REGENERATIVE MEDICINE

The Collaborative Specialization in Regenerative Medicine (RM) provides students with a broad, comprehensive training program in RM through a multidisciplinary approach. Students will gain a thorough understanding of topics and techniques, which they may use to pursue further studies and/or find employment in research, industry, or government, filling in-demand jobs such as research scientists, policy advisors, consultants, and educators. Doctoral and Master's (thesis or MRP) students wishing to undertake graduate studies with emphasis in RM will be admitted by a participating department and will register in both the participating department and in the collaborative specialization.

The participating academic programs are Biomedical Sciences (MBS, MSc, PhD), Clinical Studies (MSc), Engineering (MASc, PhD), and Human Health and Nutritional Sciences (MSc, PhD). Doctor of Veterinary Science (DVSc) students enrolled in participating programs are eligible to participate in the Collaborative Specialization as well.

Administrative Staff

Graduate Program Coordinator
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Graduate Faculty

This list may include Regular Graduate Faculty, Associated Graduate Faculty and/or Graduate Faculty from other universities.

Stephen H. M. Brown
BHK, MHK Windsor, PhD Waterloo - Associate Professor
Graduate Faculty

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DVM, PhD Guelph - Professor
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B.Sc., DVM Guelph, MS Texas - Assistant Professor
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B.Sc. Laurentian, DC Canadian Memorial Chiropractic College, PhD Guelph - Associate Professor
Graduate Faculty

Matthew Vickaryous
B.Sc., M.Sc. Calgary, PhD Dalhousie - Professor
Graduate Faculty

Admission Requirements

Graduate students in the Collaborative Specialization in RM must initially meet the department/program admission requirements in which they are enrolled. Prospective students must first apply to their primary graduate program, while at the same time identifying their interest in enrolling in the Collaborative Specialization. If the student is admitted to their primary program as a course-based or thesis-based graduate student, then the departmental graduate program coordinator will review their application for suitability within the collaborative specialization. Final vetting and approval of Collaborative Specialization applications will be performed by the RM graduate program committee, led by the Graduate Program Coordinator (RM GPC). Upon admission, the student will register in their parent program and the collaborative specialization.

As Biomedical Sciences, Human Health and Nutritional Sciences, and Engineering programs already require a statement of research interest as part of their admissions process, only prospective MSc students in Clinical Studies and DVSc students are required to submit a short statement to the RM GPC on how their proposed research topic aligns with the RM specialization.

For Biomedical Sciences graduate students who wish to do a practicum placement in BIOM*6910, the location must be pre-approved by the RM GPC to ensure it falls under RM-related research, manufacturing, or policy.

All applications to participate in the Collaborative Specialization in RM will be reviewed by the specialization's Graduate Program Coordinator and a committee of 3-5 faculty from different colleges.

Learning Outcomes

By the end of their programs, graduates will gain a comprehensive understanding of topics pertaining to the broad field of RM. Students will also be able to integrate RM theory and skill sets learned in the program in the context of their thesis/master's Major Research Project (MRP). Graduates will become proficient in RM-related techniques and be able to translate these skills to contribute to RM-related discoveries and business development. More specifically, graduates should be able to:

1. **Technical Skills**
   a. Accurately and reproducibly perform RM-related laboratory techniques
   b. Identify and describe emerging tools for RM-related research
   c. Troubleshoot protocols and outline best practices for translation to the clinic

2. **Research**
    a. Apply technical skills in conjunction with literature review to address knowledge gaps in RM research
    b. Critically evaluate RM-related literature and peer projects
    c. Expand current knowledge or generate new knowledge via peer-reviewed publications and other forms of science communication in RM (contributions dependent on graduate level and/or course-based vs. thesis-based programs)
3. **Leadership and Collaboration**
    a. Identify gaps in knowledge and seek out experts for help in project design and/or troubleshooting
    b. Generate action plans that employ the strengths of the team and promote efficiency, progress and success
4. **Ethics and Policy in RM**
    a. Describe the current regulations in place in Canada and the US for biologics and cell-based therapies
    b. Understand/relate to patient perspectives/owners in clinical trials
    c. Communicate their science truthfully
5. **Commercialization and Entrepreneurship**
    a. Outline the production of an RM product from the idea stage to market
    b. Describe the development of Canadian-made startups in the RM space
    c. Understand the production and benefits of intellectual property

Program Requirements

Master's Requirements

Master's students in the Collaborative Specialization in RM must complete:

Code	Title	Credits
BIOM*6920	Comparative Stem Cell Biology and Regenerative Medicine	0.50
BIOM*6930	Concepts in Human Regenerative Medicine	1.00

Students must also successfully complete an MRP or thesis in RM research. For thesis-based master's students, at least one member of the student's advisory committee must be a core graduate faculty member of the Collaborative Specialization in RM. Requirements of this collaborative specialization may also serve as elective requirements in the student's home program.

Doctoral Requirements

PhD students in the Collaborative Specialization in RM must complete:

Code	Title	Credits
BIOM*6920	Comparative Stem Cell Biology and Regenerative Medicine	0.50
BIOM*6930	Concepts in Human Regenerative Medicine	1.00

DVSc students in the Collaborative Specialization in RM must complete:

Code	Title	Credits
BIOM*6920	Comparative Stem Cell Biology and Regenerative Medicine	0.50

Students must also successfully complete a thesis in RM research. At least one member of the student's advisory committee must be a core graduate faculty member of the Collaborative Specialization in RM. Students that previously completed these courses as part of the master's collaborative specialization will be exempt from retaking it as part of the doctoral collaborative specialization. Requirements of this collaborative specialization may also serve as elective requirements in the student's home program.

Courses

BIOM*6920 Comparative Stem Cell Biology and Regenerative Medicine Winter Only [0.50]
The emerging field of translational regenerative medicine is explored in depth through a series of seminars, discussions, literature review and oral presentations. Specific topics include regenerative therapies for osteoarthritis, cell-based therapies in non-traditional model species, biomaterials, and novel therapeutic applications in veterinary medicine.
Restriction(s): Instructor consent required
Department(s): Department of Biomedical Sciences
Location(s): Guelph

BIOM*6930 Concepts in Human Regenerative Medicine Fall and Winter Reg Required [1.00]
This course provides a broad overview of the field of human regenerative medicine (RM), including cell-based disease models, emerging technologies, clinical applications and ethical, commercial and regulatory challenges to moving stem cell therapies from the lab to the clinic.
Restriction(s): Instructor consent required.
Department(s): Department of Biomedical Sciences
Location(s): Guelph