



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

DIVISION OF
CORPORATION FINANCE

Mail Stop 4720

September 16, 2010

Mr. Daniel Tassé
Chairman and Chief Executive Officer
Ikaria, Inc.
6 State Route 173
Clinton, New Jersey 08809

**Re: Ikaria, Inc.
Registration Statement on Form S-1
Amendment no. 2 filed September 3, 2010
File No. 333-166792**

Dear Mr. Tassé:

We have reviewed your amended registration statement and have the following comments.

Please respond to this letter by amending your registration statement and providing the requested information. If you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any amendment to your registration statement and the information you provide in response to these comments, we may have additional comments.

FORM S-1

Company Overview, page 1

1. We note your response to comment 2. If you include sales data please also include net income data over the same periods in order to provide a balanced presentation.

Summary Consolidated Financial Data, page 9

2. Please label the "Combined" column for the year ended December 31, 2007 and the columns for the six months ended June 30, 2010 and 2009 on page 13 as unaudited. Remove the label, "Unaudited," from the "Successor" column for the year ended December 31, 2009.

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Use of Proceeds, page 53

3. We note your response to comment 6 and reissue the comment in part. Please expand the discussion to quantify the amount of cash flow you anticipate will be used for each of the three late stage trials you intend to conduct during the next three years.

Management's Discussion and Analysis of Financial Condition and Results of Operations, page 61

General

4. Please label all "Combined" columns for the year ended December 31, 2007 as unaudited.

Critical Accounting Policies and Estimates

Share-Based Compensation, page 69

5. Please refer to prior comment seven. We will finalize our evaluation of the issues incorporated in this comment after the estimating offering price has been established and you have provided the requested disclosure.

Clinical Stage – Product Candidates

LUCASSIN, page 106

6. We note your response to comment 8. Please update the disclosure the status of the SPA, the nature of any discussions you have had with the FDA concerning the SPA and any special concerns the FDA has with respect to the study design to the most recent date practicable.

LUCASSIN – Orphan Therapeutics, page 114

7. We note your response to comment 9 and the statement that minimum payments are not calculated as a percentage of net sales. We also note the discussion on page 115 that you "will be obligated to pay Orphan royalties, subject to annual minimum payments, at a percentage in the low double digits on net sales..." As previously requested, please expand the discussion with respect to each royalty payable to disclose the range that the royalty rate fits into within ten percentage points, e.g. single digits, teens, mid-twenties to mid-thirties, etc., instead of the term "low double digits."

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 the information the Securities Act of 1933 and all applicable Securities Act rules require. Since the company and its

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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 you request acceleration of the effective date of the pending registration statement please provide a written statement from the company 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.

Please refer to Rules 460 and 461 regarding requests for acceleration. 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 securities specified in the above registration statement. Please allow adequate time for us to review any amendment prior to the requested effective date of the registration statement.

You may contact Franklin Wyman at (202) 551-3660 or Mary Mast at (202) 551-3613 if you have questions regarding comments on the financial statements and related matters. Please contact John Krug, Senior Counsel, at (202) 551-3862, or me at (202) 551-3715 with any other questions.

Sincerely,

Jeffrey Riedler
Assistant Director

cc: Steven D. Singer, Esq.
Lia Der Marderosian, Esq.