

STATEMENT OF CHANGES IN BENEFICIAL OWNERSHIP

Check this box if no longer subject to Section 16. Form 4 or Form 5 obligations may continue. See Instruction 1(b).

Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934 or Section 30(h) of the Investment Company Act of 1940

OMB APPROVAL	
OMB Number:	3235-0287
Estimated average burden hours per response:	0.5

1. Name and Address of Reporting Person* <u>THIRD ROCK VENTURES LP</u> (Last) (First) (Middle) <u>29 NEWBURY STREET, 3RD FLOOR</u> (Street) <u>BOSTON MA 02116</u> (City) (State) (Zip)	2. Issuer Name and Ticker or Trading Symbol <u>bluebird bio, Inc. [BLUE]</u>	5. Relationship of Reporting Person(s) to Issuer (Check all applicable) Director <input checked="" type="checkbox"/> 10% Owner Officer (give title below) Other (specify below)
	3. Date of Earliest Transaction (Month/Day/Year) <u>09/11/2014</u>	
		6. Individual or Joint/Group Filing (Check Applicable Line) <input checked="" type="checkbox"/> Form filed by One Reporting Person <input type="checkbox"/> Form filed by More than One Reporting Person

Table I - Non-Derivative Securities Acquired, Disposed of, or Beneficially Owned

1. Title of Security (Instr. 3)	2. Transaction Date (Month/Day/Year)	2A. Deemed Execution Date, if any (Month/Day/Year)	3. Transaction Code (Instr. 8)		4. Securities Acquired (A) or Disposed Of (D) (Instr. 3, 4 and 5)			5. Amount of Securities Beneficially Owned Following Reported Transaction(s) (Instr. 3 and 4)	6. Ownership Form: Direct (D) or Indirect (I) (Instr. 4)	7. Nature of Indirect Beneficial Ownership (Instr. 4)
			Code	V	Amount	(A) or (D)	Price			
Common Stock	09/11/2014		S		87,000	D	\$36.52 ⁽¹⁾	2,329,974	D ⁽²⁾	
Common Stock	09/11/2014		J ⁽³⁾		1,076,920	D	\$0	1,253,054	D ⁽²⁾	
Common Stock	09/11/2014		J ⁽⁴⁾		79,062	A	\$0	79,062	D ⁽⁵⁾	
Common Stock	09/11/2014		J ⁽⁶⁾		79,062	D	\$0	0	D ⁽⁵⁾	
Common Stock	09/12/2014		S		38,000	D	\$36.59 ⁽⁷⁾	1,215,054	D ⁽²⁾	

Table II - Derivative Securities Acquired, Disposed of, or Beneficially Owned (e.g., puts, calls, warrants, options, convertible securities)

1. Title of Derivative Security (Instr. 3)	2. Conversion or Exercise Price of Derivative Security	3. Transaction Date (Month/Day/Year)	3A. Deemed Execution Date, if any (Month/Day/Year)	4. Transaction Code (Instr. 8)		5. Number of Derivative Securities Acquired (A) or Disposed of (D) (Instr. 3, 4 and 5)		6. Date Exercisable and Expiration Date (Month/Day/Year)		7. Title and Amount of Securities Underlying Derivative Security (Instr. 3 and 4)	8. Price of Derivative Security (Instr. 5)	9. Number of derivative Securities Beneficially Owned Following Reported Transaction(s) (Instr. 4)	10. Ownership Form: Direct (D) or Indirect (I) (Instr. 4)	11. Nature of Indirect Beneficial Ownership (Instr. 4)
				Code	V	(A)	(D)	Date Exercisable	Expiration Date					

1. Name and Address of Reporting Person*
THIRD ROCK VENTURES LP

 (Last) (First) (Middle)
29 NEWBURY STREET, 3RD FLOOR

 (Street)
BOSTON MA 02116

 (City) (State) (Zip)

1. Name and Address of Reporting Person*
Third Rock Ventures GP, L.P.

 (Last) (First) (Middle)
29 NEWBURY STREET, 3RD FLOOR

 (Street)
BOSTON MA 02116

 (City) (State) (Zip)

1. Name and Address of Reporting Person*
TRV GP, LLC

(Last) (First) (Middle)

29 NEWBURY STREET, 3RD FLOOR

(Street)

BOSTON MA 02116

(City)

(State)

(Zip)

Explanation of Responses:

1. The price reported in Column 4 is a weighted average price. These shares were sold in multiple transactions at prices ranging from \$36.00 to \$36.95, inclusive. Each Reporting Person undertakes to provide to bluebird bio Inc., any security holder of bluebird bio Inc., or the staff of the Securities and Exchange Commission (the "SEC"), upon request, full information regarding the number of shares sold at each separate price within the range set forth in this footnote.
2. The shares are directly held by Third Rock Ventures, L.P. ("TRV"). The general partner of TRV is Third Rock Ventures GP, L.P. ("TRV GP"). The general partner of TRV GP is TRV GP, LLC ("TRV GP LLC") and, as such, each of TRV GP and TRV GP LLC exercises shared voting and investment power over the shares held of record by TRV. Each of the Reporting Persons disclaims beneficial ownership of the shares except to the extent of their pecuniary interest therein, if any.
3. Distribution of shares in kind by TRV on a pro rata basis to its partners.
4. TRV GP received shares distributed in kind by TRV on a pro rata basis to its partners.
5. The shares are directly held by TRV GP. As such, TRV GP LLC exercises voting and investment power over the shares held of record by TRV GP. Each of the filing persons disclaims beneficial ownership of the shares except to the extent of their pecuniary interest therein, if any.
6. Distribution of shares in kind by TRV GP on a pro rata basis to its partners.
7. The price reported in Column 4 is a weighted average price. These shares were sold in multiple transactions at prices ranging from \$36.25 to \$37.005, inclusive. Each Reporting Person undertakes to provide to bluebird bio Inc., any security holder of bluebird bio Inc., or the staff of the SEC, upon request, full information regarding the number of shares sold at each separate price within the range set forth in this footnote.

Remarks:

/s/ Kevin Gillis, Chief
Financial Officer of TRV GP,
LLC, general partner of Third 09/12/2014
Rock Ventures GP, L.P.,
general partner of Third Rock
Ventures, L.P.

/s/ Kevin Gillis, Chief
Financial Officer of TRV GP, 09/12/2014
LLC, general partner of Third
Rock Ventures GP, L.P.

/s/ Kevin Gillis, Chief
Financial Officer of TRV GP, 09/12/2014
LLC

** Signature of Reporting Person Date

Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.

* If the form is filed by more than one reporting person, see Instruction 4 (b)(v).

** Intentional misstatements or omissions of facts constitute Federal Criminal Violations See 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).

Note: File three copies of this Form, one of which must be manually signed. If space is insufficient, see Instruction 6 for procedure.

Persons who respond to the collection of information contained in this form are not required to respond unless the form displays a currently valid OMB Number.