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

DIVISION OF
CORPORATION FINANCE

September 27, 2018

Laura K. Shawver, Ph.D.
Chief Executive Officer
Synthorx, Inc.
11099 N. Torrey Pines Road, Suite 290
La Jolla, CA 92037

Re: Synthorx, Inc.
Draft Registration Statement on Form S-1
Submitted August 31, 2018
CIK No. 0001609727

Dear Dr. Shawver:

We have reviewed your draft 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.

Please respond to this letter by providing the requested information and either submitting an amended draft registration statement or publicly filing your registration statement on EDGAR. 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 the information you provide in response to these comments and your amended draft registration statement or filed registration statement, we may have additional comments.

Draft Registration Statement on Form S-1

Prospectus Summary, page 1

1. We note your disclosure in this section and throughout the prospectus regarding your "first-of-its kind" platform technology designed to create "best-in-class" biologics. Please delete these references. If your intention is to convey your belief that your platform or your product candidate utilizes a novel technology or approach, you may discuss how your technology differs from technology used by competitors or that you are not aware of competing products that are further along in the development process. Statements such as these should be accompanied by cautionary language that the statements are not intended

to give any indication that your technology or your product candidate have been proven effective or that your product candidate will receive regulatory approval.

2. Please revise your chart on page 2 and in your business section to reflect the current status for each of your programs. For example, please indicate that THOR-707 has not yet completed preclinical trials, that IL-2 for autoimmune is in the discovery stage, and that none of your programs, except for THOR-707, have completed the discovery stage. Please also remove the heading "Our Pipeline" on page 82 as this chart reflects early-stage discovery programs where you have not yet identified a product candidate and therefore it does not show a pipeline of product candidates.

3. We note that your chart on page 2 does not identify specific indications for any of your current programs, aside from broadly referencing immuno-oncology or autoimmune conditions. Please tell us when you intend to specify particular indications, including whether you will need to specify such indication(s) in your anticipated IND filing for THOR-707, and, if so, which indication(s) you intend to pursue. Please also add narrative disclosure in the summary indicating the types of cancers and autoimmune indications you intend to target.

4. Please define the following terms when first used so that a lay person may understand their meaning: increased therapeutic index, site-specific biconjugation with moieties, pegylated, IL-2 therapies, monodispersity, and prodrug approach.

Our IL-2 IO Synthorin (THOR-707), page 2

5. We note your statements that you have designed THOR-707 "without the toxicities associated with other IL-2 therapies approved and in development," and that THOR-707 will be a "more effective" therapeutic. Similarly, we note your statement on page 94 that THOR-707 has an improved safety and PK/PD profile as compared to aldesleukin. Findings of safety and efficacy are determinations that are solely within the authority of the FDA and are assessed throughout all clinical trial phases. Please delete these statement and any other similar statements that draw conclusions as to the safety or efficacy of THOR-707.

Implications of Being an Emerging Growth Company , page 5

6. Please supplementally provide us with copies of all written communications, as defined in Rule 405 under the Securities Act, that you, or anyone authorized to do so on your behalf, present to potential investors in reliance on Section 5(d) of the Securities Act, whether or not they retain copies of the communications.

Use of Proceeds, page 62

7. Please revise your disclosure to indicate the amount of proceeds that you intend to allocate to each of your IL-2 Synthorins and your other development programs. In addition, please revise to make clear that proceeds from the offering will not be sufficient to fund

development of your product candidates through regulatory approval and commercialization and disclose the sources of other funds needed to reach regulatory approval and commercialization. Refer to Instruction 3 to Item 504 of Regulation S-K.

Management's Discussion and Analysis of Financial Condition and Results of Operations
Critical Accounting Policies and Significant Judgments and Estimates
Stock-based Compensation Expense, page 77

8. Once you have an estimated offering price or range, please explain to us how you determined the fair value of the common stock underlying your equity issuances and the reasons for any differences between the recent valuations of your common stock leading up to the IPO and the estimated offering price. This information will help facilitate our review of your accounting for equity issuances including stock compensation and beneficial conversion features.

Business
Clinical Development Plan for THOR-707, page 94

9. We note your disclosure that an MTD will be defined for the initial 21 days of THOR-707 treatment using a conventional oncology 3+3 design. Please explain what the conventional oncology 3+3 design is and define what MTD means in this section.

IL-2 IO: Other Pegylated Molecules, page 98

10. We note your disclosure that Nektar has reported both partial and complete RECIST responses. Please disclose what RECIST is in this section.

License Agreement with TSRI, page 99

11. We note your disclosure that your royalty obligations as to each product will terminate on a country-by-country basis upon the expiration of the last-to-expire of the licensed patent claims that cover the Licensed Products. Please disclose when the last-to-expire patent is currently schedule to expire.

Executive Officers, page 118

12. Please disclose when Dr. Shawver became the CEO of Cleave Biosciences, Inc. Also, please revise to clarify the percentage of time Dr. Shawver spends on your business, and if time spent on other businesses is not immaterial, please expand your risk factor discussion to disclose this obligation.

General

13. Please provide us proofs of all graphics, visual, or photographic information you will provide in the printed prospectus prior to its use, for example in a preliminary prospectus. Please note that we may have comments regarding this material.

You may contact Andi Carpenter at 202-551-3645 or Angela Connell at 202-551-3426 if you have questions regarding comments on the financial statements and related matters. Please contact Ada D. Sarmento at 202-551-3798 or Erin Jaskot at 202-551-3442 with any other questions.

Sincerely,

Division of Corporation Finance
Office of Healthcare & Insurance

cc: Kenneth J. Rollins, Esq.