

UCC Program Review Committee Summary of Review

Program: Translational Biomedical Sciences

Date of last review: N/A

Date of this review: AY 2021-2022

The program offers the following degrees, minors, and certificates:

- Ph.D. in Translational Biomedical Sciences
- M.S. in Translational Biomedical Sciences

Recommendation: This program is found to be viable.

See report for commendations, concerns, and recommendations.

The report was forwarded to the program's director and the college dean. Their responses are attached.

The Graduate Council's comments are included as well.

Ohio University Curriculum Committee
Academic Program Review

Translational Biomedical Sciences Graduate Program

Susan K. Fried, External Reviewer, Professor of Medicine, Diabetes, Obesity and Metabolism
Institute, Mount Sinai School of Medicine, New York, NY

Matthew L. Layton, Associate Professor, Department of Political Science, Ohio University

Fuh-Cherng Jeng, Professor, Communication Sciences and Disorders, Ohio University

November 19, 2021

The Translational Biomedical Sciences (TBS) Graduate Program an external/internal program review on November 19, 2021. The Academic Program Review committee was comprised of Susan K. Fried, external reviewer (Mount Sinai School of Medicine), and two internal reviewers, Matthew L. Layton (Political Science) and Fuh-Cherng Jeng (Communication Sciences and Disorders).

This report is divided into seven sections, organized as requested for Ohio University Academic Program Review

1. The program as a whole:

a. Is the current number and distribution of faculty sufficient to carry out the broad overall mission of the Department (Teaching; Research, Scholarship and Creative Activity; Service).

The Translational Biomedical Sciences (TBS) Graduate Program is an interdisciplinary program rather than a traditional department. Thus, the number of active faculty is somewhat flexible. The program does not have direct hiring control over its faculty, but it actively recruits affiliate members from across the university. According to the self-study provided by the program, there were 24 charter faculty mentors in 2014; as of 2021, there are 60 faculty members across various departments who have formal ties to the program (Self-Study 2021, 3, 75-76). This appears to be a sufficient cluster of faculty conducting high quality translational research to sustain a program of this kind. Faculty with diverse expertise in engineering, basic biological sciences, clinical sciences, and/or public health actively participate in the training of TBS graduate students. Faculty and students use multidisciplinary approaches to understand the biological bases of complex diseases, such as diabetes, to develop novel therapeutics, and to target community disease prevention and treatment strategies.

b. Is the level of the Department's RSCA appropriate for the program given the size of the faculty and the resources available to the Department? Is the Department's level of external funding at an appropriate level?

The number of R15 grants was impressive and demonstrates the commitment of the faculty to their teaching mission at both the undergraduate and graduate levels. The faculty have won NIH RO1 and other national grants that speak to the quality and potential impact of their work in translational sciences. In 2020 alone, TBS-affiliated faculty produced over 200 peer-reviewed publications (Self-Study 2021, 24).

c. Is the level of service, outside of teaching, appropriate for the program given its size and the role that it plays in the University and broader communities it interacts with? Is the Department able to fulfill its service mission?

Because the TBS program is an interdisciplinary program, faculty affiliates who serve the program as the Director, members of the Steering Committee, or as student mentors inherently provide service outside their home departments. It appears that most home departments are content with this arrangement as the service to TBS comes with the opportunity to recruit students to work in labs and increase faculty productivity. For some faculty from non-doctoral departments, the TBS program is their only source of PhD students. There is one faculty director and, according to the program's by-laws, anywhere from five to ten Steering Committee members at any given time. During the review, the faculty voiced no concerns about the service burden required in these capacities.

d. Does the Department have an appropriate level of financial resources, staff, physical facilities, library resources, and technology to fulfill its mission?

The committee's interviews suggest that TBS has no designated office space on campus. Still, this is consistent with the interdisciplinary nature of the program given that lab and office spaces for faculty are provided according to arrangements with their home departments. Given the ongoing fiscal retrenchment at the university, it is remarkable that the program has retained some level of program-specific staff-administrative support. This support allows the program to manage student admissions, monitor student progress with program requirements, and coordinate faculty activities across the many contributing disciplines. Other needs are largely met through faculty grants or arrangements with home departments, with some modest budgetary support from the Graduate College. The program's quasi-endowment should compensate for the lack of traditional departmental budgetary support moving forward.

2. Undergraduate Program:

Not applicable

3. Graduate Program:

a. Is the program attracting students likely to succeed in the program? Is the number of students appropriate for the program? Is the program attracting a diverse group of students?

TBS admitted its first students in 2015. Ten students have since completed the program (two withdrew). As of 2021, there are 26 students enrolled in the program (Self-Study 2021, 3). TBS has admitted 65% of its applicants, on average, since its inception (Self-Study 2021, 14). The number of students is appropriate for a new graduate program, although the affiliated faculty noted a preference to admit seven to eight students a year for a five-year average of approximately 30 to 40 students actively enrolled. Changes in admission policies related to GRE scores make it difficult to compare cohorts' relative academic preparation prior to admission; however, the fact that the first ten successful graduates finished the program with an average of 5 publications per student is notable.

Admitted students appropriately become well integrated with students in their disciplines. The student population was impressively diverse in their cultural backgrounds and research interests, from bench to community.

b. Does the graduate curriculum provide an adequate background to pursue discipline-related careers following graduation?

TBS leverages relevant basic coursework in biological sciences, clinical and applied health disciplines, and public health research. The basics of translational research are provided in the first-year core curriculum. Seminars within TBS and relevant departments allow students to acquire the specialized knowledge they will need to pursue careers in biomedical sciences; the capstone course re-enforces the knowledge they gain.

Feedback from students was consistent with the opinion of the reviewers that the first-year core curriculum would be more effective if spread out throughout the first two years. This would allow students to gain more in-depth knowledge of the disciplines relevant to their research earlier in the program, prior to the introduction of more advanced interdisciplinary concepts. Given the diverse backgrounds of these students, a deep knowledge of relevant sciences from molecular and cell biological to endocrinology and neuroscience is needed. Students coming in with master's or at least an undergraduate degree in a clinical discipline (e.g., kinesiology, physical therapy) seem to be able to 'jump in' easily. Others seemed to need more time to understand the nuts and bolts of clinical sciences.

Students also correctly pointed out that better access to coursework or experience with higher level statistics and analysis of 'big data' was needed. It seems that many such courses are already available at Ohio University; however, students often default to external providers such as Coursera because there is a lack of clarity on which courses are available or would teach these transferrable skills "on time" and at the level appropriate for graduate students. This is not necessarily an issue for the program *per se*; it may reflect larger institutional concerns and represents a lost opportunity to keep these student credit hours "in house."

c. Does the program provide adequate mentoring and advising to students to prepare them for discipline-related careers?

The structure of the program aims to provide students with the mentoring they need to pursue discipline-related careers, and the faculty are clearly making active efforts. As the program grows, there may be a need to have additional disciplinary viewpoints added to the steering committee.

d. Are the resources and the number of and distribution of faculty sufficient to support the graduate program?

Students entering with an undergraduate or master's degrees in clinical sciences were able to hit the ground running. On the other hand, coursework in career development and leadership topics may be more meaningful after a student becomes immersed in their field of study and they have more information as a basis to choose a career path (e.g., academia vs industry, small biotechnology, patent law, or community outreach, among others).

At times, the multiple advisor model could prove an impediment to student progress. The interdisciplinary flexibility of the program could cut both ways for students: it is clearly an attraction that leads many to apply to the program; however, it leads to challenges when advisers do not share a compatible vision of the student's research.

If the student cohorts grow as desired, there may be a need to recruit additional affiliated faculty who have grant support to maintain current student-faculty ratios and student research lines. Without additional philanthropy from potential donors, it is not clear whether the quasi-endowment (sourced from patent funds) will sustain a larger program than currently exists.

e. Does the program offer appropriate financial support to graduate students?

Yes, the support appears adequate for the cost of living in the Athens community.

As the program grows, it would be ideal to develop a system where the best applicants have the first year of graduate work supported centrally, so that students do not have to choose a mentor and a specific topic from the beginning of the first year.

f. Are program learning outcomes adequately assessed?

The qualifying exam consists of a grant application for the topic of the student's research. This is an important and useful approach. The oral defense of the written dissertation proposal allows committees to probe the depth of the student's knowledge in the field, as well as translational aspects of the project. Committees should include multiple disciplines to ensure that knowledge of basic biomedical and translational aspects are both addressed.

g. Are students able to move into discipline-related careers?

The program is too new to adequately judge this. However, it appears that all past students seek careers in translational biomedical research and practice.

4. Areas of concern.

The committee has identified the following areas of concern:

- **Dual Mentorship:** Although dual mentorship broadens the student's horizon, provides a multi-disciplinary perspective, and distinguishes the TBS Program from a conventional PhD program, there is an issue that should be addressed. If two co-equal mentors disagree on a certain aspect of the student's research and/or plan of study, it may create a difficult situation for students to handle.
- **Curriculum Inflexibility:** The TBS-required core classes in the first year of study do not consider the different backgrounds of their incoming students. Through conversations with current TBS students, some of them expressed concerns about the inflexibility of the order and timing. For example, students may want to acquire an in-depth knowledge of the field and related methodologies needed to develop the knowledge and critical thinking skills to plan their thesis work, identify important gaps in knowledge, and critically evaluate research papers during the first year. Some students felt they might have benefited more from coursework such as career development and leadership later in their program of study.
- **Need for a Graduate Handbook:** Currently, important documents of the program such as the TBS curriculum, required and elective courses, policies, milestones, faculty profiles, example plans of study, and related forms are saved as separate documents. Students have expressed difficulty finding these documents from a centralized location.

Additionally, students from different backgrounds may have trouble figuring out what 'Translational Biomedical Sciences' means.

- **TBS Website**: The TBS website is not easy to navigate for students outside of Ohio University. Several students indicated that, prior to their application, they thought the TBS Program had been inactive or deactivated by simply looking at the TBS website.
- **Student Funding**: Currently, each student's funding relies primarily on the mentor's grant money. Emergency funds for students whose mentors have encountered a funding deficit are limited. This issue is more apparent when the student's mentor comes from a non-traditional home department such as the Edison Biotechnology Institute, Diabetes Institute, and OMNI. This issue is also true if the mentor comes from a department that has no funding for PhD students such as the Department of Exercise Physiology.
- **No Opportunities for a Short-Term Rotation**: Currently, students select their primary mentors prior to their application to the TBS Program. There is no opportunity for students to have a short-term rotation among several laboratories prior to the final selection of their primary mentors. This issue may also relate to the fact that some students switch mentors after their enrollment into the TBS Program.

5. Recommendations.

The committee recommends the following:

- **Dual Mentorship**: The TBS Program may consider changing its current dual mentorship to a primary, plus a secondary, mentor. If there is a disagreement between the two mentors, the primary mentor, or a predetermined mechanism (e.g., a majority vote of the student's Dissertation Advisory Committee), may step in and should have the authority to make a final decision. Additionally, some experienced mentors have track records that ensure that both basic science and translational (e.g., therapeutic) aspects are present throughout the planning and execution of the student project. Thus, consideration should be given to eliminating the requirement for co-mentoring in select instances, while ensuring the student's committee includes members with the trans-disciplinary expertise required to achieve the goals of TBS.
- **Curriculum Inflexibility**: Because not all students join the TBS Program in the fall semester and many of them come from different disciplines and backgrounds, it may be a good idea to allow students flexibility in taking the required core courses in a different order. This flexibility will also allow students to take the TBS-specific and conventional scientific classes simultaneously when completing milestone #1.
- **Missing a Graduate Handbook**: The committee recommends that the program develop a TBS Graduate Handbook to centralize all important documents and information (e.g., TBS curriculum, required and elective courses, policies, milestones, faculty profiles, example plans of study, and related forms).
- **TBS Website**: The TBS website should be reviewed and improved so that it is more searchable for an outside person and prospective students. It should include additional resources, such as example curriculum, plans of study, and the TBS Graduate Handbook (when it has been developed).

- Student Funding: When a gap for student funding emerges, some central funds should be available for the student and mentors to apply. Although the quasi-endowment has been made available to the TBS Program, it is available only to students in the DO+PhD dual-degree program. Some funds should be made available at the university and college levels. This is particularly true if the student's mentor does not have a home department (e.g., Edison Biotechnology Institute, Diabetes Institute, OMNI).
- No Opportunities for a Short-Term Rotation: The TBS Program may explore the possibility to provide a short-term rotation for students who have not chosen their primary mentors.

6. Commendations.

The committee commends the Program for the following:

- Steady Growth: Since its inception in 2014, the TBS Program has increased from 24 charter faculty members to the current 60 faculty members in 2021. The number of TBS students has also increased from an inaugural class of 4 in 2015 to a total of 26 students currently.
- Excellence in RSCA: The TBS faculty is consistently successful in obtaining extramural funds and publishing scientific papers. For example, the TBS faculty published over 200 peer-reviewed journal articles in 2020. Such accomplishments make the TBS Program one of the top interdisciplinary programs at Ohio University. Faculty in TBS have applied for and been awarded an impressive number of highly competitive R15 grant awards to support training of undergraduate and graduate students.
- Faculty Dedication and Commitment: The committee was impressed with the high-level of engagement and dedication of the faculty who essentially volunteer their time to assure positive student outcomes and productive research agendas. This level of commitment demonstrated by faculty is impressive and demonstrates the importance of the TBS Program in the development of Ohio University. Students indicated that the TBS faculty were very accessible, responsive, and helpful through emails and in-person communications. Students expressed gratitude for faculty dedication and commitment.
- Diversity and Flexibility in Research Topics: The diversity of research specialties that are available in the TBS Program allows effective interdisciplinary research collaborations for both the TBS faculty and students. The interdisciplinary nature of the Program is also very helpful in developing individualized curriculum for each student.
- Quasi-endowment for Sustainability: The TBS Program is constantly seeking ways to be self-efficient. For example, the Program has been awarded a multi-million-dollar, quasi-endowment in 2020 to support students who are in the DO+PhD dual-degree program and to serve as backup funds when the student's mentor encounters a funding shortage.
- PhD Recruitment: Aside from the conventional routes of PhD recruitment, the TBS Program provides additional opportunities for our university to attract and recruit PhD students. This is particularly important for faculty members whose home departments (e.g., HCOM, Edison Biotechnology Institute, Department of Exercise Physiology) do not have a stand-alone PhD program. For example, HCOM relies heavily on the TBS Program

to recruit students in the DO+PhD dual-degree program. Edison Biotechnology Institute, as well as the Department of Exercise Physiology, also have no PhD programs in their respective units. Thus, their only source to recruit PhD students is through the TBS Program.

7. Overall judgment: Is the program viable as a whole?

The review committee found the Translational Biomedical Sciences Graduate Program in the Graduate College to be **viable**, despite the areas of concern as described above.



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December 14, 2021

RE: TBS Program Review – Director Response

The Translational Biomedical Sciences (TBS) Graduate conducted its first 7-year review visit on November 19, 2021. The program would like to sincerely thank the reviewers of our program, Drs. Fried, Layton, and Jeng for the careful and well-considered feedback they provided both during the virtual visit and found within their report. We were pleased that committee members noted the rapid growth of the TBS program, the excellence, dedication, and diversity of the affiliated faculty, and our continued efforts at increasing self-sufficiency and student recruitment. The reviewers also pointed out some areas of concern with the TBS program. Our response to these concerns and questions are as follows:

Dual Mentorship: We agree that if two equal co-mentors disagree that this could be problematic for a student. Although such a disagreement has not occurred so far, each dissertation advisory committee is also assigned a moderator. Currently, the role of the moderator is to help resolve issues that may arise between mentors and trainees; however, we will explore whether it would be appropriate to expand the moderator's role to include resolution of disagreements that may arise within the committee.

Curriculum Inflexibility: We agree that some courses that comprise the basic TBS requirements may not be suitable for some of the entering students in the first year of study. Indeed, last year the TBS 6500 - Capstone Experience in Translational Biomedical Science Competencies was changed to be taken by students during the second year of study. Other curricular requirements such as scientific writing or statistics can be fulfilled by several different courses. The scheduling of these courses is individually determined by the student and their mentors.

Missing a Graduate Handbook and TBS website Improvements: We agree with the reviewers and plan to develop a graduate handbook and improve the TBS website.

Student Funding: We agree that gaps for student funding are sure to emerge, as almost all of the TBS students are either funded by extramural research grants or by individual fellowships. However, the reviewers are not correct in stating that the quasi-endowment is only available to DO/PhD students. Two separate quasi-endowment funds have been created with one for DO/PhD students and the other for PhD students regardless of whether they are pursuing a dual degree.

No Opportunities for a Short-Term Rotation: As the majority of our students are funded by extramural research grants or by individual fellowships, the funding of graduate students to perform short-term rotations among several laboratories remains problematic in the near future. However, if the program continues to develop and can increase its financial resources, and we are aware that the opportunity of short-term rotations may enhance the experience students in the program for students that have not yet identified mentor(s).

Sincerely,

A handwritten signature in black ink that reads "Kevin Lee". The signature is written in a cursive style with a large, sweeping initial 'K' and a long, horizontal tail for the 'L'.

Kevin Lee, PhD
Faculty Director
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December 21, 2021

Re: Translational Biomedical Sciences Program Review – Dean's Response

I would like to express my sincere thanks to the review committee members for their thorough consideration of the current state of the Translational Biomedical Sciences (TBS) graduate program. This review is significant in that it is the first such analysis for the program, which is relatively new. Additionally, the program is unusual in its interdisciplinary focus and structure, with direct administrative oversight by the Graduate College.

The program has undergone significant growth and evolution since its inception, and I am pleased to see the overall positive assessment by the committee. I am also very appreciative of the constructive feedback and suggestions for improvement. In his letter, Faculty Director Prof. Kevin Lee outlines his intentions for follow-up to these recommendations. I endorse his plan and will be available to provide assistance from the College as needed. Some of the comments also relate to fundamental issues of resources available for support of the program, which I might comment on further.

As noted by the reviewers, the program is constrained by the limited amount of student financial support (generally zero) available centrally heretofore. This situation contrasts with other research doctoral programs at the university that provide central support via teaching assistantships. In consequence, TBS students are generally supported entirely by research assistantships, requiring students to have a mentor identified from the time they apply and enter the program. As noted by the reviewers, the availability of central stipend support in the TBS program could potentially benefit students by giving them freedom to explore alternative research topics and mentors during their first year. Central support would also be very helpful when faculty encounter gaps in grant funding available to support student assistantships.

The lack of central stipend support was a known issue from the inception of the TBS program, and I consequently find it remarkable that the program has achieved the level of growth that has occurred over the past seven years. This success in recruiting and funding well qualified students is testimony to the professional stature and commitment of the faculty associated with the program. At the same time, I recognize that central support would provide additional options and benefits for students in the TBS program, and consequently I have active and ongoing efforts to secure resources for this purpose.

TBS program-level funding that has been realized to date has two forms. The first is philanthropic support. At the time the program was created, a major gift by Distinguished Professor and Goll Ohio Eminent Scholar John Kopchick and Assistant Dean Char Kopchick, matched by five colleges, resulted in funds for support of research activities by students and faculty associated with the TBS and Molecular & Cellular Biology graduate programs. While this funding does not

provide assistantships, its support for research costs and, notably, internship opportunities has been very impactful. I am currently involved in conversations with prospective donors that could lead to additional student funding that includes stipends.

The second approach for securing resources is through use of intellectual property licensing revenue to create quasi-endowments designated for support of the TBS program, with details provided in the self-study and Prof. Lee's letter. These quasi-endowments are relatively new and will only achieve their full investment return in another two years, at which point they are expected to generate \$160k annually. Clearly more funding beyond this number is desirable, but I anticipate that this revenue stream will nonetheless be impactful in benefitting the program. Intellectual property licenses that currently exist have the potential to generate additional royalties that might be used to increase quasi-endowment support in the future.

In conclusion, I agree with the overall positive assessment of the Translational Biomedical Sciences graduate program and believe that the program is well positioned to maintain a strong trajectory into the future.

Sincerely,

A handwritten signature in cursive script that reads "Joseph C. Shields".

Joseph C. Shields
Vice President for Research & Creative Activity
Dean of the Graduate College

From: [Charlotte Elster](#)
To: [Such, Barbel](#)
Subject: comments from the GC Program Review Committee
Date: Saturday, January 22, 2022 6:35:06 PM

NOTICE: This message was sent from outside Ohio University. Please use caution when clicking links or opening attachments in this message.

Hi Baerbel:

The Graduate Council reviewed the following programs on Jan. 21, 2022:

1. Translational Biomedical Sciences Graduate Program

We concur with the finding of the review committee, namely that the program is viable and thriving.

We also concur with the recommendations. The responses from the director and the dean are well prepared.

---Charlotte

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