

SC/BIOL 4061, SC/BCHM 4061 Molecular and Cellular Principles of Animal Development. Winter term, 2024 OUTLINE

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Course will be administered through eClass:

Note- In the event of an eClass outage direction/materials will be provided at alternate web page www.yorku.ca/jmcderm/.

Class Times: Tuesday & Thursday, 1.00 – 2.20 pm

Class Location: Chemistry Building CB115

Topic outline

- 1) Introduction to Molecular Analysis of Development
- 2) Programs and Regulatory Elements in DNA
- 3) Transcriptional Circuits- mechanisms of differential gene expression
- 4) Gastrulation and early development- axis specification and formation
- 5) Features of Major Model Organisms- Mouse, Chick, Drosophila
- 6) Techniques for the study of Mouse Development: gene targeting/editing technology
- 7) Receptors, Ligands
- 8) Cell-cell communication, Signaling Networks, Induction and Competence
- 9) Molecular co-ordination of Cell Division and Differentiation
- 10) Focus on Paraxial Mesoderm, Somitogenesis and Patterning

- 11) Cell Death in Development
- 12) Lineage Generation – Embryonic and Adult Stem cell properties and lineage commitment
- 13) Cell Type Specification, Induction of pluripotency and cell fate programming
- 14) Patterning in 1 and 2 Dimensions
- 15) Molecular and cellular basis of 3D Patterning
- 16) Postembryonic development: Regeneration and Aging
- 17) Developmental mechanisms of evolutionary conservation and change

Evaluation

1 Test (prior to Reading week: Date Tues 13 th Feb , 1 hr fixed period in class time) (Policy for missed midterm- mark is re-allocated to Final Exam).	30%
1 group project/presentation (scheduled in class, details to follow)	30%
1 Test (Final in exam period- 2 hours)	40%

Detailed format for tests will be clarified in advance. In general the tests will be short essay style.

Assessment in this Course

Research about learning strongly indicates that the most important factor in learning is doing the work of reading, writing, recalling, practicing, synthesizing, and analyzing. Learning happens best when people actively engage the material on a consistent basis.

Course Text: (13th edition)

Developmental Biology (Hard copy and ebook available)

Companion web site: www.devbio.com

Scott F.Gilbert and Michael J.F. Barresi

ISBN: 9780197574591

Oxford University Press

Online access is available through the Oxford Learning link:

<https://learninglink.oup.com/students>

The 10th, 11th or 12th edition of the textbook will suffice although the 13th edition is most updated and preferable.

Land Acknowledgement

York University recognizes that many Indigenous Nations have longstanding relationships with the territories upon which York University campuses are located that precede the establishment of York University. York University acknowledges its presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been care taken by the Anishinabek Nation, the Haudenosaunee Confederacy, and the Huron-Wendat. It is now home to many First Nation, Inuit, and Métis communities. We acknowledge the current treaty holders, the Mississaugas of the Credit First Nation. This territory is subject of the Dish with One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.