Course Title: Stem Cells II (MMG 1331H)
Course Location: PGCRL 18-9701
Course Time and Date: Thursdays, 1 – 3 pm (October 16 – November 27, 2025)
Course Instructor(s): James Ellis (jellis@sickkids.ca) and Tae-Hee Kim (tae-hee.kim@sickkids.ca)
Limited from 4 minimum to 10 maximum students
Prerequisite: Students should be registered in YR 2 or higher

Course Overview:

Stem cells are capable of self-renewal and differentiation into functionally diverse cell types. As these cells from patients can be phenotyped in comparison to healthy cells, they have been utilized for disease modeling and drug screens. This is an advanced discussion/journal club-oriented course covering both the general concepts and translational aspects of stem cell biology. Students will learn how stem cell biology is applied not only to understand disease mechanisms but also to help develop novel therapies. Students will read and discuss assigned papers; at the end of semester, they will submit a stem cell research plan, and review their proposals in a grant panel format. Course grades will be based on journal club presentations, proposals, and the discussions of both.

Course Objectives:

- Review basic concepts of stem cells
- Participate in journal club presentation and discussion
- Learn stem cell activity in injury and disease
- Learn stem cell systems for disease modeling and therapeutics
- Design research proposals, present your grant proposal in a chalk talk for constructive feedback, and peer review the other proposals in a grant panel format

Marking Scheme:

- 25% for 20 minute journal club presentation on an assigned paper outside the student's expertise. The presentation should introduce the topic, explain the major findings of the work, and end with constructive criticism of the study and proposed future directions for the class to discuss.
- 25% for participation in 40 minute journal club discussion after each presentation.
- 25% for a 3 page grant proposal on a stem cell topic chosen by the student using the CIHR grant format. Marks will be assigned based on the CIHR score assigned by the peer review panel.
- 25% for participation in peer reviewing and discussion of the research proposal chalk talks in class 5 and grant proposals in class 6. Each student will act as primary reviewer on one grant, secondary reviewer on one grant, and scientific officer on one grant, and offer additional questions or comments on the remaining grants. All students will provide a CIHR grant score for each grant based on the discussion. Students will be recused when their own proposal is discussed. Each student will receive their CIHR score on their grant

and the scientific officer's summary of the panel discussion. Only the identity and CIHR score of the top ranked grant will be shared with the class.

If you anticipate missing a class you must let the instructor know in advance, given the weight on participation and the fact that there are only six classes. Providing that you had a legitimate reason for missing the class, you will be provided with an assignment based on the reading for that week that you can use to make up for the lost class. Students who have more than 20% of unexcused absence will be asked to repeat the module (i.e., assigned a failing grade - FZ). Students will not get a credit if they miss 20% of module contact hours (e.g., more than 2 of 6 module sessions).

Students can withdraw from the module up until the end of the 3rd class.

In the case where a student receives a failing grade in the module (less than 70%), the grade for that course will be 'in progress'. To complete the course, the student will need to retake the module or, if that module is not offered the following year, another module. If the student passes this module, the initial failing grade will be ignored and the grade for the course computed normally. If the student fails the module (or its replacement) again, the student will be assigned a failing grade for the course.

The basic outline is below for what will be covered in the six classes over 7 weeks. Assigned reading will be sent out the week in advance.

Class 1: Reprogramming/direct differentiation (October 16, 2025 at 1:00 PM – 3:00 PM).

Class 2: Example Chalk Talk and Environmental stem cell interactions (October 23, 2025 at 1:00 PM – 3:00 PM).

Class 3: Stem cell response to injury (October 30, 2025 at 1:00 PM – 3:00 PM).

Class 4: Stem cell organoids, and disease modelling and drug screening (November 6, 2025 at 1:00 PM – 3:00 PM).

Class 5: Student Chalk Talks (November 13, 2025 at 1:00 PM – 3:00 PM).

Grant proposal due on November 20, 2025 with no class that week.

Class 6: Proposal evaluation panel (November 27, 2025 at 1:00 PM – 3:00 PM).