

Molecular Genetics Graduate Topic Course

Course Title: Experimental Techniques in Developmental Biology

Course Location: PGCRL

Course Time and Date: Wednesdays, Oct. 16-Nov. 20, 2024

Course Instructor(s): Dr. Sevan Hopyan and Dr. Madeline Hayes

Instructor Contact Information (email): sevan.hopyan@sickkids.ca,
madeline.hayes@sickkids.ca

Additional Lecturers (list name, email, Department):

Course Overview:

The goal of this topics course is to get a thorough understanding of the main techniques used in Developmental Biology and their history in the lab. The format of this course will be journal club style presentation and general discussion of selected review articles and primary research papers. Below, you will find the topics listed for each class, and papers will be carefully chosen to represent a variety of developmental model organisms as well as techniques that are used in Developmental Biology. All students are expected to read 3-5 assigned papers prior to class and come prepared to actively participate in group discussions regarding the application, merits, and limitations of experimental techniques across various model systems. Presentations should focus on the techniques used, as well as the technology that allowed for the technique to be used (as opposed to covering the biological data in the papers)

Course Objectives:

- Read new and classic literature in Developmental Biology
- Gain a thorough understanding of experimental techniques used in studying Developmental Biology
- Think outside your current area of expertise and apply a new technique to a model system in your proposal

Marking Scheme:

- 20%: Group and discussion participation
- 40%: Presentation of assigned papers
- 40%: 3-page NSERC-style proposal

NSERC proposal final guidelines:

- 3 pages: including text and figures, does not include references.
- No diseases.
- No proposals within the scope of your thesis project field nor on organisms/techniques used in your current lab.
- You can take liberties and assume you have some general tools to perform certain techniques in a different system (e.g. transgenics, knock-ins, etc.).
- Try to take an unknown about anything in developmental biology in all of the animal kingdom and tackle it with techniques explored in this course.

Policy for any absence.

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.

Final proposals will be due on Dec. 11th at midnight and will be docked 10% for each day late.

Topics:

Week 1: Fate mapping and lineage tracing (Oct. 16, 2024)

Week 2: Forward genetic screens in development (Oct. 23, 2024)

Week 3: Gene targeting and mosaics (Oct. 30, 2024)

Week 4: Genomics and spatial transcriptomics in development (Nov. 6, 2024)

Week 5: Reprogramming, organoids and synthetic embryos (Nov. 13, 2024)

Week 6: Biophysics, modeling, and live imaging of development (Nov. 20, 2024)