

MOL BIO 3D03: Experimental Approaches in Cell Biology

Spring 2017

INSTRUCTOR:

Ana Campos, Ph.D LSB 541, camposa@mcmaster.ca

ASSISTANT:

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COURSE STRUCTURE:

This course runs for three weeks from May 1st through May 19th.

The first two weeks are spent in the lab from 8:30am to 6:00pm performing experiments.

During the third week two oral assignments will take place: an oral data report and a poster presentation. The final written assignment (a research proposal) is due May 26th by electronic submission.

There will be lectures taking place most mornings prior to starting experiments.

COURSE DESCRIPTION:

Intensive laboratory-based inquiry course focused on cell biological research. Cell biology techniques from various disciplines will be used to investigate the structure and function of organisms at the cellular and molecular level. Techniques employed may include light and immunofluorescent microscopy, time lapse, tissue culture, biochemistry, genetics and molecular biology. This course will also provide opportunities to develop scientific literacy skills.

During the first week we will conduct an experimental **survey of fundamental themes in cell biology** including differentiation, movement, and programmed cell death. To that end, different approaches will be used ranging from culture of primary and transformed cells to molecular and cell biology techniques.

During the second week we will focus on a current research topic that illustrates the importance of model organisms in the study of human diseases. We will carry out experiments aimed at investigating the **role of protein misfolding in the etiology of neurodegenerative diseases**. To that end, we will use *C. elegans* strains carrying different constructs that model human neurodegenerative diseases to investigate the consequences of protein misfolding at the cellular and behavioural level. The role of various stress pathways will be discussed and investigated by genetic interaction experiments that use RNA interference (RNAi) to down regulate candidate genes. There will be ample opportunity to discuss current scientific literature.

LEARNING OUTCOMES:

In this course, students will have the opportunity to:

- Practice the art of experimental design.

- Learn and practice sterile eukaryotic cell culture techniques.

Use molecular biology to understand cellular processes
Use different forms of microscopy in the capture and analysis of data.
Use *C. elegans* as a model system
Conduct and analyse behavioural assays
Learn how to present data for publication.
Present data in written (lab reports/research proposals) and oral (poster) formats.
Critically analyse and report on the use of cell biological techniques and the analysis of data in published papers.
Engage in scientific discourse with peers and instructors.

ONLINE CONTENT:

This course uses Avenue to Learn to post the course outline, assignments, links, and other notices. Go to <http://avenue.mcmaster.ca> to find out how to log-on to the course's platform. We will be using Google Drive to upload the images and videos you take during the lab.

TEXTBOOK: There is no required textbook for this course. Required readings will be provided for each lecture.

COURSE EVALUATION:

Lab Participation: 10% (5% per week)
Assignment 1: Oral presentation on cell culture experiments (pairs), 10%
Assignment 2: Lab report on cell culture cells (individual), 25%
Assignment 3: Oral presentation on *C. elegans* experiments and research proposal (pairs), 10%
Assignment 4: Poster presentation on *C. elegans* experiments (pairs), 20%
Assignment 5: Research proposal (individual), 25% (due Monday May 29th)
TOTAL: 100%

CHANGES TO THE COURSE OUTLINE:

At certain points in the course it may make good sense to modify the schedule outlined. The instructor reserves the right to modify elements of the course and will notify students accordingly (in class and post any changes onto Avenue to Learn). Posted changes take precedence over this course outline.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

This is a lab intensive course that runs for three weeks. For the first two weeks you are in the lab every day, all day. Attendance is mandatory and MSAFs are not accepted except under extreme circumstances. Failure to attend the labs will result in an automatic fail. Assignments and presentations submitted late will receive a deduction of 10% per day late. Please think carefully about the expectations of this course before enrolling.

ACADEMIC DISHONESTY:

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at <http://www.mcmaster.ca/academicintegrity>

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group work. While we encourage you to work with your peers in solving problems on your assignments, copying of answers is not acceptable. Your final work must be your own.
3. Copying or using unauthorized aids in tests and examinations.

Grades will be converted according to the following scheme, which is the one in general use at McMaster University.

90 – 100%	A+	12	63 – 66%	C	5
85 – 89%	A	11	60 – 62%	C-	4
80 – 84%	A-	10	57 – 59%	D+	3
77 – 79%	B+	9	53 – 56%	D	2
73 – 76%	B	8	50 – 52%	D-	1
70 – 72%	B-	7	0 – 49%	F	0
67 – 69%	C+	6			

When the final marks are obtained, ALL borderline cases will be reviewed and, where warranted, adjustments will be made in the final mark.