

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

FORM S-3

**REGISTRATION STATEMENT UNDER
THE SECURITIES ACT OF 1933**

TARGACEPT, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

56-2020050
(I.R.S. Employer
Identification Number)

**200 East First Street, Suite 300
Winston-Salem, North Carolina 27101
(336) 480-2100**
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

**J. Donald deBethizy
President and Chief Executive Officer
Targacept, Inc.
200 East First Street, Suite 300
Winston-Salem, North Carolina 27101
(336) 480-2100**
(Name, address, including zip code, and telephone number, including area code, of agent for service)

with copies to:
**Peter A. Zorn, Esq.
Targacept, Inc.
200 East First Street, Suite 300
Winston-Salem, North Carolina 27101
(336) 480-2100**

**Jonathan M. Kravetz, Esq.
Megan N. Gates, Esq.
Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.
One Financial Center
Boston, Massachusetts 02111
(617) 542-6000**

Approximate date of commencement of proposed sale to the public: From time to time after this Registration Statement becomes effective.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box.

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. 333-143259

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box.

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box.

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 definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer

Non-accelerated filer (Do not check if a smaller reporting company)

Accelerated filer

Smaller reporting company

CALCULATION OF REGISTRATION FEE

<u>Title of each class of securities to be registered</u>	<u>Proposed maximum aggregate offering price(1)</u>	<u>Amount of Registration fee(2)</u>
Common Stock, \$0.001 par value per share	\$8,820,820	\$492.21

(1) This Registration Statement relates to the Registrant's Registration Statement on Form S-3 (File No. 333-143259), which was declared effective by the Securities and Exchange Commission (the "SEC") on July 20, 2007 (the "Prior Registration Statement"). In accordance with Rule 462(b) under the Securities Act of 1933, as amended, the proposed maximum offering price of the remaining securities eligible to be sold under the Prior Registration Statement (\$44,104,100) is carried forward to this Registration Statement and an additional amount of securities having a proposed maximum aggregate offering price of no more than 20% thereof, or \$8,820,820, is registered hereby, which includes shares issuable upon exercise of the underwriters' over-allotment option.

(2) Calculated in accordance with Rule 457(o) under the Securities Act of 1933, as amended.

The Registrant certifies to the SEC that it has instructed its bank to pay to the SEC the filing fee of \$492.21 for the additional securities being registered hereby by wire transfer as soon as practicable (but in any event no later than the close of business on October 8, 2009); that it will not revoke such instructions; that it has sufficient funds in the relevant account to cover the amount of the filing fee; and that it undertakes to confirm receipt of such instructions by the bank on or before October 8, 2009.

This Registration Statement shall become effective upon filing with the Securities and Exchange Commission in accordance with Rule 462(b) of the Securities Act of 1933, as amended.

**EXPLANATORY NOTE AND
INCORPORATION OF CERTAIN INFORMATION BY REFERENCE**

This Registration Statement on Form S-3 is being filed with respect to the registration of additional shares of common stock, par value \$.001 per share, of Targacept, Inc., a Delaware corporation, pursuant to Rule 462(b) and General Instruction IV.A of Form S-3, both promulgated under the Securities Act of 1933, as amended.

The Registrant hereby incorporates by reference into this Registration Statement on Form S-3 in its entirety the Registration Statement on Form S-3 (Registration No. 333-143259), which was declared effective by the Securities and Exchange Commission on July 20, 2007, including each of the documents filed by the Registrant and incorporated or deemed to be incorporated by reference therein and all exhibits thereto. The required opinions and consents are listed on an Exhibit Index attached hereto and filed herewith.

**PART II
INFORMATION NOT REQUIRED IN PROSPECTUS**

Item 16. Exhibits

All exhibits filed with or incorporated by reference in Registration Statement No. 333-143259 are incorporated by reference into, and shall be deemed a part of, this Registration Statement. The following exhibits are filed herewith pursuant to the requirements of Item 601 of Regulation S-K:

<u>Exhibit Number</u>	<u>Description</u>
5.1	Opinion of Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.
23.1	Consent of Ernst & Young LLP.
23.2	Consent of Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C. (included in the opinion filed as Exhibit 5.1).

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Winston-Salem, North Carolina, on October 7, 2009.

TARGACEPT, INC.

By: /s/ Alan A. Musso
Alan A. Musso
Vice President, Chief Financial Officer and Treasurer

Pursuant to the requirements of the Securities Act of 1933, this Registration Statement on Form S-3 has been signed below by the following persons in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ J. DONALD DEBETHIZY, PH.D.</u> J. Donald deBethizy, Ph.D.	Chief Executive Officer, President and Director (Principal Executive Officer)	October 7, 2009
<u>/s/ ALAN A. MUSSO</u> Alan A. Musso	Vice President, Chief Financial Officer and Treasurer (Principal Financial Officer and Principal Accounting Officer)	October 7, 2009
<u>*</u> Mark Skaletsky	Chairman of the Board of Directors	October 7, 2009
<u>*</u> M. James Barrett, Ph.D.	Director	October 7, 2009
<u>*</u> Charles A. Blixt	Director	October 7, 2009
<u>*</u> Julia R. Brown	Director	October 7, 2009
<u>*</u> G. Steven Burrill	Director	October 7, 2009
<u>*</u> Errol B. De Souza, Ph.D.	Director	October 7, 2009
<u>*</u> Alan W. Dunton, M.D.	Director	October 7, 2009
<u>*</u> John P. Richard	Director	October 7, 2009
<u>*</u> Ralph Snyderman, M.D.	Director	October 7, 2009

*By: /s/ ALAN A. MUSSO
Attorney-in-fact

EXHIBIT INDEX

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MINTZ LEVIN

One Financial Center
Boston, MA 02111
617-542-6000
617-542-2241 fax
www.mintz.com

October 7, 2009

Targacept, Inc.
200 East First Street
Suite 300
Winston-Salem, North Carolina, 27101

Ladies and Gentlemen:

We have acted as counsel to Targacept, Inc., a Delaware corporation (the "Company"), in connection with the preparation and filing with the Securities and Exchange Commission (the "Commission") of (i) a Registration Statement on Form S-3, Registration No. 333-143259 (the "Initial Registration Statement"), and (ii) a second Registration Statement on Form S-3 to be filed pursuant to Rule 462(b) promulgated under the Securities Act of 1933, as amended (the "462(b) Registration Statement," and together with the Initial Registration Statement, the "Registration Statements"). This opinion is being rendered to you in connection with the filing of the 462(b) Registration Statement, pursuant to which the Company is registering an aggregate of up to \$8,820,820 of shares (the "Shares") of the Company's common stock, \$0.001 par value per share (the "Common Stock"). All capitalized terms used herein and not otherwise defined shall have the respective meanings given to them in the Registration Statements.

In connection with this opinion, we have examined the Company's Restated Certificate of Incorporation and By-Laws, both as amended and currently in effect; the minutes of all pertinent meetings of stockholders and directors of the Company relating to the Registration Statements and the transactions contemplated thereby; such other records of the corporate proceedings of the Company and certificates of the Company's officers as we have deemed relevant; and the Registration Statement and the exhibits thereto.

In our examination, we have assumed the genuineness of all signatures, the legal capacity of natural persons, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as certified or photostatic copies and the authenticity of the originals of such copies.

Based upon the foregoing, and subject to the limitations set forth below, we are of the opinion that the Shares, when issued and delivered by the Company against payment therefore, will be duly and validly issued, fully paid and non-assessable shares of the Common Stock.

Our opinion is limited to the General Corporation Law of the State of Delaware (including the applicable provisions of the Delaware Constitution and the reported judicial decisions interpreting the laws) and the federal laws of the United States of America, and we express no opinion with respect to the laws of any other jurisdiction. No opinion is expressed herein with respect to the qualification of the Shares under the securities or blue sky laws of any state or any foreign jurisdiction. The foregoing opinion is rendered as of the date hereof. We assume no obligation to update such opinion to reflect any facts or circumstances which may hereafter come to our attention or changes in the law which may hereafter occur.

We understand that you wish to file this opinion as an exhibit to the 462(b) Registration Statement, and we hereby consent thereto. We hereby further consent to the reference to us under the caption "Legal Matters" in the prospectus included in the 462(b) Registration Statement.

Very truly yours,

/s/ Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.

Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.

Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.

BOSTON | WASHINGTON | NEW YORK | STAMFORD | LOS ANGELES | PALO ALTO | SAN DIEGO | LONDON

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the reference to our firm under the caption "Experts" in the Registration Statement (Form S-3) of Targacept, Inc. for the registration of shares of its common stock and to the incorporation by reference therein of our reports dated March 12, 2009, with respect to the financial statements of Targacept, Inc. and the effectiveness of internal control over financial reporting of Targacept, Inc., included in its Annual Report (Form 10-K) for the year ended December 31, 2008, filed with the Securities and Exchange Commission.

/s/ Ernst & Young LLP

Raleigh, North Carolina
October 7, 2009