

MICROBIOLOGY & IMMUNOLOGY QUALIFYING EXAMINATION GUIDELINES

The qualification exam is administered to all second year PhD students to ascertain whether the student is prepared for PhD level research. A passing grade is required to advance within the program to dissertation-only status. The exam is conducted in early March of the second year. It consists of a written report of research conducted to date in the dissertation laboratory written according to NIH F31 guidelines. Thus the report will include a brief Introduction of the problem area, Specific Aims with defined hypotheses, Experimental Results (acquired during the first year's rotation in the laboratory and those continued upon joining the lab) and Planned Experiments. The report is not to exceed 6 pages not including references. In addition, a 20 minute research presentation and an oral defense will be conducted the week following submission of the report.

Timeline:

March 1 – Deadline for submission of the report (single line spacing Arial font 11 pt with 1" margins all around) that utilizes the student's research conducted to date in the host laboratory to formulate a research proposal along the lines of an F31 application (see section below on Written Proposal Guidelines).

March 7-8 – Research presentation. Students are encouraged to use Powerpoint presentations, and to bring paper copies of their slide presentation for each committee member (see recommendations below).

Qualifying Exam Committee:

The committee will consist of Professors Silverstein, Arpaia, Basu, Dworkin and Han. It will meet as a group to review the written reports, listen to the oral presentations and ask questions. All faculty members within the department will serve on the committee on a rotating schedule, with a balance of junior and senior faculty. A thesis advisor may not examine his/her own student. In the event a committee member has a student that will be examined then an alternate committee member will be selected. Students are expected to have mastered the first year course material and can be questioned on this body of knowledge in the context of their Research Presentation

Written Proposal Guidelines:

The structure will be a brief report, in the form of an NIH Predoctoral Proposal, of no longer than **6** pages total that comprises the Specific Aims and Research Strategy: For explicit examples of Grant Applications please see this website:

<https://www.nigms.nih.gov/training/indivpredoc/pages/predoctoral-f31-sample-applications.aspx>

Specific Aims: No longer than 1 page. Each proposed aim must address experimentally testable hypotheses. 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.

Research Strategy:

No longer than 5 pages. Organize the Research Strategy in the specified order using the instructions provided below. Start each section with the appropriate section headings - Significance and Approach. Cite published experimental details in the Research Strategy section and provide the full reference in the References Cited section using EndNote to create your Bibliography.

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. 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.

Point out any procedures, situations, or materials that may be hazardous to personnel and precautions to be exercised. A full discussion on the use of select agents should be described as appropriate.

If you have multiple Specific Aims, then you may address Significance and Approach for each Specific Aim individually, or may address Significance and Approach for all of the Specific Aims collectively.

References: This section does not count towards the page total. References should be listed in the order in which they were cited in the main text (where they should be listed as a number between brackets). References should include all of the authors and the manuscript titles. It is anticipated that the student will list > 20 manuscripts that they have read about their topic, as well as references for the proposed experimental approaches.

Example Reference: Doe, J (2010). Really cool stuff about your favorite pathogen.

Nature 1: 200-12.

Incorporation of Figures and Tables into the body of the Proposal makes it easier to read and is recommended. You are allowed to include additional Figures or Tables in an Appendix that illustrate data or a model if essential for understanding the experimental rationale - these will not count towards total page length.

Writing Tips:

Dr. Fidock has agreed to discuss how to write a Grant on January 6th from 12:30 – 2pm in room 1212, you should definitely attend.

All students are strongly encouraged to use EndNote for the preparation of references. It is available for download at:

<http://www.columbia.edu/acis/software/endnote/>

Role of the Thesis Advisor:

Students are encouraged to discuss their project with their mentor and to show the mentor their written proposal and slide presentation with sufficient lead-time for the mentor to provide feedback on the documents. The thesis mentor should not be involved in any primary writing or extensive editing. The thesis mentor is also not permitted to give the student past or present grant or fellowship applications.

Committee Members:

Saul Silverstein (Chair), Nick Arpaia, Uttiya Basu, Jonathan Dworkin and Yiping Han

Student Evaluations:

At the end of the examination, the committee chair will provide students with an evaluation of their written material, slide presentation and their oral defense.

Oral Exam Guidelines:

Exams will be scheduled for 60 minutes. At the beginning of the exam, the student's file will be provided to the committee by the training program, including all grades and rotation evaluations. The committee will initially meet and discuss the student's overall record to date. They should identify possible weaknesses in order to focus the oral questioning. They will also discuss the written report and slides, and identify any deficiencies.

The student should prepare a 20 minute Powerpoint presentation. Students will be able to proceed with their presentation uninterrupted, with questioning at the conclusion. Questioning will proceed in a rotating fashion through the committee. The student is welcome to use the white board to assist with responses.

Questions will explore the depth of the student's knowledge on the subject of the research proposal. Questions pertaining to experimental design and the ability of the student to interpret results should be emphasized. Questions may extend to a broader line of inquiry about the student's fund of knowledge in areas covered by graduate courses (primarily in microbiology and immunology). When the committee feels that the student has been examined sufficiently, the student will be asked to leave the room.

Each student will be evaluated based on:

- Quality of the written report
- Quality of oral presentation
- Strength of oral defense
- General background knowledge

Committee members will be asked to evaluate the student on a numerical scale from 1-5 (1 indicates outstanding, 5 unacceptable) in each area. They will also be asked for additional comments. The forms must be signed, and submitted by the end of the day of

the exam. They will be included in the student's permanent file. At the conclusion of their exam, all students will receive their grades.

Possible Outcomes:

Pass, recommended for PhD studies -The outcome for most students is a Pass. This indicates they have a solid grounding in both knowledge and experimental design. Students with a Pass will progress to thesis research and be expected to form a thesis committee to monitor their progress.

Conditional Pass - A student that does well, but exhibits a major weakness in a specific area, may receive a Conditional Pass. The student will be asked to defend a proposal again in September. The format will be decided by the Qualifying Exam Committee Chair. This will require a revised and updated proposal. The student may also be asked to take additional coursework to fill gaps in their knowledge.

Pass, NOT recommended for PhD studies – Although the student will not be allowed to remain in the PhD program, he/she will be provided with the opportunity to receive an M.A. degree.

Fail - This is the outcome for a student with multiple, significant weaknesses. This can constitute grounds for immediate dismissal from the program. No degree will be awarded. At the committee's discretion, the student may be given the opportunity to receive an M.A. degree prior to withdrawal. Although this is possible, it is extremely rare.