REQUIREMENTS FOR THE Ph.D. QUALIFYING EXAMINATION

Ph.D. Program in Biomedical Sciences

Purpose: The purpose of the Ph.D. Qualifying Examination is to determine the student's knowledge and ability to scientifically analyze information in her/his track and in biomedical sciences in general. The student is expected to apply this knowledge to form hypotheses, specific aims to test hypotheses, and propose appropriate experimental approaches to address the specific aims. The examination serves to test the scientific acumen of the graduate student to address biomedical issues with rigor and bioethical considerations.

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. These documents should be completed within two weeks after the student joins a faculty mentor's lab.

Scheduling: The first meeting should occur within the Spring term of the student's first year, but certainly no later than early Summer semester of the first year. At this meeting, the topic of the research proposal for the Qualifying Exam should be decided upon. The Qualifying Examination must be administered by the end of the Fall semester of the second year. Should a student need to extend their deadline beyond the end of the Fall semester of their second year, the student and major advisor must petition, in writing, to the Associate Dean of COMLS Graduate Programs at least two months prior to the above deadline. The student cannot, under any circumstances, register for, audit, or attend any sessions of the Grant Writing Workshop before passing the Qualifying Examination.

Format: The examination consists of a written research grant proposal (NIH R21) followed by an oral defense session with the student's Advisory Committee. The written proposal will follow the NIH R21 style (see **Appendix** for additional instructions)

The topic of the Qualifying Examination may be based on the student's dissertation project or another topic approved by the student's Advisory Committee. This is typically decided at the student's first meeting with the Advisory Committee which should be held within 2-3 months after the student joins the lab.

The R21 proposal must be developed and written by the student and shall not be reviewed, edited, or critiqued by other persons (including students, staff, or faculty) as part of a course or outside of a course. A major goal of the Qualifying Exam is to determine if a student has the ability to apply knowledge towards the solution of problems that s/he may encounter in her/his professional career. Towards that aim, it is important that the student's research proposal reflect as much as possible her/his own intellectual work including conception, approach, writing, and interpretation. Cut and paste, or minimal rewriting of any part of an existing funded grant or grant application of the major advisor, or anyone else, is strictly forbidden. If the student submits a written grant proposal that is significantly similar to any other, that student will not pass the Qualifying Exam.

The proposal may include preliminary data generated by the student (this is not mandatory) or by other sources that support the project's feasibility. The proposal must indicate the source of all preliminary data that was not obtained by the student. Committee approval of the written proposal requires that the student first submit the grant application to all Advisory Committee members who, within one week, review the document for clarity of writing and adherence to the NIH format, **but not for content**. If all committee members agree that the document is of sufficient written clarity and adherent to the NIH format, the oral presentation and examination may proceed. Committee members who have issues with content of the proposal should address these during the oral examination.

The oral exam should be scheduled by the student and major advisor no sooner than two weeks after the written document has been approved by the committee. The oral exam should include an oral presentation of the R21

followed by an oral exam period, which 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.

The student's Major Advisor may not serve as chairperson for the oral part of the exam. Another committee member, the Track Director, or the home department Chairperson may serve as chair for the oral part of the exam. The QE chair should be appointed during or shortly after the initial committee meeting to discuss the students topic for the QE. Specific guidelines for the duration of the oral presentation and format and duration of questioning may be decided by each track. The recommended duration of the oral presentation is 30 minutes and total examination time is no longer than three hours.

A COMLS Graduate Faculty Representative (Associate or Full Professor) must be appointed to attend the oral portion of the examination. The student must first identify the Faculty Representative and submit the faculty's name to the Associate Dean of COMLS Graduate Programs for approval at least 2 weeks before the oral portion of the examination. The Representative and the oral examination Committee Chair should ensure that the student is treated fairly during the oral exam.

The student may arrange to have coffee, tea or water for committee members during the exam, but food cannot be brought to the exam by the student who is undergoing the QE.

Grading: Successfully passing the Qualifying Exam requires committee acceptance of 1) the written grant proposal for both substantive clarity and adherence to the NIH R21 format and 2) subsequent passage by the student of the oral presentation and examination session.

If any committee member disapproves the document, s/he will submit criticism(s) to the Committee Chair. The Committee Chair will present the criticisms to the student and the student will address the criticisms by submitting a revised proposal within two weeks. Similar to an NIH grant application, the revised proposal will include a succinct introduction that describes how the criticisms were addressed.

As before, the committee members will have one week to evaluate the revised proposal for clarity of writing and adherence to the NIH format. If all committee members approve the revised proposal, the oral examination may proceed. If any committee member disapproves the revised proposal, the committee will meet to decide if the student will be allowed one more rewrite. If the student is not allowed a second rewrite, the student will be subject to dismissal from the program. If the committee does allow a second rewrite but this second rewrite is not approved by the committee, the student will be subject to dismissal from the program.

After approval of the written 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. Following (or during) 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 the student fails the oral exam, 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. A simple majority vote is necessary to pass or fail the student. If a student fails the exam a second time, she/he will be subject to dismissal from the program.

The Report of the Qualifying Exam form should be completed and signed by all members of the Advisory Committee: http://www.utoledo.edu/med/grad/biomedical/pdfs/UTCOMLS-QualifyingExam-Form-2017.pdf The completed form should be sent to the Associate Dean of College of Medicine and Life Sciences Graduate Programs.

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://www.mailman.columbia.edu/sites/default/files/legacy/R21_Guidance_Sheet_R2_Sept_2013.pdf

Examples of R21 grant applications can be found at:
https://www.niaid.nih.gov/sites/default/files/mccunefull.pdf
https://www.niaid.nih.gov/grants-contracts/sample-applications#r21
https://www.niaid.nih.gov/grants-contracts/sample-applications

The proposal should be divided into four major sections:

Title: Limited to **81 characters** (includes spaces and punctuation marks).

Specific Aims:
 1 page limit. The Specific Aims do NOT count toward your Research Strategy, which has a 6 page limit.
 Concisely state the goals of the proposed research.
 Summarize the expected outcomes, including **impact** of research on fields involved
 Succinctly list objectives of proposed research (e.g., to test a hypothesis, create a novel design, solve a specific problem, etc.).

Research Strategy:
 Cannot exceed **6 pages**
 This section includes the following headings: **Significance, Innovation, Approach.**

A. 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.

B. 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 intervention(s) to be developed or used, and any **advantage over existing** methodologies, instrumentation or intervention(s).

 Explain any **refinements, improvements, or new applications** of theoretical concepts, approaches or methodologies, instrumentation or interventions.

C. Approach:
 If you are including **Preliminary Studies**, put this information in the "Approach"

Section.

 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.

 Discuss **potential problems and alternative strategies** 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.

 Point out any procedures, situations, or materials that may be **hazardous to personnel** and precautions to be exercised.

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

3. 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.