

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

SCHEDULE 13G

UNDER THE SECURITIES EXCHANGE ACT OF 1934
(Amendment No.)*

REGENXBIO INC.

(Name of Issuer)

Common Stock, \$0.0001 par value
(Title of Class of Securities)

75901B107
(CUSIP Number)

December 31, 2015
(Date of Event Which Requires Filing of This Statement)

Check the appropriate box to designate the rule pursuant to which this Schedule is filed:

Rule 13d-1(b)

Rule 13d-1(c)

Rule 13d-1(d)

* The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter the disclosures provided in a prior cover page.

The information required in the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

1.	Name of Reporting Persons Venrock Healthcare Capital Partners, L.P.
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> ¹
3.	SEC USE ONLY
4.	Citizenship or Place of Organization Delaware
Number of Shares Beneficially Owned by Each Reporting Person With:	5. Sole Voting Power 0
	6. Shared Voting Power 1,083,454 ²
	7. Sole Dispositive Power 0
	8. Shared Dispositive Power 1,083,454 ²
9.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,083,454 ²
10.	Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) <input checked="" type="checkbox"/> ³
11.	Percent of Class Represented by Amount in Row (9) 4.1% ⁴
12.	Type of Reporting Person (See Instructions) PN

¹ This Schedule 13G is being filed by Venrock Healthcare Capital Partners, L.P. (“VHCP I”), VHCP Co-Investment Holdings, LLC (“VHCP Co-Invest I”), Venrock Healthcare Capital Partners II, L.P. (“VHCP II”), VHCP Co-Investment Holdings II, LLC (“VHCP Co-Invest II”), VHCP Management, LLC (“VHCP Management”), VHCP Management II, LLC (“VHCP Management II” and collectively with VHCP I, VHCP Co-Invest I, VHCP II, VHCP Co-Invest II and VHCP Management, the “VHCP Entities”), Venrock Associates VII, L.P. (“VA7”), Venrock Partners VII, L.P. (“VP7”) and Venrock Management VII, LLC (“VM7” and together with VA7 and VP7, the “Venrock 7 Entities” and the Venrock 7 Entities together with the VHCP Entities, the “Reporting Persons”). The Reporting Persons expressly disclaim status as a “group” for purposes of this Schedule 13G.

² Consists of 44,381 shares owned by VHCP I, 8,119 shares owned by VHCP Co-Invest I, 783,474 shares owned by VHCP II and 247,480 shares owned by VHCP Co-Invest II.

³ The shares included on rows 6, 8 and 9 do not include an aggregate of 908,453 shares of common stock held by VA7 and VP7. The VHCP Entities disclaim beneficial ownership over the shares held by the Venrock 7 Entities.

⁴ This percentage is calculated based upon 26,313,471 shares of the Issuer’s common stock outstanding as of November 5, 2015, as set forth in the Issuer’s quarterly report on Form 10-Q filed with the Securities and Exchange Commission on November 5, 2015.

1.	Name of Reporting Persons VHCP Co-Investment Holdings, LLC	
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> ¹	
3.	SEC USE ONLY	
4.	Citizenship or Place of Organization Delaware	
Number of Shares Beneficially Owned by Each Reporting Person With:	5.	Sole Voting Power 0
	6.	Shared Voting Power 1,083,454 ²
	7.	Sole Dispositive Power 0
	8.	Shared Dispositive Power 1,083,454 ²
9.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,083,454 ²	
10.	Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) <input checked="" type="checkbox"/> ³	
11.	Percent of Class Represented by Amount in Row (9) 4.1% ⁴	
12.	Type of Reporting Person (See Instructions) OO	

¹ This Schedule 13G is being filed by Venrock Healthcare Capital Partners, L.P. (“VHCP I”), VHCP Co-Investment Holdings, LLC (“VHCP Co-Invest I”), Venrock Healthcare Capital Partners II, L.P. (“VHCP II”), VHCP Co-Investment Holdings II, LLC (“VHCP Co-Invest II”), VHCP Management, LLC (“VHCP Management”), VHCP Management II, LLC (“VHCP Management II”) and collectively with VHCP I, VHCP Co-Invest I, VHCP II, VHCP Co-Invest II and VHCP Management, the “VHCP Entities”), Venrock Associates VII, L.P. (“VA7”), Venrock Partners VII, L.P. (“VP7”) and Venrock Management VII, LLC (“VM7” and together with VA7 and VP7, the “Venrock 7 Entities” and the Venrock 7 Entities together with the VHCP Entities, the “Reporting Persons”). The Reporting Persons expressly disclaim status as a “group” for purposes of this Schedule 13G.

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³ The shares included on rows 6, 8 and 9 do not include an aggregate of 908,453 shares of common stock held by VA7 and VP7. The VHCP Entities disclaim beneficial ownership over the shares held by the Venrock 7 Entities.

⁴ This percentage is calculated based upon 26,313,471 shares of the Issuer’s common stock outstanding as of November 5, 2015, as set forth in the Issuer’s quarterly report on Form 10-Q filed with the Securities and Exchange Commission on November 5, 2015.

1.	Name of Reporting Persons Venrock Healthcare Capital Partners II, L.P.
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> ¹
3.	SEC USE ONLY
4.	Citizenship or Place of Organization Delaware
Number of Shares Beneficially Owned by Each Reporting Person With:	5. Sole Voting Power 0
	6. Shared Voting Power 1,083,454 ²
	7. Sole Dispositive Power 0
	8. Shared Dispositive Power 1,083,454 ²
9.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,083,454 ²
10.	Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) <input checked="" type="checkbox"/> ³
11.	Percent of Class Represented by Amount in Row (9) 4.1% ⁴
12.	Type of Reporting Person (See Instructions) PN

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³ The shares included on rows 6, 8 and 9 do not include an aggregate of 908,453 shares of common stock held by VA7 and VP7. The VHCP Entities disclaim beneficial ownership over the shares held by the Venrock 7 Entities.

⁴ This percentage is calculated based upon 26,313,471 shares of the Issuer’s common stock outstanding as of November 5, 2015, as set forth in the Issuer’s quarterly report on Form 10-Q filed with the Securities and Exchange Commission on November 5, 2015.

1.	Name of Reporting Persons VHCP Co-Investment Holdings II, LLC
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> ¹
3.	SEC USE ONLY
4.	Citizenship or Place of Organization Delaware
Number of Shares Beneficially Owned by Each Reporting Person With:	5. Sole Voting Power 0
	6. Shared Voting Power 1,083,454 ²
	7. Sole Dispositive Power 0
	8. Shared Dispositive Power 1,083,454 ²
9.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,083,454 ²
10.	Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) <input checked="" type="checkbox"/> ³
11.	Percent of Class Represented by Amount in Row (9) 4.1% ⁴
12.	Type of Reporting Person (See Instructions) OO

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⁴ This percentage is calculated based upon 26,313,471 shares of the Issuer’s common stock outstanding as of November 5, 2015, as set forth in the Issuer’s quarterly report on Form 10-Q filed with the Securities and Exchange Commission on November 5, 2015.

1.	Name of Reporting Persons VHCP Management, LLC
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> ¹
3.	SEC USE ONLY
4.	Citizenship or Place of Organization Delaware
Number of Shares Beneficially Owned by Each Reporting Person With:	5. Sole Voting Power 0
	6. Shared Voting Power 1,083,454 ²
	7. Sole Dispositive Power 0
	8. Shared Dispositive Power 1,083,454 ²
9.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,083,454 ²
10.	Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) <input checked="" type="checkbox"/> ³
11.	Percent of Class Represented by Amount in Row (9) 4.1% ⁴
12.	Type of Reporting Person (See Instructions) OO

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1.	Name of Reporting Persons VHCP Management II, LLC
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> ¹
3.	SEC USE ONLY
4.	Citizenship or Place of Organization Delaware
Number of Shares Beneficially Owned by Each Reporting Person With:	5. Sole Voting Power 0
	6. Shared Voting Power 1,083,454 ²
	7. Sole Dispositive Power 0
	8. Shared Dispositive Power 1,083,454 ²
9.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,083,454 ²
10.	Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) <input checked="" type="checkbox"/> ³
11.	Percent of Class Represented by Amount in Row (9) 4.1% ⁴
12.	Type of Reporting Person (See Instructions) OO

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1.	Name of Reporting Persons Venrock Associates VII, L.P.
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> ¹
3.	SEC USE ONLY
4.	Citizenship or Place of Organization Delaware
Number of Shares Beneficially Owned by Each Reporting Person With:	5. Sole Voting Power 0
	6. Shared Voting Power 908,453 ²
	7. Sole Dispositive Power 0
	8. Shared Dispositive Power 908,453 ²
9.	Aggregate Amount Beneficially Owned by Each Reporting Person 908,453 ²
10.	Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) <input checked="" type="checkbox"/> ³
11.	Percent of Class Represented by Amount in Row (9) 3.5% ⁴
12.	Type of Reporting Person (See Instructions) PN

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² Consists of 838,956 shares owned by VA7 and 69,497 shares owned by VP7.

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1.	Name of Reporting Persons Venrock Partners VII, L.P.
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> ¹
3.	SEC USE ONLY
4.	Citizenship or Place of Organization Delaware
Number of Shares Beneficially Owned by Each Reporting Person With:	5. Sole Voting Power 0
	6. Shared Voting Power 908,453 ²
	7. Sole Dispositive Power 0
	8. Shared Dispositive Power 908,453 ²
9.	Aggregate Amount Beneficially Owned by Each Reporting Person 908,453 ²
10.	Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) <input checked="" type="checkbox"/> ³
11.	Percent of Class Represented by Amount in Row (9) 3.5% ⁴
12.	Type of Reporting Person (See Instructions) PN

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⁴ This percentage is calculated based upon 26,313,471 shares of the Issuer’s common stock outstanding as of November 5, 2015, as set forth in the Issuer’s quarterly report on Form 10-Q filed with the Securities and Exchange Commission on November 5, 2015.

1.	Name of Reporting Persons Venrock Management VII, LLC
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> ¹
3.	SEC USE ONLY
4.	Citizenship or Place of Organization Delaware
Number of Shares Beneficially Owned by Each Reporting Person With:	5. Sole Voting Power 0
	6. Shared Voting Power 908,453 ²
	7. Sole Dispositive Power 0
	8. Shared Dispositive Power 908,453 ²
9.	Aggregate Amount Beneficially Owned by Each Reporting Person 908,453 ²
10.	Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) <input checked="" type="checkbox"/> ³
11.	Percent of Class Represented by Amount in Row (9) 3.5% ⁴
12.	Type of Reporting Person (See Instructions) OO

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Introductory Note: This Schedule 13G is filed on behalf of Venrock Healthcare Capital Partners, L.P., a limited partnership organized under the laws of the State of Delaware (“VHCP I”), VHCP Co-Investment Holdings, LLC, a limited liability company organized under the laws of the State of Delaware (“VHCP Co-Invest I”), Venrock Healthcare Capital Partners II, L.P., a limited partnership organized under the laws of the State of Delaware (“VHCP II”), VHCP Co-Investment Holdings II, LLC, a limited liability company organized under the laws of the State of Delaware (“VHCP Co-Invest II”), VHCP Management, LLC, a limited liability company organized under the laws of the State of Delaware (“VHCP Management”), VHCP Management II, LLC, a limited liability company organized under the laws of the State of Delaware (“VHCP Management II” and collectively with VHCP I, VHCP II, VHCP Co-Invest I, VHCP Co-Invest II and VHCP Management, the “VHCP Entities”), Venrock Associates VII, L.P. (“VA7”), Venrock Partners VII, L.P. (“VP7”) and Venrock Management VII, LLC (“VM7”) and collectively with VA7 and VP7, the “Venrock 7 Entities”) in respect of shares of common stock of REGENXBIO Inc.

Item 1.

- (a) Name of Issuer
REGENXBIO Inc.
- (b) Address of Issuer’s Principal Executive Offices
9712 Medical Center Drive, Suite 100
Rockville, MD 20850

Item 2.

- (a) Name of Person Filing
Venrock Healthcare Capital Partners, L.P.
VHCP Co-Investment Holdings, LLC
Venrock Healthcare Capital Partners II, L.P.
VHCP Co-Investment Holdings II, LLC
VHCP Management, LLC
VHCP Management II, LLC
Venrock Associates VII, L.P.
Venrock Partners VII, L.P.
Venrock Management VII, LLC
- (b) Address of Principal Business Office or, if none, Residence

New York Office:
530 Fifth Avenue
22nd Floor
New York, NY 10036

Palo Alto Office:
3340 Hillview Avenue
Palo Alto, CA 94304

Boston Office:
470 Atlantic Avenue
4th Floor
Boston, MA 02210

(c) Citizenship

Each of the Venrock 7 Entities and VHCP Entities was organized in Delaware.

(d) Title of Class of Securities
Common Stock, \$0.0001 par value(e) CUSIP Number
75901B107**Item 3. If this statement is filed pursuant to §§240.13d-1(b), or 240.13d-2(b) or (c), check whether the person filing is a:**

Not applicable

Item 4. Ownership

(a) Amount Beneficially Owned as of December 31, 2015:

Venrock Healthcare Capital Partners, L.P.	1,083,454 (1)
VHCP Co-Investment Holdings, LLC	1,083,454 (1)
Venrock Healthcare Capital Partners II, L.P.	1,083,454 (1)
VHCP Co-Investment Holdings II, LLC	1,083,454 (1)
VHCP Management, LLC	1,083,454 (1)
VHCP Management II, LLC	1,083,454 (1)
Venrock Associates VII, L.P.	908,453 (2)
Venrock Partners VII, L.P.	908,453 (2)
Venrock Management VII, LLC	908,453 (2)

(b) Percent of Class as of December 31, 2015:

Venrock Healthcare Capital Partners, L.P.	4.1% (3)
VHCP Co-Investment Holdings, LLC	4.1% (3)
Venrock Healthcare Capital Partners II, L.P.	4.1% (3)
VHCP Co-Investment Holdings II, LLC	4.1% (3)
VHCP Management, LLC	4.1% (3)
VHCP Management II, LLC	4.1% (3)
Venrock Associates VII, L.P.	3.5% (3)
Venrock Partners VII, L.P.	3.5% (3)
Venrock Management VII, LLC	3.5% (3)

(c) Number of shares as to which the person has, as of December 31, 2015:

(i) Sole power to vote or to direct the vote

Venrock Healthcare Capital Partners, L.P.	0
VHCP Co-Investment Holdings, LLC	0
Venrock Healthcare Capital Partners II, L.P.	0
VHCP Co-Investment Holdings II, LLC	0
VHCP Management, LLC	0
VHCP Management II, LLC	0
Venrock Associates VII, L.P.	0
Venrock Partners VII, L.P.	0
Venrock Management VII, LLC	0

(ii) Shared power to vote or to direct the vote

Venrock Healthcare Capital Partners, L.P.	1,083,454 (1)
VHCP Co-Investment Holdings, LLC	1,083,454 (1)
Venrock Healthcare Capital Partners II, L.P.	1,083,454 (1)
VHCP Co-Investment Holdings II, LLC	1,083,454 (1)
VHCP Management, LLC	1,083,454 (1)
VHCP Management II, LLC	1,083,454 (1)
Venrock Associates VII, L.P.	908,453 (2)
Venrock Partners VII, L.P.	908,453 (2)
Venrock Management VII, LLC	908,453 (2)

(V) Sole power to dispose or to direct the disposition of

Venrock Healthcare Capital Partners, L.P.	0
VHCP Co-Investment Holdings, LLC	0
Venrock Healthcare Capital Partners II, L.P.	0
VHCP Co-Investment Holdings II, LLC	0
VHCP Management, LLC	0
VHCP Management II, LLC	0
Venrock Associates VII, L.P.	0
Venrock Partners VII, L.P.	0
Venrock Management VII, LLC	0

(iv) Shared power to dispose or to direct the disposition of

Venrock Healthcare Capital Partners, L.P.	1,083,454 (1)
VHCP Co-Investment Holdings, LLC	1,083,454 (1)
Venrock Healthcare Capital Partners II, L.P.	1,083,454 (1)
VHCP Co-Investment Holdings II, LLC	1,083,454 (1)
VHCP Management, LLC	1,083,454 (1)
VHCP Management II, LLC	1,083,454 (1)
Venrock Associates VII, L.P.	908,453 (2)
Venrock Partners VII, L.P.	908,453 (2)
Venrock Management VII, LLC	908,453 (2)

- (1) These shares are owned directly as follows: 44,381 shares are owned by VHCP I, 8,119 shares are owned by VHCP Co-Invest I, 783,474 shares are owned by VHCP II and 247,480 shares are owned by VHCP Co-Invest II.
- (2) These shares are owned directly as follows: 838,956 shares are owned by VA7 and 69,497 shares are owned by VP7.
- (3) This percentage is calculated based upon 26,313,471 shares of the Issuer's common stock outstanding as of November 5, 2015, as set forth in the Issuer's quarterly report on Form 10-Q filed with the Securities and Exchange Commission on November 5, 2015.

Item 5. Ownership of Five Percent or Less of a Class

If this statement is being filed to report the fact that as of the date hereof the reporting person has ceased to be the beneficial owner of more than five percent of the class of securities, check the following .

Item 6. Ownership of More than Five Percent on Behalf of Another Person

Not Applicable

Item 7. Identification and Classification of the Subsidiary Which Acquired the Security Being Reported on By the Parent Holding Company or Control Person.

Not Applicable

Item 8. Identification and Classification of Members of the Group

Not Applicable

Item 9. Notice of Dissolution of a Group

Not Applicable

Item 10. Certification

Not Applicable

SIGNATURE

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this Statement is true, complete and correct.

Dated: February 16, 2016

Venrock Healthcare Capital Partners, L.P.

By: VHCP Management, LLC
Its: General Partner

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

VHCP Co-Investment Holdings, LLC

By: VHCP Management, LLC
Its: Manager

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

VHCP Management, LLC

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

Venrock Healthcare Capital Partners II, L.P.

By: VHCP Management II, LLC
Its: General Partner

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

VHCP Co-Investment Holdings II, LLC

By: VHCP Management II, LLC
Its: Manager

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

VHCP Management II, LLC

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

Venrock Associates VII, L.P.

By: Venrock Management VII, LLC
Its: General Partner

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

Venrock Partners VII, L.P.

By: Venrock Partners Management VII, LLC
Its: General Partner

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

Venrock Management VII, LLC

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

EXHIBITS

A: Joint Filing Agreement

EXHIBIT A

JOINT FILING AGREEMENT

In accordance with Rule 13d-1(k) under the Securities Exchange Act of 1934, as amended, the undersigned agree to the joint filing on behalf of each of them of a statement on Schedule 13G (including amendments thereto) with respect to the Common Stock of REGENXBIO Inc. and further agree that this agreement be included as an exhibit to such filing. Each party to the agreement expressly authorizes each other party to file on its behalf any and all amendments to such statement. Each party to this agreement agrees that this joint filing agreement may be signed in counterparts.

In evidence whereof, the undersigned have caused this Agreement to be executed on their behalf this 16th day of February, 2016.

Venrock Healthcare Capital Partners, L.P.

By: VHCP Management, LLC
Its: General Partner

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

VHCP Co-Investment Holdings, LLC

By: VHCP Management, LLC
Its: Manager

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

VHCP Management, LLC

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

Venrock Healthcare Capital Partners II, L.P.

By: VHCP Management II, LLC
Its: General Partner

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

VHCP Co-Investment Holdings II, LLC

By: VHCP Management II, LLC
Its: Manager

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

VHCP Management II, LLC

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

Venrock Associates VII, L.P.

By: Venrock Management VII, LLC
Its: General Partner

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

Venrock Partners VII, L.P.

By: Venrock Partners Management VII, LLC
Its: General Partner

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory

Venrock Management VII, LLC

By: /s/ David L. Stepp
David L. Stepp
Authorized Signatory