UNITED STATES SECURITIES AND EXCHANGE COMMISSION Washington, D.C. 20549

SCHEDULE 13D

(Rule 13d-101)

INFORMATION TO BE INCLUDED IN STATEMENTS FILED PURSUANT TO § 240.13d-1(a) AND AMENDMENTS THERETO FILED PURSUANT TO § 240.13d-2(a)

(Amendment No. 4)1

<u>Targacept, Inc.</u> (Name of Issuer)

Common Stock, par value \$0.001 (Title of Class of Securities)

87611R306 (CUSIP Number)

SPIKE LOY BVF PARTNERS L.P. 1 Sansome Street, 30th Floor San Francisco, California 94104 (415) 525-8890

ADAM W. FINERMAN, ESQ.
OLSHAN FROME WOLOSKY LLP
Park Avenue Tower
65 East 55th Street
New York, New York 10022
(212) 451-2300
(Name, Address and Telephone Number of Person Authorized to Receive Notices and Communications)

August 5, 2015 (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 x.

Note: Schedules filed in paper format shall include a signed original and five copies of the schedule, including all exhibits. *See* § 240.13d-7 for other parties to whom copies are to be sent.

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 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.

1	NAME OF REPORT	ING PERSON			
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11	AGGREGALE AMC	OUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON			
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11	AGGREGATE AMO	DUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON				
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1	NAME OF REPORTING PERSON BVF INVESTMENTS, L.L.C.				
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	9	SOLE DISPOSITIVE POWER			
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11	AGGREGATE AMO	DUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON			
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12	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (11) EXCLUDES CERTAIN SHARES 0				
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1	NAME OF REPORTING PERSON					
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_	MSI BVF SPV, LLC					
2	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (a) x					
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11	AGGREGATE AMO	DUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON				
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12	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (11) EXCLUDES CERTAIN SHARES 0					
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14	TYPE OF REPORTING PERSON					
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	NAME OF PEROPE	TING DEDGON				
1	NAME OF REPORT	ING PERSON				
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2	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (a) x (b) o					
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11	AGGKEGALE AMC	DUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON				
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11	AGGREGATE AMO	DUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON			
	7,020,128				
12	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (11) EXCLUDES CERTAIN SHARES 0				
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13	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (11)				
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PERSON WITH		7,020,128			
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11	AGGREGATE AMO	OUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON			
	7,020,128				
12	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (11) EXCLUDES CERTAIN SHARES 0				
13	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (11)				
	20.5%				
14	TYPE OF REPORT	ING PERSON			
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The following constitutes Amendment No. 4 to the Schedule 13D filed by the undersigned ("Amendment No. 4"). This Amendment No. 4 amends the Schedule 13D as specifically set forth herein.

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

Item 3 is hereby amended and restated to read as follows:

The Shares purchased by each of BVF, BVF2, BVLLC, ILL10 and MSI were purchased with working capital (which may, at any given time, include margin loans made by brokerage firms in the ordinary course of business) in open market purchases, except as otherwise noted on Schedule A. The aggregate purchase price of the 2,977,919 Shares beneficially owned by BVF is approximately \$12,899,438, including brokerage commissions. The aggregate purchase price of the 1,713,907 Shares beneficially owned by BVF2 is approximately \$7,421,983, including brokerage commissions. The aggregate purchase price of the 349,482 Shares beneficially owned by BVLLC is approximately \$2,388,744, including brokerage commissions. The aggregate purchase price of the 1,130,361 Shares beneficially owned by ILL10 is approximately \$4,897,765, including brokerage commissions. The aggregate purchase price of the 848,459 Shares beneficially owned by MSI is approximately \$3,045,450, including brokerage commissions.

Item 5. <u>Interest in Securities of the Issuer.</u>

Items 5(a)-(c) are hereby amended and restated to read as follows:

(a) The aggregate percentage of Shares reported owned by each person named herein is based upon 34,292,291Shares outstanding as of July 27, 2015, which is the total number of Shares outstanding as reported in the Issuer's Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on July 31, 2015.

As of the close of business on August 7, 2015, (i) BVF beneficially owned 2,977,919 Shares, (ii) BVF2 beneficially owned 1,713,907 Shares, (iii) BVLLC beneficially owned 349,482 Shares, (iv) ILL10 beneficially owned 1,130,361 Shares, and (v) MSI beneficially owned 848,459 shares of Common Stock, representing percentage ownership of approximately 8.7%, 5.0%, 1.0%, 3.3% and 2.5%, respectively, of the Shares outstanding.

Partners, as the general partner of BVF and BVF2, the manager of BVLLC, and the investment adviser of each of ILL10 and MSI, may be deemed to beneficially own the 7,020,128 shares of Common Stock beneficially owned in the aggregate by BVF, BVF2, BVLLC, ILL10 and MSI, representing percentage ownership of approximately 20.5% of the Shares outstanding.

BVF Inc., as the general partner of Partners, may be deemed to beneficially own the 7,020,128 Shares beneficially owned by Partners, representing percentage ownership of approximately 20.5% of the Shares outstanding.

Mr. Lampert, as a director and officer of BVF Inc. may be deemed to beneficially own the 7,020,128 Shares beneficially owned by BVF Inc., representing percentage ownership of approximately 20.5% of the Shares outstanding.

- (b) Each of BVF, BVF2, BVLLC, ILL10 and MSI shares with Partners voting and dispositive power over the Shares each such entity beneficially owns. Partners, BVF Inc. and Mr. Lampert share voting and dispositive power over the 7,020,128 Shares they may be deemed to beneficially own with BVF, BVF2, BVLLC, ILL10 and MSI.
- (c) Schedule A annexed hereto lists all transactions in securities of the Issuer during the past sixty days by the Reporting Persons. All of such transactions were effected in the open market, except as otherwise noted.

SIGNATURES

After reasonable inquiry and to the best of his knowledge and belief, each of the undersigned certifies that the information set forth in this statement is true, complete and correct.

Dated: August 7, 2015

BIOTECHNOLOGY VALUE FUND, L.P.

By: BVF Partners L.P., its general partner

By: BVF Inc., its general partner

/s/ Mark N. Lampert By:

Mark N. Lampert

President

BIOTECHNOLOGY VALUE FUND II, L.P.

By: BVF Partners L.P., its general partner

By: BVF Inc., its general partner

/s/ Mark N. Lampert By:

Mark N. Lampert

President

BVF PARTNERS L.P.

BVF Inc., its general partner By:

/s/ Mark N. Lampert By:

Mark N. Lampert

President

BVF INVESTMENTS, L.L.C.

By: BVF Partners L.P., its manager

By: BVF Inc., its general partner

By: /s/ Mark N. Lampert

Mark N. Lampert

President

INVESTMENT 10, L.L.C.

By: BVF Partners L.P., its investment adviser

By: BVF Inc., its general partner

/s/ Mark N. Lampert By:

Mark N. Lampert

President

MSI BVF SPV, LLC

BVF Partners L.P., its investment adviser By:

By: BVF Inc., its general partner

By: /s/ Mark N. Lampert

> Mark N. Lampert President

BVF INC.

By: /s/ Mark N. Lampert

Mark N. Lampert

President

/s/ Mark N. Lampert

MARK N. LAMPERT

SCHEDULE A

<u>Transactions in the Securities of the Issuer During the Past Sixty Days</u>

Class of <u>Security</u>	Securities <u>Purchased / (Sold)</u>	<u> Price (\$)</u>	Date of <u>Purchase / Sale</u>
	MSI BVF SP	V, LLC	
Common Stock	365,000	2.3500	08/05/2015