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 (which includes reported judicial decisions interpreting 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

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statement (Form S-8) pertaining to the 2013 Stock Option and Incentive Plan of bluebird bio, Inc. of our reports dated February 22, 2017, with respect to the consolidated financial statements of bluebird bio, Inc. and the effectiveness of internal control over financial reporting of bluebird bio, Inc. included in its Annual Report (Form 10-K) for the year ended December 31, 2016, filed with the Securities and Exchange Commission.

/s/ Ernst & Young LLP

Boston, Massachusetts
February 22, 2017