



## COMPREHENSIVE EXAMINATION for Ph.D. CANDIDATES

### Department of Pathology and Laboratory Medicine, University of British Columbia

The Faculty of Graduate and Postdoctoral Studies requires that each Ph.D. student pass a comprehensive examination in their discipline. To fulfill this requirement in the Department of Pathology and Laboratory Medicine, the student must prepare and defend a Research Proposal in the style of a grant application within 30 months of initial registration in the program. The goals are to advance intellectual independence, scientific creativity and organizational skills, to broaden knowledge, and to provide an introduction to grant writing. To achieve these goals the student will select a comprehensive exam topic outside their immediate thesis topic and defend a grant proposal to an Examining Committee.

**Choosing a Topic:** Most students find that selecting a Research Proposal topic is the most difficult aspect of the Comprehensive Exam. It should be chosen based on a careful literature review, keeping in mind that a grant application proposal must have solid rationale and justification. To encourage independence and creativity, the Comprehensive Exam topic must address an original hypothesis distinct from the student's thesis topic. A Comprehensive Exam research proposal in the same general area as the thesis may be chosen, however the topic must be original and not ongoing or previously proposed in a Supervisor's or collaborator's grant application. This scenario is common for new investigators who are starting their own lab. Preparation of the Comprehensive Exam research proposal is intended to be an academic rather than a practical exercise. Therefore, conducting preliminary experiments is not permitted, although it should be understood that key proof-of-concept data are an essential element of composing an actual grant application.

**Topic Approval:** After informal discussion of the Comprehensive Exam research proposal topic with the Supervisor, it is required that a summary be circulated by the student to the Thesis Supervisory Committee (including the Chair) on the fully completed [Approval of Comprehensive Exam Topic and Examining Committee Form](#) which includes: Thesis project summary (250 words), Comprehensive Exam research proposal summary (600 words) and several bullets describing how the topic differs and may overlap the thesis project (75 words each). Following good grant-writing practices, these should be written in scientific language suitable for an audience lacking background in the specific field or proposed technologies. The form should also list suggestions for Examination Committee members who must be informally contacted by the Supervisor and agree to participate in approximately 2 months.

After the unanimous email approval of the topic by the Supervisory Committee, the form should be signed by the student and Supervisor. The student should submit it to the Graduate Program Coordinator. Final approval of the topic will be made by the Departmental Associate Director of Examinations, who will inform the student.



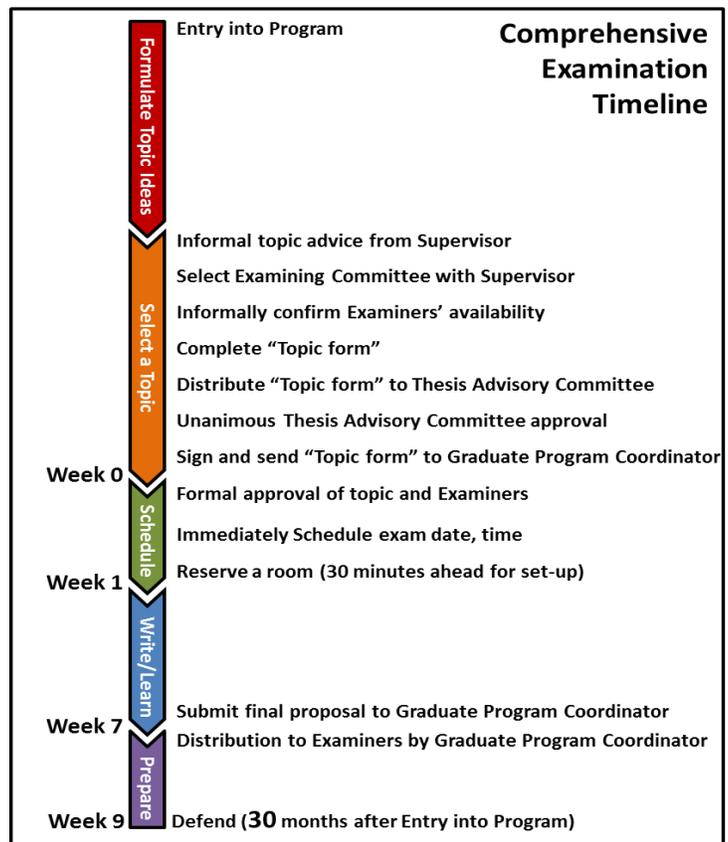
**Role of Supervisor:** The student must be encouraged to select a topic on their own. However, the Supervisor may provide informal guidance on the rationale, feasibility, impact and appropriate timeframe of a topic, which are important factors a grant review panel would consider. The student should not ask the Supervisor for input once the topic has been selected, and is encouraged to seek feedback from other experts in the field and from experienced grant-writers. If requested, the Supervisor may provide an example of a successful grant application to the student, but should not participate if the student wishes to hold a rehearsal talk in preparation for the exam.

The Supervisor will attend the exam as a silent observer. The student will be asked to leave the room to allow confidential discussion on their performance. The Supervisor will remain present for the first part of this discussion to offer an opinion and later be excused for the second part where the Examination Committee will finalize their decision.

**Selecting an Examination Committee:** In consultation with the Supervisor, the student will compile and present a list of nominees for the Examination Committee first to the Supervisory Committee as part of the [Approval of Comprehensive Exam Topic and Examining Committee Form](#). After the topic has been approved by all members of the Supervisory Committee, the entire form should be signed, scanned and sent to the [Graduate Program Coordinator for approval by the Departmental Associate Director of Examinations](#). The Examination Committee consists of the student’s research Supervisor, a member of the student’s Supervisory Committee, two other examiners (at least one of whom is a member of the Department) and a Chair. Members are normally selected based on overlapping expertise with the Comprehensive Exam topic. The Chair is typically the Chair of the Supervisory Committee.

**Timeline:** For optimal benefit and scheduling, the Comprehensive Exam Research Proposal topic should be selected and defended 24 to 30 months from initial entry into the Graduate Program. This would normally follow the completion of all required course work with the exception of PATH635. **When determining the Comprehensive Examination Date ensure the PALM Examination/Supervisory Committee blackout months of July and August are observed. Accordingly, approval of the Research Proposal will not be considered between May 1<sup>st</sup> and July 1<sup>st</sup>.**

After formal approval of the topic by





the Departmental Associate Director of Examinations, the final written Research Proposal must be submitted to the [Graduate Program Coordinator](#) within 7 weeks, who will include it with the 2 week reminder to the Examination Committee along with instructions. As soon as possible' after the topic is approved, an exam date and room booking should be scheduled by the student, normally to take place by week 9 (or 10) to provide sufficient time for the examiners to evaluate the Research Proposal. The student must ensure the room is booked 30 minutes in advance of the exam to allow for setup and troubleshooting of equipment and must again observe the PALM Examination/Supervisory Committee blackout months of July and August.

**Written Proposal Format:** To provide the student with an initiation into grant-writing, the research proposal must be prepared according to CIHR grant guidelines, and on a CIHR form assuming a three year duration. The Operating Grant form consists of and requires a Lay Abstract (200 words), Scientific Summary (300 words), Detailed Research Proposal, (11 pages, 11 pt. font, 2 cm margins, not counting figures with brief legends and references), and Budget with justification. A Common CV is not required. Appendices containing additional information will not be accepted.

Targeting a non-expert, but highly skilled scientific audience, the Detailed Research Proposal is generally organized to:

- justify and clearly state an overall hypothesis or objective,
- clearly list specific aims addressing the hypothesis,
- provide a background literature review rationalizing the proposal, and
- describe experimental design addressing each objective. Since this is an academic exercise, anticipated results must be considered and discussed to rationalize the next experimental step.

Where appropriate, more than one possible experimental outcome should also be considered. For guidance on grantsmanship please see available publications, such as but not limited to: [The-Art-of-Grantsmanship.pdf](#). Once complete, the student must collate and distribute the complete written proposal to the Examining Committee and advise the [Graduate Program Coordinator](#).

**Examiner Responsibilities:** The Examiner must familiarize themselves with the Pathology and Laboratory Medicine Comprehensive Exam guidelines and read the student's Research Proposal as though it was submitted to a peer review panel for consideration for funding. At the exam, Examiners question the student on any aspect of the research proposal, typically focusing on the student's knowledge in the general Research Proposal area, and the ability to think critically and logically, and less on their capacity to memorize minute details. Questions may cover topics directly or indirectly related to the Research Proposal area. Further details on the rationale emphasizing literature discrepancy or how the proposal could be strengthened for actual submission to a grant review panel are often requested. Neither a formal evaluation is required, nor advance discussion with the student of strengths and weaknesses.



**Please Consider at the Examination:**

- A) Literature review and introduction.**
  - Long and short term objectives
  - Hypothesis
  - Literature review/rationale
  
- B) Experimental Design/Methods**
  - Is hypothesis tested by proposed experiments?
  - Interpretation of possible results
  - Experimental methods/controls
  - Feasibility
  - Alternative approaches
  
- C) Grantsmanship**
  - Targeting the audience
  - Good use of graphics
  - Project justification
  - Impact conveyed
  - Contingency plan

**Exam Format:** To begin the exam, the student will present a 20 minute summary of the Research Proposal to the Examination Committee. If needed, the Chair will warn the student at 20 minutes, and stop the presentation at 22 minutes. The student is expected to have the AV equipment set up ahead of time (room unlocked, projector, pointer, etc.). Therefore the room booking should be made 30 minutes earlier than the exam time. The Committee will then question the student on the written and presented material. The Supervisor is a silent observer. The oral exam is usually ~2 hours. Each Examination Committee member will be allowed a 20 minute period of questioning, with a second round of up to 20 minutes each. During the question period the student may not use supplementary slides to illustrate answers of points raised. If needed, students will be encouraged to explain their answers using the available white board or other media.

**Outcomes:** Following the exam the Examining Committee will either pass the student, recommend that all or part of the examination be repeated (a conditional pass), or fail the student. The decision of the Committee will require the agreement of three of the members. The Supervisor may not take part in the discussion and does not have a vote. Students who fail will be allowed to repeat the exam once within three months, which will take into consideration the deadline for candidacy to transfer into the Ph.D. program. If needed, the second examining committee may have new external examiners.

To help make a decision the relative weights of the various components of the Comprehensive Examination are as follows: Written Proposal: 40%, Oral Presentation: 20%, Oral Exam: 40%. The final outcome will be pass, fail or conditional pass. The latter will involve remedial work to address the



weaknesses in the student's performance. The student may be asked to repeat the exam after additional preparation.

The Examining Committee may choose to use the following points in their evaluation of the written proposal. Regardless, the student should consider these (and more!) when planning and writing the Research Proposal.

## **Committee Assessment of Pathology Comprehensive Exam Written Proposal**

### **The Literature Review**

- a) Is it clear and concise?
- b) Does it flow logically from one section to the next?
- c) Is it thorough and current, equally covering contradictory literature?
- d) Is the literature review unbiased?

### **The Objectives**

- a) Are they clearly stated?
- b) Are they reasonable?
- c) Are they a logical extension of the literature review?
- d) Would they significantly advance the field?

### **The Proposed Experiments**

- a) Are they technically feasible?
- b) Are they logical?
- c) Do they contain the proper controls?
- d) Are the proposed statistical analyses appropriate?
- e) Do they address the objectives?
- f) Are potential problems discussed?
- g) Can the research be completed within three years?