

The Graduate Program in Cell and Developmental Biology

The Comprehensive Examination (Ph.D. candidates only)

All doctoral students are required to successfully complete a Comprehensive Examination. Students are not eligible to take the Comprehensive Examination until the Program's course requirements have been met. Successful completion of the Comprehensive Examination is a critical requirement for Advancement to Candidacy, which must take place within 36 months of the start of a doctoral program.

It is the Research Supervisor's responsibility to schedule their students' Comprehensive Examination. Students should take the Comprehensive Examination no later than mid-way through their third year in their Ph.D. program, *i.e.* well before the 36 month deadline for Advancement to Candidacy.

Purpose

The purpose of the Comprehensive Examination is to have the student demonstrate to the Examination Committee that he/she has a comprehensive knowledge in their area of specialization and related fields of cell and developmental biology and has attained sufficient intellectual understanding of the subject matter to proceed with research likely to lead to the submission of a competent Ph.D. thesis.

The examination has written and oral components which together allow Examiners to evaluate a student's:

- Breadth and depth of overall knowledge of cell and developmental biology.
- Detailed knowledge of the student's specific area(s) of research, based on a written research grant proposal.
- Ability to formulate hypotheses and design tests of them.
- Critical thinking, analytical and problem-solving abilities.
- Ability to reason and integrate fundamental principles of research.

A student must pass both the written and oral components to pass the Comprehensive Examination. If a student fails one or both components, (s)he will be given one attempt to improve his/her standing. If the student fails the second sitting of the Comprehensive Examination, (s)he will be required to withdraw from the CELL Program immediately.

Procedures

Establish Examination Committee and schedule oral examination. A student's Research Supervisor should establish an Examination Committee and set a date for the oral component of the examination. The Examination Committee must consist of:

- A minimum of three examiners, each of whom must be familiar with at least one aspect of the student's doctoral research. At least one of the examiners (the 'External Examiner') must not be on the student's Advisory Committee. This person need not be CELL Program faculty member (*i.e.* they can be a faculty member in another graduate program).
- A non-voting Chair. Once the date for the oral examination has been set, the Director of the CELL Program should be contacted. The Director will then appoint a CELL Program faculty member to act as Chair. The Chair of the Examination Committee ensures that questioning is fair and relevant and that the student has adequate opportunity to demonstrate his/her knowledge; the Chair will not engage in the questioning of the student except where he or she feels that clarification is needed.

A student's Research Supervisor is expected to attend the oral examination but does not play a role in the examination; only members of the Examination Committee ask questions and evaluate the student.

Organize initial meeting between student and the Examiners. Following the establishment of the Examination Committee, the student should set up a meeting of their Examination Committee. This meeting, which should take place 8 – 10 weeks before the oral examination itself, sets the scope of the exam and defines the topics that the student will be expected to cover in detail.

- At least one week prior to the initial meeting, the student must submit a title and one-page summary of his or her proposed written research proposal (see below) to the members of the Examination Committee.
- At the meeting itself, the Examination Committee and the student will discuss and mutually agree upon the topics to be covered and the level of understanding that will be required to pass the written and oral components of the Examination, and the members of the Examination Committee will suggest pertinent reading materials. The due date for the written research proposal will also be set at the initial meeting and should be no later than two weeks before the date of the oral component of the examination.
- No later than one week after the meeting, the student must provide each member of the Examination Committee and the CELL Program Coordinator with a brief written summary of the discussion; any discrepancies in interpretation should be resolved at this time.

Write research proposal and prepare an oral presentation for the defense. The written component of the Comprehensive Examination will consist of a CIHR grant-like research proposal. The student must provide:

- 1) Scientific Abstract** - including rationale, hypothesis, aims and significance (one page, maximum).
- 2) Lay Abstract** - a brief summary of the proposal written in non-scientific language (one-half page, maximum).
- 3) Research Proposal** - including background information/literature review; preliminary data; hypotheses to be tested; specific aims consisting of proposed experiments, methodologies and assays, expected results, alternative approaches; timeline, and; significance of the proposed work (ten pages, maximum, including figures; references are separate, unlimited pages).

Although the student's research supervisor will provide guidance and feedback to the student in the preparation of the research proposal, the proposal, including the essential experimental design, must be written by the student. The Research Supervisor must read the final version of the proposal before it is forwarded to the Examination Committee.

The final version of the abstracts and research proposal must be submitted to the members of the Examination Committee and the Chairperson at least two weeks before the scheduled date of the oral examination.

The oral examination. The oral component of the Comprehensive examination normally lasts 2 – 3 hours. The exam is closed to the public. The student's research supervisor is expected to attend but does not play a role in the examination.

The student may be questioned on any aspect of the research proposal and will be asked to elaborate upon or defend issues arising from the literature review and the research plan contained in the proposal. The range of questioning may include topics that are not discussed directly in the written proposal but that are deemed relevant by individual members of the Examination Committee. [*Advice for students:* Consider asking your Research Supervisor and other members of the lab to have a “dry-run” to help you prepare for the exam. At the exam, if you don't know something, say so. If you don't understand the question, ask for it to be repeated, or rephrased. If you think you understand, but aren't sure, ask something like “Are you asking about X, or about Y?” Being asked hard questions that challenge you is a sign the exam is going well. If you don't know an answer, but think you can make an informed guess, say something like “I don't know the answer, but based on the analogy to system X, I would predict Y” – the exam is not designed to test merely factual recall and you will be credited for your ability to reason and integrate information.]

Prior to the oral examination, the Chair should inform those present about the format of the examination.

- The student will present a 20 – 25 minute summary of their proposal.
- The oral presentation will be followed by a first round of questions from each of the Examiners. Each Examiner can question the student for up to 20 min.
- After the first round of questions, each Examiner will be offered the opportunity to ask additional questions for up to 10 min.
- At the end of questioning, the Chair will ask the student to leave the room. The Chair will ask the supervisor for a brief statement about the student's performance in the laboratory then he or she may also be asked to leave.
- The Chair will then moderate a discussion of the quality of the student's written proposal and performance during the oral examination. The Examination Committee must come to a consensus on whether the student should pass or fail the written and/or oral components. Decision to pass or fail either component will be by simple majority; in the case of a tie, the Chair will cast the deciding vote.

If the Examination Committee rates the student's performance in both the written and oral components as passing, the student will be called back to the room and informed of the Committee's decision. At this time, the student will also be given constructive feedback on specific areas of strength and/or weakness.

If the Examination Committee rates the student's performance in either the written or oral component as failing, the student will be informed that he/she has attained a conditional pass. The Chair will explain the deficiencies in detail and inform the student that he/she will be required to resubmit all or part of their research proposal or have another oral examination within 3 months of the first exam, as decided by the Examination Committee. The student will be given one attempt to improve his/her standing; if the student fails to improve his/her performance, he/she will be required to withdraw from the CELL Program immediately.

If the Examination Committee fails the student on both the written and oral components, the student will be informed that he/she has failed the examination. The Chair will explain the deficiencies in detail and inform the student that he/she will be required to retake the entire examination within 3 months of the first exam. The student will be given one attempt to improve his/her standing; if the student fails the second sitting of the Comprehensive Examination, he/she will be required to withdraw from the CELL Program immediately.

Following the examination:

- Within one week of the examination, the Chair will prepare a report of the examination on the attached form ('Comprehensive Examination Report'). The Chair and the student must sign this form, which will be placed in the student's file with copies to the student, Research Supervisor, members of the Examination and Advisory Committees, and the [CELL Program Coordinator](mailto:cell.grad@ubc.ca) [cell.grad@ubc.ca].
- When the student has passed the Comprehensive Examination, (s)he will need to fill out the G+PS [Advancement to Candidacy](#) form, obtain the signature of his/her Research Supervisor, and forward it to the [CELL Program Coordinator](mailto:cell.grad@ubc.ca) [cell.grad@ubc.ca] who will in turn submit the form to G+PS.

The Graduate Program in Cell and Developmental Biology

Comprehensive Examination Report

This form is to be completed by the Chair of the Examination Committee within one week of the examination. The Chair and the student must sign this form, which must be sent to the [Program Coordinator](mailto:cell.grad@ubc.ca) [cell.grad@ubc.ca] to be placed in the student's file.

Name of Student: _____ **Student #:** _____

Name of Supervisor: _____ **Date of examination:** _____

Title of Research Proposal: _____

Members of the Examination Committee (NB at least one of the examiners (the 'External Examiner') must NOT be on the student's Advisory Committee):

Chair: _____ **External Examiner:** _____

Examiner: _____ **Examiner:** _____

Evaluation of written research proposal (additional pages may be added):

Evaluation of oral examination (additional pages may be added):

Decision of the Examination Committee:

• Research Proposal: Pass Fail Conditional pass Date for re-submission: _____

• Oral Examination Pass Fail Conditional pass Date for re-examination: _____

Chair's Signature

Student's Signature