

Graduate Program in Cellular and Molecular Biosciences
University of California, Irvine
PRELIMINARY EXAMINATION

Instructions for Format, Rules and Possible Outcomes of Examination

Examination Objectives

The Preliminary Examination enables evaluation of a student's overall progress following the first year of graduate study. It is important that by the end of the first year of study, graduate students have accomplished specific goals that will enable them to complete the remainder of their graduate studies.

These general goals include -

1. Acquiring a basic foundation of knowledge in relevant disciplines.
2. Acquiring knowledge of basic principles of research, including presentation skills, responsible conduct of research, and hypothesis-based inquiry.
3. Developing critical thinking skills associated with the scientific process. Critical thinking is a pre-requisite for beginning thesis research in which the student assumes increasing responsibility for the design, performance, and reporting of research conducted during the Ph.D. training experience.

Examination date

The annual preliminary exam period occurs during two weeks following Spring Quarter Finals week. In the event that a student must remediate a first-year course, the prelim exam will be deferred until the required course work has been passed. Such deferred prelim exams will be administered by an *ad hoc* prelim committee the week following final exam week of the quarter in question.

Composition of Examination Committee

The composition of each committee will be selected by the Program Director. It will include three faculty members from the six CMB Program departments, each from a different department if possible and whenever possible will include at least one Full Professor and one Assistant Professor. The committee will not include faculty members who served as rotation supervisors or first year advisors for the student.

Format of Examination

Part One (30 minutes) - Oral presentation of first year rotation research.

The student will give an oral presentation to demonstrate a thorough understanding of research accomplished during one research rotation. Candidates prepare a 15-20 minute presentation, modeled on the mini-symposium presentations but with some allowance for greater depth and detail. The presentation will include a consideration of background, rationale and hypothesis, methods, experimental results, and interpretation. The introduction should include enough background that faculty with diverse backgrounds can understand the significance and rationale for the project. To ensure that the student has an opportunity to present his or her findings on schedule, faculty are requested to hold most questions until the conclusion of each presentation. Nevertheless, interruptions to clarify certain points are often valuable. The main presentation will be followed by a 10-minute question-answer period. LCD projectors will be provided, and students are encouraged to bring their presentations to the exam on a laptop. The CMB office laptop computer may be reserved, and, if so, students should bring their presentations on flash drives.

Part Two (50-60 minutes) - Oral presentation of proposed research based on a published manuscript

The student will be evaluated on the ability to 1) summarize a published research paper and 2) present a research proposal with experimental goals that extend the findings reported in the manuscript. On the Friday, approximately 10-14 days before the date of the prelim examination, candidates will be provided with a list of scientific journals from which they will select one article as the basis for their presentation. Candidates must select an article from the specific issues cited on the list. On the following Tuesday, approximately 6-10 days prior to the prelim exam, students will forward their selection to the Committee Chair. The manuscript must be approved by the Chair prior to the examination. Candidates will be notified by that Thursday of the suitability of the chosen paper. If not suitable, the Candidate must select another paper, which must be approved by the Chair. It is likely that a suitable manuscript will be chosen in the first attempt. As an issue of Responsible Conduct of Research, a student may not choose a paper that he or she has already discussed in any capacity with a mentor, faculty member, or other supervisor. Articles presented in the first year journal club will also be excluded. During the first ~20 minutes of the manuscript portion of the exam, the student will summarize and evaluate the work. The presentation should be considerably shorter than a journal club format, and not attempt to explain each experiment and figure. Emphasis should be placed on the authors' hypothesis, the goals of the project, the principle findings of the authors, and suitable conclusions as they relate to the topic. The student should evaluate the data themselves, not merely re-state the authors' interpretation of the data. Emphasis should be placed on the significance of the findings, any weaknesses in the data or interpretation, and particularly the research questions that arise from the work. Why did you choose this paper and decide to propose experiments based on the findings? For the remainder of the manuscript portion of the exam, students will propose a hypothesis based on the findings from the manuscript. They will then state one or two aims of a new study to test that hypothesis. Special emphasis should be placed on design of experiments that will test the hypothesis. Candidates should recognize that the emphasis will be placed on the strength of the hypothesis developed, the experimental strategy devised to test the hypothesis, and the interpretation of the potential outcomes.

To keep on schedule, the paper summary portion should be given using a computer and projector. For the proposal section of the exam, the student must use the white board in "chalk talk" format.

The manuscript presentation and proposal should be brief enough to allow approximately 20 minutes for questions and discussion. Background on the article should be limited to insure a suitable amount of time for interpretation and analysis. In developing the proposed research plan, students should include appropriate positive and negative controls, consider anticipated results and their interpretation, relate possible outcomes to the original hypothesis, consider potential pitfalls and alternative approaches in the proposed experiments. Candidates are strongly encouraged to apply knowledge and concepts acquired in the CMB year, including the core courses, responsible conduct of research, and rotation experiences.

All members of the examination committee will have access to the manuscript. The Candidate should expect that the members of the Committee have critically evaluated the manuscript prior to the student's presentation. To help keep the examination on schedule, faculty are requested to defer extensive questioning until after the presentation. After the presentation, up to 20 minutes are allowed for questions and discussion. Students should be prepared to make effective use of the board during this portion. Students may bring notes or note cards to the exam and refer to those materials during the presentation or answer period. In addition, the student should be prepared for possible interruptions to the presentation for clarification or to probe the student's understanding of a particular topic.

Scoring

Each committee member scores student performance during the exam according to four criteria listed in the table below. For each category and exam section, the committee member will enter “P” for pass or “F” for fail. A point system will no longer be used. The committee members will consider the performance for each criterion and give an overall P/F score for each portion of the exam.

| | Rotation report | Published Manuscript | COMMENTS |
|--|-----------------|----------------------|----------|
| Background knowledge in the relevant disciplines. | | | |
| Understanding of relevant research methods including the responsible conduct of research. | | | |
| Critical thinking, including making hypotheses, designing experiments, and interpreting results. | | | |
| Clarity of explanation and presentation. | | | |
| Overall | | | |

Possible outcomes

- PASS
- FAIL, with opportunity to re-take examination.

To determine the outcome, the committee will deliberate while the candidate waits outside the exam room. The committee will review the scoring by each member and decide whether the candidate has performed at or above the level expected of a student entering the second year of PhD studies. Members will be expected to use their experience together with the scoring sheets to arrive at this decision. If the decision is to FAIL, the committee must be prepared to cite specific deficiencies.

Notes

The student will be told the general outcome of the exam, i.e., Pass/No Pass but individual scores will not be made available to students. The committee Chair will relay to the student the strengths and weaknesses of the exam performance and any suggestions for improvement.

In the event of a No-Pass, the student has the option to be re-examined once. In such cases, the student will be informed of the specific deficiencies identified by the prelim committee, and those must

be rectified before the beginning of the Fall quarter of the same year. The outcome of a subsequent prelim exam is PASS, or FAIL without the opportunity to re-take the exam for an additional time. Following completion of the examination, the committee decision will be referred to the Program Director for action. Students who pass the exam normally move immediately to a departmental Ph.D. Program.

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