THE UNIVERSITY OF BRITISH COLUMBIA

MEDICAL GENETICS GRADUATE PROGRAM

GUIDELINES FOR THE CHAIR/COMMON EXAMINER OF THE PHD COMPREHENSIVE EXAMINATION

Purpose of the Examination:

The purpose of the PhD comprehensive examination is to:

> *…assess the candidate's knowledge of the areas of specialization in his/her research program, and of general human genetics. The ability to reason and integrate will be emphasized*.

The exam is intended to assess whether the student has developed:

- Strong analytical, problem-solving and critical thinking abilities;
- Required breadth and in-depth knowledge of the discipline;
- Required academic background for the specific doctoral research to follow;
- Potential ability to conduct independent and original research; and
- Demonstrated ability to communicate knowledge of the discipline.

Scope of the Examination:

The comprehensive examination will include an assessment of:

(i) The student's knowledge of basic scientific and genetic principles and of the field of human genetics;

(ii) Detailed knowledge of the specific area of proposed research, based on a proposal following the format of a Canadian Institutes of Health Research operating grant.

Approximately half of the examination will be focused on a general body of knowledge of human genetics, as well as core concepts in Medical Genetics including methodologies and techniques used. The other half of the examination will deal with topics related to the proposed research area. There will be emphasis on the candidate's ability to relate knowledge from the specific research area to more general areas of human genetics.

Core Concepts in Medical Genetics:

- Mendelian Inheritance and Complex Trait Genetics (including sex-linked, mitochondrial and multifactorial inheritance)
- Linkage Analysis (including linkage disequilibrium and polymorphisms)
- Differentiation and Development and Somatic Cell Genetics
- Genotype/Phenotype Correlations in Human Genetic Disease (including mutations and mutation detection, issues of heterogeneity, penetrance, and expressivity)
- Gene Structure/Protein Structure and Function (including gene-regulation and epigenetics)
- Bioinformatic Analysis
- Structure and Composition of the Human Genome
- Comparative Genetics and the use of model organisms
- Ethical issues in Genetics
- Gene Therapy

Format of the Examination:

- Chair/Common Examiner ("Chair") asks the student to present a 10-20 minute summary of their research proposal.
- Chair next calls on each examiner to question the student for approximately 20 minutes. Generally, the Chair asks questions at the end of the round to ensure that the questioning is evenly distributed between general knowledge of human genetics and the student's specific research area.
- A second round of questions is usual before the Chair will ask the supervisor if they have questions. (Note: The supervisor acts as an observer and is not a voting examiner.)
- A third round is usually not required.

Examination Outcome:

- Student will be asked to leave the room and the Chair leads a discussion of the proposal and examination.
- Each examiner is to offer a brief opinion on the strengths/weaknesses of the proposal and the student's defence of it; and the supervisor is to give a brief statement about the student.
- Each examiner votes pass/fail (can be a paper or verbal vote).
- If the opinions are not unanimous, the Chair will make a decision in consultation with the Examination Committee and acceptable to the majority of the Committee.
- Chair will advise the candidate regarding the examination results.
- In the event of failure, the candidate will be informed of the reasons and will be asked to withdraw from the Medical Genetics Graduate Program[1]. Under exceptional circumstances, a candidate showing deficiency in one specific area may be given a conditional pass, but required to pass an oral re-examination in that area or be required to pass (68%) a course covering that particular field - subsequent examination or verification to be arranged by the Chair of the Examination Committee in consultation with the Medical Genetics Graduate Advisor.
- If student fails the examination, they can be allowed one retake of the exam if the Examination Committee recommends this at the time of the first examination. The Examination Committee will remain the same. It is also possible that the student will be asked to rewrite their proposal, be re-examined or meet other criteria to satisfy deficiencies in a subset of the exam material. If re-examination on any aspect is required, the Chair should note requirements on a time frame.
- Chair ensures Examination Committee signs appropriate forms; and emails scans of original forms to medical.genetics@ubc.ca.

[1] Except for the MSc student who has taken the comprehensive exam as part of the requirement for transfer to the PhD program and fails the comprehensive exam - they will then continue in their MSc program.