

Molecular Genetics Graduate Topic Course

Course Title: Stem Cells 1

Course Location: Room 1112 – CCBR (11th Floor, 160 College Street)

Course Time and Date: 2 PM – 4 PM Tuesdays, October 29 – December 3, 2024

Course Instructor(s): Derek van der Kooy and John Dick

Instructor Contact Information (email): derek.van.der.kooy@utoronto.ca
John.Dick@uhn.ca

Additional Lecturers (list name, email, Department):

Course Overview:

Welcome to the best graduate course you will ever take (at least about stem cells, this year, taught by Derek and John). Stem cells are at the heart of development and regeneration in organisms from plants to humans. We will pursue issues of cell fate, cell division, differentiation and self-renewal (see the weekly topics below). This is a reading and discussion course, so everyone will read the papers for each week prior to coming to class. This means you should come to the first meeting on Tuesday October 29th having read all of the week 1 papers, or don't bother coming to class. Each person may be asked to give the synopsis of a paper and/or initiate the discussion by answering the first questions about the papers. For this course, you must be prepared for robust discussion and presentation. This course will be fun and everybody will do well if they participate in the class discussion.

Course Objectives:

- Discuss common principles of stem cell biology across tissues and organisms.
- Explore the concepts and mechanisms of self-renewal, differentiation, cell division symmetry and stem cell niche.
- Agree on a definition of stem cells that works across tissues and organisms from plants to humans.

Marking Scheme:

- Paper presentations: 20%
- Discussion and participation: 40%
- Written one page presentation of your best stem cell experiment: 40%

Define policy for any absence.

If you anticipate missing a class you must let the instructors 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.

The entire reading list will be sent out two weeks before the start of the course.

Week 1: Topic: Definitions and evolution of stem cells

Tuesday October 29, 2024 at 2:00 PM – 4:00 PM

Week 2: Topic: Properties of stemness - self-renewal, cell division symmetry

Tuesday November 5, 2024 at 2:00 PM – 4:00 PM

Week 3: Topic: Plasticity, pluripotency and nuclear reprogramming

Tuesday November 12, 2024 at 2:00 PM – 4:00 PM

Week 4: Topic: The stem cell niche

Tuesday November 19, 2024 at 2:00 PM – 4:00 PM

Week 5: Topic: Cancer and stem cells

Tuesday November 26, 2024 at 2:00 PM – 4:00 PM

Week 6: Topic: 1. Stem cell experiment presentations.

2. Ethics and the future of stem cell biology – immortality?

Tuesday December 3, 2024 at 2:00 - PM – 4:00 PM