

Second Year Biochemistry Students

Graduate Research Proposal (also known as Qualifying Exam Part 1)

Overview:

Goals of this exercise include: 1) helping second year Biochemistry graduate students gain experience in proposal writing prior to their qualifying exams; and 2) helping students to become more familiar with their own chosen area of research.

Within the next few months you will design, write, and orally defend a research proposal. The subject of the proposal will be the research that you plan to perform during the next two or three years. Although graduate research often presents unexpected twists and turns, the goal is that this proposal will potentially form the core of your thesis project.

Since your proposal will be based on work that you are actually doing now, or are planning to do in the near future, it should not be necessary to halt your lab work to work on this proposal. Performing your own research should help you find ideas for your proposal, and the proposal writing should help you understand your own research. There should be synergy between your research efforts and this proposal'; this should not be a situation where one effort detracts from the other.

Steps to take in preparation for writing your proposal

1. Discuss your research project with your mentor. Formulate specific hypotheses and think about how you could test them. These can become the Specific Aims of your proposal.
2. Begin reading the literature that will serve as the foundation for your project. The best place to start is usually the earlier papers from your lab, and next are the papers from the two or three other groups (typically) that are working in the same area. You should strive to develop a deep knowledge of the research that has led up to the starting point for your work. It is better to identify the handful of papers that directly precede your work – and then to read them over and over until you thoroughly understand them – than it is to skim a large number of papers that are only tangentially related.
3. You may want to manage your references using a software system like Endnote or Reference Manager. This may make it easier to properly list citations, which you will continue to use as long as you continue to work in the same area of research.
4. Do some experiments! One section of your proposal will be Preliminary Results, and you may include any relevant results that you obtain during the summer or have already obtained during your rotation. It is not necessary to have a lot of preliminary results for this, and we realize that some of you have only recently joined a lab, but you should strive to include what you can.

Writing the proposal

1. Organization. Use the format of NIH proposals. The sections of the proposal are:
 - A. Specific Aims
 - B. Background and Significance
 - C. Preliminary Results
 - D. Research Design and Methods
 - G. Literature cited

In addition to these sections, you need a title and abstract. You may, but are not required to, use the form pages provided by the NIH at the web page.

The total length of sections A through D must not exceed 10 pages. This includes figures, but note that it does not include references. Also, this is a maximum, not an absolute requirement. It is fine for your proposal to be shorter! You should strive for brevity. There is no minimum length, but it is hard to imagine an effective and complete proposal that is shorter than six or seven pages.

2. Rules for writing. You should get help in the design of your project and in the writing. First, the Specific Aims should be designed in close consultation with your mentor. Your mentor may also assist in the organization of your proposal, but you should write it yourself. You should then solicit feedback on the proposal from your mentor, other members of your lab, and anyone else that you think will be helpful.

Defending your proposal orally

1. Choose a committee in consultation with your mentor. The committee should include your mentor and two additional faculty members from within the Biochemistry Graduate Studies Committee (GSC). When possible, choose faculty that are closely aligned with your area of research because they are most likely to provide valuable feedback and to ultimately serve on your thesis committee.

2. Select a date and time for your defense that is acceptable to all members of the committee. This date should be no later than Dec. 1 (remember, you need to complete this assignment before your qualifying exam). Regarding scheduling, it may be helpful to send to the committee members a list of several possible days and times, so that they can indicate which ones are OK, and then you can find at least one day when all members can make it.

3. Prepare a Powerpoint presentation and talk that summarizes the background and describes what questions you plan to address (*i.e.* your Specific Aims) and how you plan to address them. The total length of your talk should be roughly 20 minutes. The committee will ask you questions that are centered on your project and the background, and the questions may branch out to other relevant areas.

Outcomes

1. Unconditional pass. Self-explanatory.

2. Conditional pass. Your committee may ask you to re-write a portion of your proposal or satisfy some other condition before you pass the exam.

3. No pass. This outcome indicates that the proposal and/or defense are inadequate to begin performing successful research. Any student receiving this outcome will need to substantially re-write the proposal and re-defend it, before proceeding on to the qualifying exam in spring of second year.

After your (successful) defense

Hopefully, preparing this proposal has provided you with a better understanding of what you are planning for you PhD research. So get in the lab and get going!