
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

SCHEDULE 13D

UNDER THE SECURITIES EXCHANGE ACT OF 1934
(Amendment No. 2)*

Flex Pharma, Inc.

(Name of Issuer)

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

33938A 105
(CUSIP Number)

Christoph Westphal, M.D., Ph.D.
Longwood Fund Management
Prudential Tower, Suite 1555
800 Boylston Street
Boston, MA 02199
(617) 351-2590

(Name, Address and Telephone Number of Person Authorized to Receive Notices and Communications)

May 17, 2016
(Date of Event Which Requires Filing of this Statement)

If the filing person has previously filed a statement on Schedule 13G to report the acquisition that is the subject of this Schedule 13D, and is filing this schedule because of §§240.13d-1(e), 240.13d-1(f) or 240.13d-1(g), check the following box.

Note: Schedules filed in paper format shall include a signed original and five copies of the schedule, including all exhibits. See Rule 13d-7 for other parties to whom copies are to be sent.

* 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 disclosures provided in a prior cover page.

The information required on 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 Longwood Fund II, L.P.	
2.	Check the Appropriate Box if a Member of a Group (see instructions) (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3.	SEC USE ONLY	
4.	Source of Funds (see instructions) N/A	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization Delaware, United States of America	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 0
	8.	Shared Voting Power 2,697,264
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 2,697,264
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 2,697,264	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (see instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row 11 15.0%	
14.	Type of Reporting Person (see instructions) PN	

1.	Name of Reporting Persons Longwood Fund III, L.P.	
2.	Check the Appropriate Box if a Member of a Group (see instructions) (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3.	SEC USE ONLY	
4.	Source of Funds (see instructions) WC	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization Delaware, United States of America	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 0
	8.	Shared Voting Power 357,249
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 357,249
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 357,249	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (see instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row 11 2.0 %	
14.	Type of Reporting Person (see instructions) PN	

1.	Name of Reporting Persons Longwood Fund II GP, LLC	
2.	Check the Appropriate Box if a Member of a Group (see instructions) (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3.	SEC USE ONLY	
4.	Source of Funds (see instructions) N/A	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization Delaware, United States of America	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 0
	8.	Shared Voting Power 2,697,264
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 2,697,264
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 2,697,264	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (see instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row 11 15.0%	
14.	Type of Reporting Person (see instructions) OO	

1.	Name of Reporting Persons Longwood Fund III GP, LLC	
2.	Check the Appropriate Box if a Member of a Group (see instructions) (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3.	SEC USE ONLY	
4.	Source of Funds (see instructions) N/A	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization Delaware, United States of America	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 0
	8.	Shared Voting Power 357,249
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 357,249
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 357,249	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (see instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row 11 2.0%	
14.	Type of Reporting Person (see instructions) OO	

1.	Name of Reporting Persons Christoph Westphal, M.D., Ph.D.	
2.	Check the Appropriate Box if a Member of a Group (see instructions) (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3.	SEC USE ONLY	
4.	Source of Funds (see instructions) AF, PF	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization United States citizen	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 3,925,248
	8.	Shared Voting Power 3,054,513
	9.	Sole Dispositive Power 3,925,248
	10.	Shared Dispositive Power 3,054,513
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 6,979,761	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (see instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row 11 38.8%	
14.	Type of Reporting Person (see instructions) IN	

1.	Name of Reporting Persons Richard Aldrich	
2.	Check the Appropriate Box if a Member of a Group (see instructions) (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3.	SEC USE ONLY	
4.	Source of Funds (see instructions) N/A	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization United States citizen	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 216,828
	8.	Shared Voting Power 3,054,513
	9.	Sole Dispositive Power 216,828
	10.	Shared Dispositive Power 3,054,513
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 3,271,341	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (see instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row 11 18.2%	
14.	Type of Reporting Person (see instructions) IN	

1.	Name of Reporting Persons Michelle Dipp, M.D., Ph.D.	
2.	Check the Appropriate Box if a Member of a Group (see instructions) (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3.	SEC USE ONLY	
4.	Source of Funds (see instructions) N/A	
5.	Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e) <input type="checkbox"/>	
6.	Citizenship or Place of Organization United States citizen	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 216,829
	8.	Shared Voting Power 3,054,513
	9.	Sole Dispositive Power 216,829
	10.	Shared Dispositive Power 3,054,513
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 3,271,342	
12.	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (see instructions) <input type="checkbox"/>	
13.	Percent of Class Represented by Amount in Row 11 18.2%	
14.	Type of Reporting Person (see instructions) IN	

Explanatory Note

This Amendment No. 2 to Schedule 13D is being filed by Longwood Fund II, L.P., Longwood Fund III, L.P., Longwood Fund II GP, LLC, Longwood Fund III GP, LLC, Christoph Westphal, M.D., Ph.D., Richard Aldrich, and Michelle Dipp, M.D., Ph.D. (collectively, the "Reporting Persons"), pursuant to §240.13d-2(a), to amend the Schedule 13D filed by the Reporting Persons on February 19, 2015, as amended on March 22, 2016 (the "Existing Schedule 13D") relating to the Common Stock, \$0.0001 par value per share (the "Common Stock"), of Flex Pharma, Inc. (the "Issuer"). The purpose of this amendment is to reflect the additional shares of Common Stock purchased by Longwood Fund III, L.P. since March 18, 2016. Except as set forth below, all Items of the Existing Schedule 13D remain unchanged. All capitalized terms not otherwise defined herein shall have the meanings ascribed to such terms in the Existing Schedule 13D.

Item 1. Security and Issuer.

There are no amendments to Item 1 of the Existing Schedule 13D.

Item 2. Identity and Background.

There are no amendments to Item 2 of the Existing Schedule 13D.

Item 3. Source and Amount of Funds or Other Consideration.

Item 3 is hereby amended to append the following:

On March 21, 2016, Longwood Fund III purchased in the open market 24,107 shares of Common Stock at a purchase price of \$11.70, for an aggregate purchase price of \$282,124.85. On March 22, 2016, Longwood Fund III purchased in the open market 23,951 shares of Common Stock at a purchase price of \$11.78, for an aggregate purchase price of \$282,075.50. On March 23, 2016, Longwood Fund III purchased in the open market 25,356 shares of Common Stock at a purchase price of \$11.55, for an aggregate purchase price of \$292,973.54. On March 24, 2016, Longwood Fund III purchased in the open market 24,207 shares of Common Stock at a purchase price of \$10.55, for an aggregate purchase price of \$255,297.98. On May 9, 2016, Longwood Fund III purchased in the open market 17,532 shares of Common Stock at a purchase price of \$9.80, for an aggregate purchase price of \$171,784.49. On May 10, 2016, Longwood Fund III purchased in the open market 12,577 shares of Common Stock at a purchase price of \$10.14, for an aggregate purchase price of \$127,540.85. On May 11, 2016, Longwood Fund III purchased in the open market 14,120 shares of Common Stock at a purchase price of \$10.33, for an aggregate purchase price of \$145,929.53. On May 12, 2016, Longwood Fund III purchased in the open market 16,097 shares of Common Stock at a purchase price of \$9.94, for an aggregate purchase price of \$159,961.86. On May 13, 2016, Longwood Fund III purchased in the open market 7,269 shares of Common Stock at a purchase price of \$10.09, for an aggregate purchase price of \$73,357.48. On May 16, 2016, Longwood Fund III purchased in the open market 8,200 shares of Common Stock at a purchase price of \$10.40, for an aggregate purchase price of \$85,317.61. On May 17, 2016, Longwood Fund III purchased in the open market 18,200 shares of Common Stock at a purchase price of \$11.14, for an aggregate purchase price of \$202,787.99. The working capital of Longwood Fund III was the source of funds for the purchase of these shares.

Item 4. Purpose of Transaction.

There are no amendments to Item 4 of the Existing Schedule 13D.

Item 5. Interest in Securities of the Issuer.

Items 5(a) and 5(b) of the Existing Schedule 13D are hereby amended and restated in their entirety as follows:

The aggregate percentage of shares of Common Stock reported beneficially owned by each person named herein is determined in accordance with Securities and Exchange Commission ("SEC") rules and is based upon 17,967,891 shares of the Issuer's Common Stock outstanding as of April 29, 2016. The applicable SEC rules generally attribute beneficial ownership of securities to persons who possess sole or shared voting power or investment power with respect to those securities.

A. Longwood Fund II, L.P.

- (a) As of the closing of business on May 17, 2016, Longwood Fund II beneficially owned 2,697,264 shares of Common Stock, representing a beneficial ownership of approximately 15.0% of the shares of Common Stock. All such shares are directly held by the Longwood Fund II.

(b)	1. Sole power to vote or direct vote:	0
	2. Shared power to vote or direct vote:	2,697,264
	3. Sole power to dispose or direct the disposition:	0
	4. Shared power to dispose or direct the disposition:	2,697,264

B. Longwood Fund II GP, LLC

(a) As of the closing of business on May 17, 2016, Longwood Fund II GP, LLC beneficially owned 2,697,264 shares of Common Stock, representing a beneficial ownership of approximately 15.0% of the shares of Common Stock. All such shares are directly held by the Longwood Fund II.

(b)	1. Sole power to vote or direct vote:	0
	2. Shared power to vote or direct vote:	2,697,264
	3. Sole power to dispose or direct the disposition:	0
	4. Shared power to dispose or direct the disposition:	2,697,264

C. Longwood Fund III, L.P.

(a) As of the closing of business on May 17, 2016, Longwood Fund III beneficially owned 357,249 shares of Common Stock, representing a beneficial ownership of approximately 2.0% of the shares of Common Stock. All such shares are directly held by the Longwood Fund III.

(b)	1. Sole power to vote or direct vote:	0
	2. Shared power to vote or direct vote:	357,249
	3. Sole power to dispose or direct the disposition:	0
	4. Shared power to dispose or direct the disposition:	357,249

D. Longwood Fund III GP, LLC

(a) As of the closing of business on May 17, 2016, Longwood Fund III GP, LLC beneficially owned 357,249 shares of Common Stock, representing a beneficial ownership of approximately 2.0% of the shares of Common Stock. All such shares are directly held by the Longwood Fund III.

(b)	1. Sole power to vote or direct vote:	0
	2. Shared power to vote or direct vote:	357,249
	3. Sole power to dispose or direct the disposition:	0
	4. Shared power to dispose or direct the disposition:	357,249

E. Christoph Westphal, M.D., Ph.D.

(a) As of the closing of business on May 17, 2016, Christoph Westphal, M.D., Ph.D., beneficially owned 6,979,761 shares of Common Stock, representing a beneficial ownership of approximately 38.8% of the shares of Common Stock. 3,925,248 of these shares are directly held by Dr. Westphal personally and 3,054,513 are directly held by the Funds.

(b)	1. Sole power to vote or direct vote:	3,925,248
	2. Shared power to vote or direct vote:	3,054,513
	3. Sole power to dispose or direct the disposition:	3,925,248
	4. Shared power to dispose or direct the disposition:	3,054,513

F. Richard Aldrich

- (a) As of the closing of business on May 17, 2016, Richard Aldrich beneficially owned 3,271,341 shares of Common Stock, representing a beneficial ownership of approximately 18.2% of the shares of Common Stock. 170,488 of these shares are directly held by Mr. Aldrich personally, 46,340 are directly held by the Richard H. Aldrich 2014 GRAT and 3,054,513 are directly held by the Funds.
- (b)
- | | |
|---|-----------|
| 1. Sole power to vote or direct vote: | 216,828 |
| 2. Shared power to vote or direct vote: | 3,054,513 |
| 3. Sole power to dispose or direct the disposition: | 216,828 |
| 4. Shared power to dispose or direct the disposition: | 3,054,513 |

G. Michelle Dipp, M.D., Ph.D.

- (a) As of the closing of business on May 17, 2016, Michelle Dipp, M.D., Ph.D. beneficially owned 3,271,342 shares of Common Stock, representing a beneficial ownership of approximately 18.2% of the shares of Common Stock. 216,829 of these shares are directly held by Dr. Dipp and 3,054,513 of these shares are directly held by the Funds.
- (b)
- | | |
|---|-----------|
| 1. Sole power to vote or direct vote: | 216,829 |
| 2. Shared power to vote or direct vote: | 3,054,513 |
| 3. Sole power to dispose or direct the disposition: | 216,829 |
| 4. Shared power to dispose or direct the disposition: | 3,054,513 |

Item 5(c) is hereby amended to append the following:

Item 3 sets forth the transactions effected by Longwood Fund III in the past sixty (60) days. None of the other Reporting Persons has effected any transaction in the Common Stock during the last 60 days.

Item 6. Contracts, Arrangements, Understandings or Relationships with Respect to Securities of the Issuer.

There are no amendments to Item 6 of the Existing Schedule 13D.

Item 7. Material to Be Filed as Exhibits.

There are no amendments to Item 7 of the Existing Schedule 13D.

SIGNATURES

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: May 19, 2016

LONGWOOD FUND II, L.P.

By: Longwood Fund II GP, LLC, a
Delaware limited liability company and
general partner of Longwood Fund II L.P.

By: /s/ Michelle Dipp
Michelle Dipp, M.D., Ph.D., Manager

LONGWOOD FUND III, L.P.

By: Longwood Fund III GP, LLC, a
Delaware limited liability company and
general partner of Longwood Fund II L.P.

By: /s/ Michelle Dipp
Michelle Dipp, M.D., Ph.D., Manager

LONGWOOD FUND II GP, LLC

By: /s/ Michelle Dipp
Michelle Dipp, M.D., Ph.D., Manager

/s/ Christoph Westphal
Christoph Westphal, M.D., Ph.D.

/s/ Richard Aldrich
Richard Aldrich

/s/ Michelle Dipp
Michelle Dipp, M.D., Ph.D.

LONGWOOD FUND III GP, LLC

By: /s/ Michelle Dipp
Michelle Dipp, M.D., Ph.D., Manager

**Attention: Intentional misstatements or omissions of fact
constitute Federal criminal violations (See 18 U.S.C. 1001)**