BIOL 512/BIOL 498N Functional Genomics Fall 2011

Wednesday & Friday 10:15-11:30, Room CC-312

Instructor: **Dr. Madoka Gray-mitsumune**
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Please put BIOL512 in the subject line!
Tel: 848-2424 ext.4026

Prerequisite (Grad students): BIOL 367 (Molecular Biology) or permission of the Diploma Program

Prerequisite (Undergrad): BIOL271, BIOL367, at least 60 credits in Biology majors AND permission of the instructor.

Course description: This course focuses on the functional analysis of expressed genes and their products. Course content includes: the construction and screening of normalized cDNA libraries; analysis of expressed sequence tags (ESTs); functional analysis by gene knock-outs; localization of gene products by gene knock-ins; transcription profiling; proteomics; analysis of transcriptome and proteome data; systematic identification of proteins; and functional analysis of proteins by detection of protein-protein interactions.

Evaluation:

	% of final grade
Class participation & reading assignments	10 %
Oral Presentation	20 %
Assignments	10 % x 2
Quizzes	5 % x2
Final exam	40 %

Reading assignments

Read the assigned article before the class. Participate in class discussion. Answer questions regarding the article during the class. Direction will be posted on Moodle.

Oral presentation (Oct 21)

Should be group work (group of two or three). Each group present a research article published within the last 5 years. The presentation should be about 15 min long for a group of two and 23 min for a group of three. Direction will be posted on Moodle.

Assignments

You will study and characterize a mouse gene in publically available expression and phenotype databases. Direction will be posted on Moodle.

Quizzes (Oct 7 & Nov 11)
Each quiz is 2 pages long. You may bring one cheat sheet (2 pages). Time limit is 30 min.

Final Exam (Date & time determined by Exam office)
You may bring 3 cheat sheets (6 pages) to the exam. Time limit is 3 hours.

Tentative schedule (subject to change)

	Date	Assignment/quiz	Topic	
1	Sep 7		Introduction Overview of functional genomics	
2	Sep 9		Transcriptome analysis	cDNA synthesis, normalization & screening, EST library, Gene annotation, microarray Serial analysis of gene expression (SAGE), massively parallel signature sequencing (MPSS), RNAseq
3	Sep 14	reading assignment		
4	Sep 16			
5	Sep 21	reading assignment		
6	Sep 23			
7	Sep 28			
8	Sep 30		Proteomics	Protein separation, 2D-gel, liquid chromatography Mass spectrometry, DIGE, SILAC, protein array
9	Oct 5			
10	Oct 7	Quiz 1		
11	Oct 12			
12	Oct 14			
13	Oct 19		Protein & RNA localization	in situ RNA hybridization, GFP and other protein tags, laser dissection
14	Oct 21	Presentation Day		
15	Oct 26		Reverse genetics	targeted deletion/replacement, random insertion, RNAi
16	Oct 28	reading assignment		
17	Nov 2			
18	Nov 4	Assignment 1 due		
19	Nov 9			
20	Nov 11	Quiz 2	Protein expression, activity assays	High-throughput *in vivo* & *in vitro* expression systems, affinity purification, protein assays
21	Nov 16			
22	Nov 18	Assignment 2 due		
23	Nov 23	reading assignment		
24	Nov 25		Protein interaction (interactome)	Two hybrid assay, tandem affinity purification (TAP), synthetic interactions BiFC
25	Nov 30			
26	Dec 2			

Avoiding plagiarism

Since the course work requires written works (presentation slides and assignment), I need to remind of you of good citation practice. Throughout the text, you should be clear on what part has been cited from which articles. Please visit the Academic Integrity Website prepared by Provost office. http://provost.concordia.ca/academicintegrity/index.php. Also, Concordia University Library has a good referencing guide http://library.concordia.ca/research/subjects/biology/. Watch self tutorial on how to acknowledge information sources (prepared by Concordia librarian Ms. Danielle Dennie): http://library.concordia.ca/research/subjects/biology/plagiarism/plagiarism_video.htm

The following statements are taken from The Academic Integrity Website (http://provost.concordia.ca/academicintegrity/plagiarism/).

*"**Plagiarism**:*

*The most common offense under the Academic Code of Conduct is plagiarism which the Code defines as **"the presentation of the work of another person as one's own or without proper acknowledgement."***

This could be material copied word for word from books, journals, internet sites, professor's course notes, etc. It could be material that is paraphrased but closely resembles the original source. It could be the work of a fellow student, for example, an answer on a quiz, data for a lab report, a paper or assignment completed by another student. It might be a paper purchased through one of the many available sources. Plagiarism does not refer to words alone - it can also refer to copying images, graphs, tables, and ideas. "Presentation" is not limited to written work. It also includes oral presentations, computer assignments and artistic works. Finally, if you translate the work of another person into French or English and do not cite the source, this is also plagiarism.

In Simple Words:
DO NOT COPY, PARAPHRASE OR TRANSLATE ANYTHING FROM ANYWHERE WITHOUT SAYING FROM WHERE YOU OBTAINED IT!"

If you are not sure how to paraphrase without plagiarizing, please refer to this example given by the Academic Integrity information site created by the Office of Provost: http://provost.concordia.ca/academicintegrity/index.php. Examples are shown near the end of the web page.

LIST OF SERVICES

- **Concordia Counselling and Development:** http://cdev.concordia.ca/ (offers career services, psychological services, student learning services, etc.)
- **The Concordia Library Citation and Style Guides:** http://library.concordia.ca/help/howto/citations.html
- **The Concordia Library Biology Research Guide:** http://library.concordia.ca/research/subjects/biology/
- **Advocacy and Support Services** http://supportservices.concordia.ca/
- **Student Transition Centre** http://stc.concordia.ca/
- **New Student Program** http://newstudent.concordia.ca/
- **Access Centre for Students with Disabilities** http://supportservices.concordia.ca/disabilities/
- **Student Success Centre** http://studentsuccess.concordia.ca/
- **The Academic Integrity Website** http://provost.concordia.ca/academicintegrity/
- **Financial Aid & Awards** http://web2.concordia.ca/financialaid/
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