OMB APPROVAL
OMB Number: 3235-0058 Expires: April 30, 2009 Estimated average burden hours per response . . . 2.50
SEC FILE NUMBER 001-33277
CUSIP NUMBER 87162T 20 6

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

FORM 12b-25

NOTIFICATION OF LATE FILING

(Check one): ☒ Form 10-K ☐ Form 20-F ☐ Form 11-K ☐ Form 10-Q ☐ Form 10-D
☐ Form N-SAR ☐ Form N-CSR

For Period Ended: December 31, 2008
☐ Transition Report on Form 10-K
☐ Transition Report on Form 20-F
☐ Transition Report on Form 11-K
☐ Transition Report on Form 10-Q
☐ Transition Report on Form N-SAR
For the Transition Period Ended:

Read Instructions (on back page) Before Preparing Form. Please Print or Type.
Nothing in this form shall be construed to imply that the Commission has verified any information contained herein.

If the notification relates to a portion of the filing checked above, identify the Item(s) to which the notification relates:

PART I — REGISTRANT INFORMATION

Synta Pharmaceuticals Corp.
Full Name of Registrant

N/A
Former Name if Applicable

45 Hartwell Avenue
Address of Principal Executive Office *(Street and Number)*

Lexington, MA 02421
City, State and Zip Code

PART II — RULES 12b-25(b) AND (c)

If the subject report could not be filed without unreasonable effort or expense and the registrant seeks relief pursuant to Rule 12b-25(b), the following should be completed. (Check box if appropriate)

☒
(a) The reason described in reasonable detail in Part III of this form could not be eliminated without unreasonable effort or expense;
(b) The subject annual report, semi-annual report, transition report on Form 10-K, Form 20-F, Form 11-K, Form N-SAR or Form N-CSR, or portion thereof, will be filed on or before the fifteenth calendar day following the prescribed due date; or the subject quarterly report or transition report on Form 10-Q or subject distribution report on Form 10-D, or portion thereof, will be filed on or before the fifth calendar day following the prescribed due date; and
(c) The accountant's statement or other exhibit required by Rule 12b-25(c) has been attached if applicable.

PART III — NARRATIVE

State below in reasonable detail why Forms 10-K, 20-F, 11-K, 10-Q, 10-D, N-SAR, N-CSR, or the transition report or portion thereof, could not be filed within the prescribed time period.

On February 26, 2009, Synta Pharmaceuticals Corp. ("Synta") announced that it was suspending all clinical development of its lead drug candidate, elesclomol, based on an analysis by an independent Data Monitoring Committee (the "DMC") of the data from Synta's pivotal Phase 3 clinical trial comparing elesclomol in combination with paclitaxel to paclitaxel alone in patients with stage IV metastatic melanoma (the "SYMMETRY Trial"). The DMC identified potential safety concerns with the SYMMETRY Trial, citing an imbalance in overall survival, with a greater number of deaths occurring in the combination arm (elesclomol with paclitaxel) compared to the control arm (paclitaxel alone). Based on these findings, Synta suspended the SYMMETRY Trial as well as all other ongoing studies with elesclomol, including a study of elesclomol in combination with docetaxel in hormone-refractory metastatic prostate cancer and a monotherapy dose escalation study, pending further analysis of the results of the SYMMETRY Trial. A copy of the press release with this announcement was filed as an exhibit to Synta's Current Report on Form 8-K dated February 27, 2009.

Since the February 26, 2009 announcement, Synta has been diligently assessing the impact of the suspension of the clinical development of elesclomol, a subsequent event for purposes of its 2008 financial statements, on Synta's business, plans for the future, and 2008 financial statements. However, due to the recent occurrence of this event and its significance to the disclosure in Synta's Form 10-K for the fiscal year ended December 31, 2008 (the "Form 10-K"), Synta did not have sufficient time to analyze and revise its disclosure in its Form 10-K, including its 2008 financial statements, by March 16, 2009, without unreasonable effort or expense.

Synta is proceeding expeditiously to complete this work and finalize the Form 10-K, and expects to file the Form 10-K within the time period specified in Rule 12b-25(b)(2)(ii).

SEC 1344 (05-06) **Persons who are to respond to the collection of information contained in this form are not required to respond unless the form displays a currently valid OMB control number.**

(Attach extra Sheets if Needed)
PART IV — OTHER INFORMATION

(1) Name and telephone number of person to contact in regard to this notification

Safi R. Bahcall	**(781)**	**274-8200**
(Name)	(Area Code)	(Telephone Number)

(2) Have all other periodic reports required under Section 13 or 15(d) of the Securities Exchange Act of 1934 or Section 30 of the Investment Company Act of 1940 during the preceding 12 months or for such shorter period that the registrant was required to file such report(s) been filed? If answer is no, identify report(s).

☒ Yes ☐ No

(3) Is it anticipated that any significant change in results of operations from the corresponding period for the last fiscal year will be reflected by the earnings statements to be included in the subject report or portion thereof?

☒ Yes ☐ No

If so, attach an explanation of the anticipated change, both narratively and quantitatively, and, if appropriate, state the reasons why a reasonable estimate of the results cannot be made.

Synta has not completed the preparation of its financial statements for the year ended December 31, 2008, and is still discussing the potential effects internally and with its independent registered accounting firm of the suspension of the clinical development of elesclomol. Synta estimates, however, that it will report a net loss attributable to common stockholders of between $91 million and $94 million for the year ended December 31, 2008, compared to $122.1 million for the year ended December 31, 2007, which included a one-time, non-cash charge in the amount of $58.6 million for the beneficial conversion of preferred stock in connection with Synta's initial public offering in February 2007. The decrease in the net loss to stockholders principally resulted from this non-recurring beneficial conversion charge, offset by an increase in research and development expenses that was principally due to expenses incurred in connection with elesclomol for the treatment of metastatic melanoma, including the advancement of the SYMMETRY Trial, which was suspended in the first quarter of 2009, and related development costs. In addition, Synta advanced its water-soluble, sodium salt formulation of elesclomol in other cancer types.

This Notification of Late Filing on Form 12b-25 contains forward-looking statements, including statements regarding Synta's anticipated financial results and condition and its ability to complete the filing of its Annual Report on Form 10-K within the 15-day extension period. These statements are based on current expectations as of the date of this filing and involve a number of risks and uncertainties, which may cause results to differ materially from those indicated by these forward-looking statements. These risks include, without limitation, risks related to Synta's ability to complete its Annual Report on Form 10-K, including the financial statements, for the fiscal year ended December 31, 2008, and the possibility that it will not be able to do so within the anticipated time period and other risks detailed in Synta's filings with the Securities and Exchange Commission, including its Annual Report on Form 10-K for the fiscal year ended December 31, 2007. You are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date of this Notification of Late Filing on Form 12b-25. Synta undertakes no obligation to revise or update any forward-looking statements to reflect events or circumstances after the date hereof.

Synta Pharmaceuticals Corp.

(Name of Registrant as Specified in Charter)

has caused this notification to be signed on its behalf by the undersigned hereunto duly authorized.

Date **March 16, 2009**

By **/s/ Safi R. Bahcall**
Safi R. Bahcall, Ph.D.
President and Chief Executive Officer

INSTRUCTION: The form may be signed by an executive officer of the registrant or by any other duly authorized representative. The name and title of the person signing the form shall be typed or printed beneath the signature. If the statement is signed on behalf of the registrant by an authorized representative (other than an executive officer), evidence of the representative's authority to sign on behalf of the registrant shall be filed with the form.

ATTENTION

Intentional misstatements or omissions of fact constitute Federal Criminal Violations (See 18 U.S.C. 1001).