Mail Stop 6010 December 19, 2006

Safi R. Bahcall, Ph.D.
President and Chief Executive Officer
Synta Pharmaceuticals Corp.
45 Hartwell Avenue
Lexington, Massachusetts 02421

Re: Synta Pharmaceuticals Corp.
Registration Statement on Form S-1
Filed November 22, 2006
File No. 333-138894

Dear Dr. Bahcall:

We have reviewed your filing and have the following comments. Where indicated, we think you should revise your document in response to these comments. If you disagree, we will consider your explanation as to why our comment is inapplicable or a revision is unnecessary. Please be as detailed as necessary in your explanation.
In some of our comments, we may ask you to provide us with information so we may better understand your disclosure. After reviewing this information, we may raise additional comments.

Please understand that the purpose of our review process is to assist you in your compliance with the applicable disclosure requirements and to enhance the overall disclosure in your filing. We look forward to working with you in these respects. We welcome any questions you may have about our comments or any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

FORM S-1

General

1. Please provide us proofs of all graphic, visual, or photographic information you will provide in the printed prospectus prior to its use, for example in a preliminary prospectus. Please note we may have comments regarding these materials.

2. Please note that when you file a pre-effective amendment containing pricing-related information, we may have additional comments. As you are likely aware, you must file this amendment prior to circulating the prospectus.
3. Please note that when you file a pre-effective amendment that includes your price range, it must be bona fide. We interpret this to mean your range may not exceed $2 if you price below $20 and 10% if you price above $20.
4. Please note that where we provide examples to illustrate what we mean by our comments, they are examples and not complete lists. If our comments are applicable to portions of the filing that we have not cited as examples, please make the appropriate changes in accordance with our comments.
5. Comments related to your request for confidential treatment will be provided under separate cover. Please be advised that we will not be in a position to consider a request for acceleration of effectiveness of the registration statement until we resolve all issues concerning the confidential treatment request.

Cover page
6. Please remove the phrase "joint book-running managers."

Prospectus Summary, page 1

7. Please expand the discussion to briefly indicate that you currently have no products approved for commercial sale and you have not generated any revenues from commercial sales.

8. We note your discussion on page one of Fast Track designation for your STA-4783 product. Please revise your discussion to explain what Fast Track designation signifies and to clarify that such status does not mean you may eliminate any phases of clinical study. Please also state how Fast Track status facilitates the drug development and regulatory review process.

Our Oncology Programs, page 1
STA-4783

9. We note the statistical information in the last paragraph on page 1. Please clarify whether the potential market for STA-4783 will include anyone suffering from metastatic melanoma or a smaller group of sufferers. If you anticipate the use of STA-4783 for metastatic melanoma will be indicated for only some patients, you should identify the indication and disclose the number of individuals who would meet that indication.

10. Please expand the discussion to indicate when you filed IND`s for each of your drug candidates.
11. Throughout the document, including your business section, you reference several industry sources and various statistics and other figures, including statements relating to the market in which you expect your products to compete. Please provide us supplementally with copies of the sources from which you obtained the statistical and other data for the following statements. These copies should be marked to indicate the information supporting your statements.

* "We believe this is the first blinded clinical trial of a drug candidate for the treatment of metastatic melanoma in 30 years to meet its primary endpoint with statistical significance." Page 1.
* "Melanoma is the deadliest type of skin cancer and is the sixth most commonly diagnosed cancer in the United States. The National Cancer Institute has estimated that the prevalence of melanoma in the United States, or the number of patients alive who have been diagnosed with the disease, is more than 660,000. The American Cancer Society estimates that in 2006, the incidence, or number of newly diagnosed cases, in the United States will be approximately 62,000, with 8,000 deaths from the disease. According to GLOBOCAN, the worldwide incidence of melanoma in 2002 was 160,177, with 40,781 deaths from the disease." Pages 1 and 61.
* "The World Health Organization estimates that more than 11 million people are diagnosed with cancer every year worldwide, and seven million people die from the disease annually. The American Cancer Society estimates that approximately 1.4 million people in the United States will be diagnosed with cancer in 2006, and approximately 565,000 people will die from the disease. Chemotherapeutics are the second largest therapeutic class of pharmaceuticals in the world, with global sales of $28.5 billion in 2005." Page 61.
* "In 2001, the American Joint Committee on Cancer estimated that approximately 15% of patients with melanoma were initially diagnosed with advanced-stage disease, which consists of stage III and stage

IV
melanoma. However, recent scientific articles suggest that this percentage may grow significantly with the increased use of improved
diagnostic techniques. In a study reported in the February 2003 issue of The Journal of the American College of Surgeons, approximately 38% of 175 patients originally diagnosed with stage I
or stage II melanoma should have been categorized with stage III melanoma." Page 62.
* "In metastatic melanoma, the response rate of single agent paclitaxel has been reported as less than 20%. A study published in
2002 in Cancer Investigation showed that combining DTIC and paclitaxel for the treatment of metastatic melanoma was not superior
to using each agent alone." Page 62.

To the extent that the statements are your beliefs or estimates, please present the basis for your estimates and beliefs. To the extent that these estimates are based on information obtained from

other reports, you should provide these reports and explain how they
were used to form your estimates.
12. We note the reference to the trials anticipated to be initiated
in 2007. Where applicable throughout the prospectus, please update
the discussion concerning the status and timing of trials and related
events, e.g., pages 1 and 3.

Risks associated with our business", page 4

13. Please revise the embedded list of risks to present this information in bullet point format.

"If we fail to obtain the capital necessary to fund our operations....", page 11

14. It appears this risk factor describes two risks: the risk of not
being able to raise the necessary funds and the risk of potential negative effects to shareholders as a result of raising additional funds. Please discuss these distinct risks in two separate risk factor headings and discussions.

"We deal with hazardous materials....", page 19
15. Please quantify the extent of your insurance coverage.

"We rely on third parties to conduct our clinical trials....", page
19

16. Please identify the third parties you substantially rely upon for conducting your clinical trials. Also, to the extent you have any agreements with such parties, please so indicate and describe in
your business section the material terms of the agreement(s). You should also file the agreements as exhibits to the registration statement. If you have determined that you are not substantially dependent on these parties, please provide us with an analysis supporting this determination and disclose the number of parties you
engage to conduct your clinical trials.

"We have no manufacturing capacity and depend on third-party manufacturers....," page 20

"We intend to use a single manufacturer for the supply of STA-4783 .....", page 21

17. Please identify your third-party manufacturers. Also, to the extent you have any agreements with such parties, please so indicate
and describe in your business section the material terms of the agreement(s). You should also file the agreements as exhibits to the

registration statement. If you have determined that you are not substantially dependent on these parties, please provide us with an analysis supporting this determination and disclose the number of parties you may engage to manufacture your drug candidates.

"If our patent position does not adequately protect our drug candidates....", page 22

18. We note there may be instances where your licensors and collaborators may be primarily or wholly responsible for the maintenance of patents and prosecution of patent applications. If you do not have the obligation to take action, do you have the right to take necessary action if the other party does not?

"If a successful product liability claim or series of claims is brought against us....", page 26

19. Please expand the discussion to quantify the amount of product liability insurance coverage you currently maintain.

"Our future success depends on our ability to retain our chief executive officer....", page 28

20. Please expand the discussion to identify the other members of your executive and scientific teams upon whom you are dependent and who are not specifically identified on page 92.

"Investors in this offering will pay a much higher price....", page 32

21. Please revise this discussion to also state that shareholders will contribute __% of the total amount to fund the registrant but will only own __% of the outstanding shares.

Use of proceeds, page 34

22. Please refer to the second bullet. Please state where you expect to be in the clinical testing process with apilimod after the application of these proceeds, i.e. initiate Phase 2b trial, complete Phase 2b trial, complete a Phase 2b and initiate a Phase III trial, etc.

23. Please describe for which "general corporate purposes" you plan to use the proceeds from this offering. State an approximate dollar amount for each use.

24. We note you may use a portion of the net proceeds to fund possible acquisitions of, or invest in, technologies, products, or companies that complement your business. Please clarify from which currently specified allocation(s) you will take funds for such possible use.

Management`s Discussion and Analysis of Financial Condition and Results of ..., page 42

Financial Operations Overview, page 43

Research and Development, page 43

25. Please revise your table here to attribute the IPR&D expenses to

each acquired product for each period presented including inception to date. To the extent that such expenses can not be reasonably attributed to specific products (whether currently or no longer pursuing), please include the amount of these costs for each period presented, in total and by nature of the costs.

Critical Accounting Policies and Estimates, page 46

Stock-Based Compensation, page 47

26. Please expand your current disclosure to include the following:

a. Qualitatively and quantitatively discuss the significant factors, assumptions and methodologies used in the mid-December 2005 valuation and November 2006 retrospective valuation performed, including the actual amount of enterprise value and a discussion as to how that amount was estimated.

b. Qualitatively and quantitatively discuss the specific factors and assumptions utilized in your probability-weighted, discounted cash flow analysis. Describe what "probability factors and discount rate" were considered and how you determined that they were reasonable and appropriate.

c. Qualitatively and quantitatively disclose how your analysis considered the probability of selling the company, the probability of ultimately completing an initial public offering or not, and how the ultimate success of your "two most advanced drug candidates" were weighted in your calculation.

d. Once you can reasonably estimate the IPO price, qualitatively and quantitatively discuss each significant factor contributing to the difference between each valuation and the estimated IPO price.

27. You state at the bottom of page 48 that you contemporaneously estimate the fair value of the equity instruments issued, but you also go on to state on page 49 that you performed a retrospective analysis in November 2006. If you have performed contemporaneous valuations of your equity instruments please explain to us what necessitated the need to perform a retrospective valuation.

28. Please demonstrate how you determined the amount of the incremental stock-based compensation associated with the repriced options disclosed here in this note, including how you determined the aggregate amount of common stock to be purchased. We note that at December 31, 2005, the total number of options outstanding with exercise prices equal to or greater than $4 were approximately 4.9 million, and the remaining weighted average contractual life ranged between eight and ten years.

29. Please tell us how you determined that the difference between the value of the common stock and the Series A convertible preferred stock purchase price was appropriate. In so doing, elaborate on the perceived value of the adjustable conversion feature of the Series A convertible preferred stock.

Safety profile, page 67

30. Please expand the discussion to define the terms "neutropenia" and "neuropathy."

ACCOUNTING COMMENTS

December 31, 2005 Financial Statements

Consolidated Statements of Cash Flows, page F-26

31. Please explain why you present of restricted cash within the operating section of the statement of cash flows. Include references to specific literature relied on in your determination.

* * *

General

As appropriate, please amend your registration statement in response to these comments. You may wish to provide us with marked copies of the amendment to expedite our review. Please furnish a cover letter with your amendment that keys your responses to our comments and provides any requested information. Detailed cover letters greatly facilitate our review. Please understand that we may have additional comments after reviewing your amendment and responses to our comments.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filing to be certain that the filing includes all information required under the Securities Act of 1933 and that they have provided all information investors require for an informed investment decision. Since the company and its management are in possession of all facts relating to a company`s disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

Notwithstanding our comments, in the event the company requests acceleration of the effective date of the pending registration statement, it should furnish a letter, at the time of such request, acknowledging that:

* should the Commission or the staff, acting pursuant to delegated authority, declare the filing effective, it does not foreclose the Commission from taking any action with respect to the filing;

* the action of the Commission or the staff, acting pursuant to delegated authority, in declaring the filing effective, does not relieve the company from its full responsibility for the adequacy and accuracy of the disclosure in the filing; and

* the company may not assert staff comments and the declaration of effectiveness as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

In addition, please be advised that the Division of Enforcement has access to all information you provide to the staff of the Division of Corporation Finance in connection with our review of your filing or in response to our comments on your filing.

We will consider a written request for acceleration of the effective date of the registration statement as confirmation of the fact that those requesting acceleration are aware of their respective responsibilities under the Securities Act of 1933 and the Securities Exchange Act of 1934 as they relate to the proposed public offering of the securities specified in the above registration statement. We will act on the request and, pursuant to delegated authority, grant acceleration of the effective date.

We direct your attention to Rules 460 and 461 regarding requesting acceleration of a registration statement. Please allow adequate

time
after the filing of any amendment for further review before submitting a request for acceleration. Please provide this request
at least two business days in advance of the requested effective date.

You may contact Tabatha Akins at (202) 551-3658 or Joseph Roesler at (202) 551-3628 if you have questions regarding comments on
the financial statements and related matters. Please contact John Krug at (202) 551-3862, or me at (202) 551-3715 with any other questions.

Sincerely,

Jeffrey Riedler
Assistant Director

cc: Wendy E. Rieder, Esq.
Jonathan L. Kravetz, Esq.
Patrick O`Brien, Esq.