

REQUIREMENTS FOR THE Ph.D. QUALIFYING EXAMINATION

Ph.D. Program in Biomedical Sciences

Purpose: The purpose of the Ph.D. Qualifying Examination (QE) is to determine the student's scientific reasoning by his/her ability to form a clear hypothesis, establish specific aims designed to test the validity of the hypothesis and to develop relevant experimental approaches with appropriate positive and negative controls to critically test the stated specific aims. The student is NOT expected to have significant preliminary results of their own. The purpose of the QE is NOT to defend the student's dissertation, but rather their knowledge of the correct scientific approach to developing and investigating biomedical hypotheses., and their critical thinking skills to defend their approach and broader scientific questions, if required.

The QE consists of a written R21 grant proposal followed by an oral presentation of the proposal and questioning session with the student's QE Committee. The QE committee should consist of the student's Advisory Committee, except for the student's major advisor, plus a Graduate Faculty Representative* outside of the committee (see **Format** below).

Prior to scheduling of the examination, the Advisory Committee section of the GRAD form and Plan of Study form must be approved and on file in the College of Graduate Studies.

Time: The QE is due by the end of the student's second Fall semester, after the student has obtained approval of their Advisory Committee to prepare for and take the QE. A student not meeting this examination deadline is subject to termination of financial support from the university. Should a student need to extend the deadline beyond the Fall semester of the second year, the student and major advisor must petition, in writing, to the Senior Associate Dean of COMLS Graduate Programs at least one month prior to the end of the Fall of the second year of training. All students must complete the exam by the end of Spring of the second year in the program. The student cannot register for dissertation credits until passing the QE, both oral and written parts.

Topic: The student's Advisory Committee is responsible for the approval of the topic of the proposal, hypothesis, specific aims and experimental approach before the student begins writing. This is decided at a meeting of the Advisory Committee and student either late summer or early fall of the students' 2nd year. The proposal must be newly developed by the student and cannot be based on any specific aim(s) of a grant application of the major advisor or anyone else besides the student. The pre-QE meeting with the student is the opportunity to give the student input from the committee specifically for the student's preparation for the QE. The committee should NOT tell the student that they need more preliminary results, although the topic of the QE is usually based on the student's dissertation project (see **Purpose** above).

Format: The QE will consist of two parts evaluated by the Qualifying Committee: a written research grant proposal, and an oral presentation with questioning session. The proposal will resemble the NIH R21 style (see **Appendix** for additional instructions):

The initial grant proposal must be written solely by the student and should not have been reviewed, edited, or critiqued by other persons (including students, postdocs, research staff, major advisor or faculty) as part of a course or outside of a course. The proposal may include preliminary data generated by the student, but is NOT required, or data generated by others that support the project's feasibility. The proposal must cite, or otherwise indicate, any preliminary data that was not obtained by the student. The oral exam may include questions that relate directly to the proposal as well as those that probe the breadth and depth of basic knowledge and critical thinking skills of the student. Towards this aim, it is important that the student's written QE must be her/his own work including conception, approach, writing, interpretation, etc.

A QE Committee member should be selected as Chair for the QE oral presentation and examination. The Chair of the QE must be at Associate Professor level or above. Specific guidelines for the duration of the oral presentation, format and duration of questioning, overall duration of the presentation and oral examination, and other aspects of the proceedings may be set individually by each QE committee. The recommended duration of the oral presentation is 30 - 45 minutes and total examination time should be no longer than three hours.

A Graduate Faculty Representative should be appointed at the student's request to attend the oral portion of the examination. The Graduate Faculty Representative must be at Associate Professor level or above. The Senior Associate Dean of COMLS Graduate Programs should be notified when and where the oral examination will take place and the name of the Graduate Faculty to serve as Representative. It is the duty of the student to first identify the Graduate Faculty Representative and submit the faculty's name to the Senior Associate Dean of COMLS Graduate Programs for approval.

It is the responsibility of both the Graduate Representative* and the QE Chair to ensure that the student is treated fairly during the oral exam. Both Chair and Representative are responsible for ensuring that the student be allowed to answer oral questions by the examining committee without interference by other members of the examining committee.

Grading: Successfully passing the Qualifying Exam requires committee acceptance of the written grant proposal for written clarity and adherence to the NIH format and subsequent passage of the oral presentation and examination session.

Committee approval of the written proposal requires the student first submit his/her R21 grant proposal to all Advisory Committee members who then, within two weeks, will review the document for clarity of writing and adherence to the NIH format, *but not content*. If any committee member disapproves of written format, or major lack of clarity, of specific elements of the initial written proposal, s/he will submit criticism(s) to the QE Committee Chair. The QE Committee Chair will present the criticisms to the student and the student will address the criticisms by submitting a revised proposal with corrected format and/or clarity within two weeks. Committee members may only comment, but not advise, on incorrect format or lack of clarity, of specific parts of the proposal. If all committee members agree the document is of sufficient clarity of writing and adherence to the NIH format, the oral examination may proceed. If committee members have issues with the content of the written proposal related to the topic, these should be addressed during the oral examination.

The student will have no more than two weeks to submit the revised proposal with corrected format. If all committee members approve, the oral examination may proceed. If any committee member disapproves the format of the revised proposal, the student will be asked to again revise and resubmit the proposal. The student will be allowed the initial proposal submission and two revisions of format. If the committee does not approve the proposal after the second revision, the student may be subject to dismissal from the Ph.D. program.

After approval of the correctly formatted proposal, the student will orally present and defend the proposal to the Advisory Committee. The student is not allowed to bring texts, papers, or other materials to the exam, but should rely on her/his acquired knowledge when presenting and answering questions. Following the presentation, the student will be questioned by the committee members. The questions may be directed towards the oral presentation, the written proposal, and/or probe the breadth and depth of basic knowledge and critical thinking skills of the student. After completion of oral questioning, the committee will vote in the absence of the student to pass or fail the student. **A simple majority vote is necessary to pass or fail the student.**

If a failure is achieved, the student may be re-examined one time. Re-examination may require revision of the content of the written proposal and its resubmission/approval by the committee and/or a second oral examination. Similar to an NIH grant proposal, the revised proposal will include a one-page Introduction that describes how the criticisms were addressed. For the second examination, a simple majority vote is necessary to pass or fail the student.

If a student fails the exam a second time, s/he may be subject to dismissal from the Ph.D. program. However, if the majority of the committee agrees that an additional attempt is warranted, the QE Committee Chair will petition the Senior Associate Dean of COMLS Graduate Programs in writing to request an additional attempt. No additional attempts beyond this third one will be permitted.

The Report of the Qualifying Exam form should be completed and signed by all members of the QE Committee: <https://www.utoledo.edu/med/grad/biomedical/pdfs/UTCOMLSQualifyingExamForm2022.pdf>.

Both the written and oral portions of the exam must be passed for the student to gain candidacy towards their PhD. The completed form and pdf of the final QE should be sent to the Senior Associate Dean of COMLS Graduate Programs.

Attestation signatures of student and major advisor that both have read and understand Qualifying Exam rules outlined above.

Student printed name and signature

Date

Faculty printed name and signature

Date

*Graduate representatives are present to make sure the meeting goes smoothly, for both the QE committee and the student. You do not need to read the proposal or join in the oral part of the exam (but sometimes questions of a general nature to clear up confusion are welcome). You can help clarify a faculty question to the student if the student seems confused, step in if faculty become verbally abusive to the student, or ask inappropriate questions, or otherwise make the student unnecessarily uncomfortable.

APPENDIX: GUIDELINES FOR PREPARING THE QUALIFYING EXAMINATION GRANT PROPOSAL

The proposal will resemble the NIH R21 style. The proposal should be prepared in single-spaced 11 point Arial font.

Instructional assistance for preparing R21 grant applications can be found at:

<https://grants.nih.gov/grants/how-to-apply-application-guide.html>

Examples of R21 grant applications can be found at:

<https://grants.nih.gov/grants/how-to-apply-application-guide/resources/sample-applications.htm>

NIH YouTube videos of tips: <https://www.youtube.com/user/NIHgrants>

NIH tips for applicants; <https://www.youtube.com/watch?v=IAOGtr0pM6Q>

The proposal should be divided into four major sections:

1. Title Page

2. Specific Aims (1 page limit)

In one or two paragraphs, state concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will exert on the research field(s) involved.

List succinctly the specific objectives of the research proposed, e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology.

3. Research Strategy (6 page limit)

Organize the Research Strategy under the following three section headings:

Significance

- Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses.
- Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields.
- Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

Innovation

- Explain how the application challenges and seeks to shift current research or clinical practice paradigms.
- Describe any novel theoretical concepts, approaches or methodologies, instrumentation or interventions to be developed or used, and any advantage over existing methodologies, instrumentation, or interventions.
- Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation, or interventions.

Approach

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Include how the data will be collected, analyzed, and interpreted as well as any resource sharing plans as appropriate.

- Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.
- If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high risk aspects of the proposed work.

If an application has multiple Specific Aims, the applicant may address Significance, Innovation, and Approach under each Specific Aim. Alternatively, the applicant may address Significance, Innovation, and Approach for all of the Specific Aims collectively.

If applicable, preliminary data should be included in the Research Strategy. The data may be presented as a single section under Approach or distributed within individual sections of the Research Plan.

All published experimental details should be cited in the Research Strategy section and full references should be provided in the Bibliography section.

4. Bibliography (no page limit)

List all citations numerically in the order they appeared in the text. Each citation should include names of all authors (et. al. is not an acceptable name), title of manuscript, book chapter, book or journal name, volume, page numbers, and year of publication.