



DIVISION OF
CORPORATION FINANCE

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

Mail Stop 4720

August 31, 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. 1 filed August 17, 2010
File No. 333-166792**

Dear Mr. Tassé:

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

Cover Page

1. Please indicate the number of shares that will be sold by the selling shareholders.

Company Overview, page 1

2. We note your response to comment 7. Please update the disclosure for all of the measures you have provided to include the first six months of 2010. In addition,

please expand the discussion to explain the reasons for the decline in net income, adjusted net income, EBITDA and adjusted EBITDA.

Risk Factors, page 4

3. Please expand the discussion to include a bullet briefly addressing the recent recall of your INOMAX DS drug-delivery system.

“We are the sole manufacturer of INOMAX...,” page 18

4. We note your response to comment 14. Please expand the discussion to define a “prior approval supplement” and to explain the effect on the company if such PAS is approved or denied. In addition, please update the discussion relative to your submission of the PAS and the anticipated amount of time required to obtain FDA approval subsequent to the FDA inspection.

“If we experience problems with, or delays in obtaining, components...,” page 18

5. We note the additional disclosure under this heading to address the recall of the INOMAX DS drug delivery systems. Please present this disclosure under its own risk factor heading. In addition, please expand the discussion to quantify, to the extent practicable, the anticipated costs of the recall.

Use of Proceeds, page 53

6. Please revise the disclosure to include additional bullets indicating the amount of proceeds and other sources you will use for any of the three late stage trials you intend to conduct during the next few years. In addition, please state how far the application of these proceeds will advance your efforts in the completion of these trials. In this regard, if you anticipate the use of other sources such as borrowings under your line of credit to bring you to the stage of development you anticipate, please disclose the amount and source of such funding.

Management’s Discussion and Analysis of Financial Condition and Results of Operations

Critical Accounting Policies and Estimates

Share-Based Compensation, page 69

7. In your response to prior comment 36, you have acknowledged that the requested disclosure will be provided when the estimating offering price has been established. In this respect, we note the additional options and restricted stock, which have been granted in the six months ended June 30, 2010. We will finalize our evaluation of the issues incorporated in this comment at that time.

Clinical Stage – Product Candidates
LUCASSIN, page 106

8. We note the discussion on page 108 relative to the special protocol assessment. Please expand the discussion to indicate when the meeting(s) occurred and when the SPA was submitted. In addition, please disclose whether the SPA has been approved by the FDA and, if not, 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. Similar information should be provided with respect to any other pending SPAs you may have.

LUCASSIN – Orphan Therapeutics, page 114

9. We note your response to comment 41 and that you have requested confidential treatment for the royalty rate. 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.

Separation Agreements with Former Chief Financial Officer, page 161

10. Please file the April 19, 2010 professional services agreement and work order as exhibits.

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 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

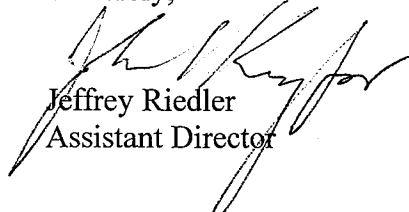
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- the company may not assert staff comments and the declaration of effectiveness as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

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, Suzanne Hayes, Branch Chief, at (202) 551-3675, Dan Greenspan, Special Counsel, at (202) 551-3623, or me at (202) 551-3715 with any other questions.

Sincerely,



Jeffrey Riedler
Assistant Director

cc: Steven D. Singer, Esq.
Lia Der Marderosian, Esq.
Wilmer Cutler Pickering Hale and Dorr LLP
60 State Street
Boston, Massachusetts 02109