

Course Outline

Advanced Cell Biology – Biol467 and Biol634

This course introduces advanced topics on the growth and division of eukaryotic cells and their differentiation through the review of selected examples of original research conducted in model organisms (yeast, *Drosophila*, *Xenopus*, plants, mammals, cultured cells). We will focus on mechanisms controlling cell proliferation, cell differentiation, and cell migration in steady states, as well as special states, such as embryonic development, regenerative processes and cancer. Lectures only.

Course material

Textbook: “The Cell Cycle. Principles of Control” David O. Morgan

Class material is based on the text and on supplementary material from other sources, including original research papers. The lectures slides will be available on the class website, after class.

Instructor

Dr. Chiara Gamberi, Part-time Faculty, Department of Biology, Faculty of Arts and Science, Concordia University, And Visiting Scholar, Institut de Recherches Cliniques de Montreal.

Email: chiara.gamberi@concordia.ca

Office hours (**appointment only**): Tuesdays 11.45 am-12.45 pm and Thursdays 9-10 am., PT Faculty Office Rm. 437.

****Pls. use email for communication whenever possible; do not drop by without an appointment****

Assignments and evaluation

Biol467

Written assignment nb. 1: due mid-October (precise date TBA in class, 10 marks)

Written assignment nb. 2: paper due mid-November (precise date TBA in class, 20 marks)

One 10 minutes presentation on an assigned research paper, starting late October (precise date TBA in class, 20 marks)

Participation – asking questions about topics during other students’ presentations, contribution to discussions in class (10 marks)

Final exam (December, regularly scheduled exam time, 40 marks)

Biol634

Written assignment nb. 1: due mid-October (precise date TBA in class, 10 marks)

Written assignment nb. 2: paper due mid-November (precise date TBA in class, 30 marks)

One 20 min presentation on an agreed topic*, starting late October (precise date TBA in class, 20 marks)

Participation – asking questions about topics during other students’ presentations, contribution to discussions in class (10 marks)

Take home exam due mid-December (precise date TBA in class, 30 marks)

*Chosen by the student and approved by the teacher, or assigned by the teacher.

Assignments Biol467

Written assignments: critical elaboration on topics in Cell Biology (format and length TBA in class). You should reference and discuss at least two original published articles (use PubMed). One of these can be a review of the topic, and at least your second reference should be a relevant and original research publication.

You can use the original figures from your references, as long as they are properly cited (proper citation practice and acceptable format are available through the Concordia library <http://library.concordia.ca/help/howto/citations.html> and will also be discussed in class).

Avoid plagiarism: you **must** put ideas into your own words and you cannot copy ANY sentences. Use references appropriately. Improper referencing or passing off another person's work as your own is academic misconduct and will be reported.

Oral presentations: brief summary of a published paper: pick one key experiment that supports the authors' main hypothesis and *briefly* describe the experimental method. Please adhere to the 10 minute time limit and notice that timeliness will be included in the evaluation.

Any student interested in using these assignments to develop his/her knowledge of a particular topic in Cell Biology of personal interest, please email me ASAP at chiara.gamberi@concordia.ca for discussion and arrangements.

Presentation slots will be assigned randomly. If you know in advance that you will not be able to attend a class mid-October to mid-November, please email me ASAP for coordination. If you find that your assigned paper is too complicated please contact me for advice or re-assignment.

Assignments Biol634

Written assignments: critical elaboration of topics in Cell Biology (format and length TBA in class). You should reference and discuss at least four original published articles (use PubMed). One of these can be a review of the topic, and the others should be relevant and original research publications. Discuss the techniques used for the studies and their advantages and limits. Please refer to the guidelines reported above for referencing and avoiding plagiarism.

I encourage graduate students to propose topics of their interest for their assignments. I can also assist in this process by providing discussion and guidance. Please notice that the topics for the second written assignment must be decided at the latest by October 1st.

Examples of topics:

Organelle division (mitochondria or lysosomes)

Organelle fragmenting during division (ER or golgi)

Chromatin modifications (changes upon entry or during M phase)

Regulation of cellular functions by ubiquitination or Sumoylation

Selected examples of regulation of cellular function by protein phosphorylation or other post-translational modifications

Membrane remodeling (changes in curvature during cell rounding/division, secretory

events to add new membrane or changes in phospholipid composition)
Mitotic spindle formation and centrosome biology
Contractile ring formation and ingression (actin polymerization and/or myosin activation)
Prokaryotic division (i.e. ftsZ ring formation, mreB in sculpting cell shape)
Mitotic exit network
Plant cell division
Cell migration and its regulation
Epigenetic mechanisms
Cellular polarity (e.g. mechanisms of planar cell polarity, epithelial organization)

Oral presentations: these can be done in two formats. The first is a *brief* summary of a published paper: introduce the notions in the field that are necessary to understand the novel contribution(s) of the presented paper. Then, critically discuss the key experiment supporting the authors' main hypothesis and *briefly* describe the experimental method(s) used. The second format is to present a current scientific debate by introducing multiple papers and discussing their specific contribution to the debate and which unresolved issue(s) remain. In this case you will have to choose how much detail you would like to present for each paper. Please adhere to the 20 minute time limit and notice that timeliness will be included in the evaluation.

Grade scale: A+: ≥ 90 ; A: 85-89; A-: 80-84; B+: 77-79; B: 74-76; B-: 70-73; C+: 67-69; C: 64-66; C-: 60-63; D+: 57-59; D: 54-56; D-: 50-53; F < 50

*******In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.***