BIOCHEMISTRY MOLECULAR CELL AND DEVELOPMENTAL BIOLOGY GRADUATE GROUP
Ph.D. QUALIFYING EXAMINATION GUIDELINES

A Biochemistry Molecular Cell and Developmental Biology (BMCDB) student must pass an oral qualifying examination before being advanced to candidacy for the Ph.D. To be eligible for the exam, the student must have completed all BMCDB course requirements, must have removed any deficiencies on the transcript, and must have at least a B average in all work undertaken while in graduate standing. The student must be registered during the quarter in which the qualifying exam is taken unless it is summer.

The **purposes of the qualifying examination** are two-fold: 1) to determine that the student has acquired sufficient knowledge, in breadth and depth, of biochemistry, molecular genetics, cell biology, developmental biology and related areas (general knowledge) and 2) to determine that the student has identified a dissertation research topic that addresses a significant question in biochemistry, molecular, cell and developmental biology (research). The research part of the exam centers on an oral defense of a dissertation proposal, a written version of which is submitted to the committee prior the exam. The student must demonstrate they have completed a literature review of that topic, have identified a set of achievable goals and have designed appropriate experimental approaches to accomplish those goals. The scope of the general knowledge part of the qualifying examination will be informed by performance in the core courses, and in consultation with the QE committee. The student's previous academic record, performance on specific parts of the examination, and overall performance/potential for scholarly research will be evaluated in determining the outcome of the examination.

The oral portion of the qualifying exam is intended to demonstrate the student's critical thinking ability, synthesis, and broad knowledge of the field of study. If a student has not accumulated sufficient preliminary data, the proposal will necessarily be more general in nature so that the examining committee has evidence that a student can formulate hypotheses and experimentally test them. Note: The focus is not on the students' own preliminary data, although this may be included, but rather to determine if the student can formulate hypotheses based on prior work from the lab or the literature, then propose approaches that experimentally test those hypotheses. Therefore, students will take their QE on the scheduled date, regardless of whether, or not, they have generated what they or their Major Professor consider sufficient preliminary data.

Qualifying examination committees will consist of five faculty members who are recommended to Graduate Studies by the BMCDB Student Affairs Committee in the Winter quarter of the student's second year. Three members will be selected by the BMCDB Student Affairs Committee with solicited input from major advisers and students; students will be asked to recommend names of the three members - ideally two of these faculty will also to serve on the student's dissertation committee. The remaining two faculty will be selected to ensure coverage of the core areas of BMCDB (i.e. Biochemistry, Molecular Genetics, Cell Biology, and Developmental Biology). Qualifying examination committees are submitted to Graduate Studies and appointed in accordance with the Academic Senate regulations.

The chair of the qualifying examination committee is expected to ensure that the student receives a fair examination. Qualifying Examination Committees may not include the major professor who will serve as chair of the student's dissertation committee. The area of the student's dissertation research will be considered so that at least one individual with expertise in this area

is a member of the qualifying examination committee. These names are forwarded to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy (DDB 80. Graduate Council B.1.). The "Application for Qualifying Examination" can be found at:

https://gradstudies.ucdavis.edu/current-students/forms-information

Students will be informed of the prospective composition of the qualifying examination committee (i.e. the recommendations of the Student Affairs Committee), and will be asked to confer with their major professor to inform their graduate advisor of any concerns with the committee composition. With this input taken into account, the advisors formally recommend to Graduate Studies the composition of the qualifying examination. Committees will be submitted to Graduate Studies and appointed in accordance with the Academic Senate regulations. Copies of the approved petition are sent to the student, the chair of the examining committee, and the BMCDB Program Liaison. *Students must notify all members of their examination committee that they have been appointed*. This is important - for example, if a faculty member will be on sabbatical and unable to serve, the exam committee must be reconstituted through the BMCDB Student Affairs Committee and Graduate Studies.

Scheduling the qualifying examination. A student in the Ph.D. program should take their qualifying exams Spring Quarter of their second year. If they require Spring Quarter to finish coursework or TA requirements, the qualifying exam can be taken during the summer of their second year. They may take it earlier if they wish. Only exceptional circumstances will exempt a student from the summer deadline, which may include: serious illness, temporary withdrawal from the academic program (PELP), debilitating personal problems, or a switch in major professors. Major Professors should note that the Graduate Advisors will not approve the delay of a student's oral exam because a Major Professor requires additional data collected for a grant proposal or a manuscript. It is the student's responsibility to schedule the qualifying exam at a time convenient to all members of the committee.

****IMPORTANT:** It is wise to check with your QE chair 1-2 weeks before your exam to make sure that they have received the appropriate paperwork (PASS form, QE guidelines) from Graduate Studies. If they **have not**, then contact Graduate Studies IMMEDIATELY to make sure that your QE Application was actually processed and approved, and if not, request an expedited approval. YOUR QE CANNOT BE TAKEN without the approval of the Application.

*Please note that Graduate Studies policy states that students are specifically *forbidden* to provide food or drink to the examining committee.

Format of the Qualifying Examination. The qualifying examination will consist of a dissertation research proposal. It is expected that in the course of the exam, the student will demonstrate knowledge in the core subject areas. Candidates will be expected to submit a written dissertation proposal to their committee at least one week prior to the oral examination (see below). The qualifying examination will be administered on a chalk/white board only. The exam should last no longer than 3 hours.

The Dissertation Proposal. The goal of the dissertation research proposal is to provide a substantial and original contribution to the fields of biochemistry, molecular genetics, cell and/or

developmental biology. The scope should be similar to that of a postdoctoral grant proposal. Written versions of the dissertation research proposal are to be prepared by the student and distributed to the committee at least one week prior to the examination. The format is that of an NIH postdoctoral fellowship proposal. Organize sections 1-5 of the research proposal to answer these questions: (1) Specific aims. What do you intend to do? (2) Background and significance. Why is the work important? (3) Preliminary studies. What have you already done? (4) Research design and methods. How are you going to do the work? (5) References. DO NOT EXCEED 5 PAGES FOR SECTIONS 1-4. The following distribution for length is recommended:

(1) **Specific aims**. State briefly the broad, long-term objectives of the work. Then state the specific purposes of the proposed research. One-half page is recommended.

(2) **Background and significance**. Briefly sketch the background to the proposal. Critically evaluate existing knowledge, and identify the gaps that the project is intended to fill. State concisely the importance of the proposed research by relating the specific aims to the broad, long-term objectives. One page is recommended.

(3) **Preliminary studies** - dissertation research only. Describe the work you have already accomplished that is relevant to the proposal. A maximum of one page is recommended.

(4) **Research design and methods**. Outline the experimental design and the procedures to be used to accomplish the specific aims. Include the means by which data will be collected, analyzed and interpreted. Describe any new methodology and its advantage over existing methodologies. Discuss the potential difficulties and limitations of the proposed procedures along with alternative approaches to achieve the aims. Provide a tentative sequence for the investigation. Although no specific number of pages is recommended for this section, the total for sections 1-4 should not exceed 5 pages.

(5) **References**. Each citation must include the names of all authors, title of the article, name of the book or journal, volume number, page numbers and year of publication.

BMCDB students are encouraged to meet with each committee member well before the examination. These informal meetings will allow students to learn their committee's expectations for the examination and focus their preparations accordingly. These meetings should not entail detailed discussions of the research proposals and are in no way pre-examinations.

Qualifying Examination Evaluations. There are three possible outcomes of the examinations - pass, not pass, and fail. Pass advances the student to candidacy for the Ph.D. Fail means that the student is disqualified. Not pass means that the student is required to retake all or part of the examination OR to satisfy another requirement. If requested, the second examination is to be scheduled at the earliest possible date and will be administered by the same committee. Satisfactory completion of this examination (or completion of the new requirement) will result in Advancement to Candidacy. Failure will result in disqualification. Note: To officially advance to candidacy, a fee must be paid to the Cashiers Office and the fully endorsed Advanced to Candidacy Petition can then be submitted to Graduate Studies. Students should file this document immediately after successfully passing the qualifying exam.