BIMM112

Regulation of Eukaryotic Gene Expression

Summer Session I 2017
M/W 8:00-10:50 am
Discussion section: T/Th 11-11:50 am
Center Hall 207

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Course Description: Gene expression is the multistep process, which is tightly regulated at each step. Regulation ensures that cells express the appropriate balance of functional molecules within a cell. Misregulation caused by inherited mutations and environmental influences can lead to developmental abnormalities and diseases such as cancer and neurodegenerative conditions. The field of gene expression is rapidly growing with new discoveries reported every week. This course exploits some of the most exciting and recent topics in gene expression research and begins with a discussion of transcriptional control including how non-coding RNAs are emerging as crucial in activating and repressing transcription. We then dissect co-transcriptional processing events including regulation by alternative polyadenylation and RNA methylation. Finally we discuss regulation in the cytoplasm including codon optimality and RNA decay.

Class structure and course learning objectives: Progress in science and medicine depend on understanding peer-reviewed literature, critically evaluating the data and interpretations, and synthesizing what steps come next. To gain a current understanding of topics in the field of gene expression, we will be reading literature reviews and primary research articles. Lectures will cover 3 major fields of research within the field of gene expression: transcription, co-transcriptional processing events and regulation in cytoplasm. The overall learning objectives for this course are:

1. to be able to describe the major pathways governing gene expression and the methods commonly used in the field, examine data, and design experiments to test new questions.
2. to be able to read primary literature, understand it and:
    (a) communicate the reason for the study
    (b) draw an interpretation of the data/figures
    (c) analyze the significance of the findings
    (d) discuss and develop future directions

Lectures: Roughly half of the class period will be lectures and the other half of the class will be activities (group-based) surrounding the reading assignments (reviews or primary research).

Group work: You will form groups on the first day of class and you will work within these groups to discuss the review or research article. Groups will then be assigned an element of the article to present (e.g. figure, table, section, supplemental information, box). Each group will work together to prepare their assigned element of the article. It is expected that all students participate in the group discussion and preparation for presentation. A reporter from the group will present the figure/table/etc. Each person within the group must be the primary reporter at least 2 times during the quarter. The goal of this is to learn to communicate scientific findings to the rest of the class.

Assignments: Assignments are primarily based on research articles, but may also include subjects covered in the literature review reading and/or lectures. **Pre-discussion quizzes** are due at 8am before research paper discussions (expect for week 1 - see schedule) – these multiple choice questions are designed to assess if you have read the paper. **Post-discussion quizzes** are short answer and intended to assess your understanding and interpretations of the paper and are due ~48 hours (see schedule) after the classroom discussion.

Exam: The final exam is on August 4th at 8am (location TBA). Confirm now that you are able to attend as there will be no make-ups for missing it. For the final, you will be given a research article paper to read in advance. Part of the exam is based on this paper and questions will be similar in style to your post-reading questions. You may have a printed out version of this paper and notes on the paper. Thus the best possible preparation (other than reading the paper assigned for the final) is to participate in class discussions and do the post-discussion quizzes.

Grading:

iClicker questions in lecture and discussion**	50 points
Pre-discussion quizzes (Ted, graded)	50 points
Presentations (2x 10 points)	20 points
Post-discussion quizzes (Ted, graded)	150 points
Final exam (8/4/17 8-11 am)	150 points
	420 points

This class is graded on a hybrid curve. The top 5% of the class will be normalized to 100% and the letter grade cutoffs made at 10%, e.g. 90-100%=A, 80-90%=B, etc. Therefore everyone in this course ***could*** get an A.

**Clicker questions will be used to monitor how the class is progressing. They are intended to provoke thought and spark discussions. Therefore clicker points will be given for participation – you do not have to get the answer right to receive points as outlined here:

If you **answer** >70% of clicker questions you will receive 50 points

>60%	25 points
>40%	15 points
>20%	5 points

However, if you receive an A in the class AND you answer >60% of the clicker questions **correctly**, a plus will be added to your grade (+). This only applies for A's.

TritonEd: Lecture notes in PDF will be available on TritonEd (https://tritoned.ucsd.edu) by 10 pm the day preceding each lecture. Pre-discussion assignments will be available on TritonEd within 48 hours of discussion and will close at the start of each discussion. Post-discussion assignments will be available on TEd and will be turned in by turnitin.

Academic Integrity: This class uses multiple learning tools, including iclickers group work. The best possible method to prepare for the final exam is by reading before class, attending class, clicking in, and performing the assignments/quizzes before seeking the correct answers. I encourage you to work in groups (after attempting quizzes on your own). HOWEVER, copying off of someone else's assignments is considered cheating and will result in university sanctions as well as academic sanctions from me. FURTHERMORE, copying someone else's answers helps NO ONE learn. Letting someone copy off of you, giving someone your clicker and using someone else's clicker in class are also all considered cheating. Please review http://academicintegrity.ucsd.edu/about/index.html for information about what constitutes cheating.

OSD students: If you need testing accommodation for this class, please work with the Office for Students with Disabilities (OSD). Students requesting accommodations and services due to a disability for this course need to provide a current Authorization for Accommodation (AFA) letter issued by OSD prior to eligibility for requests. Receipt of AFAs in advance is necessary for appropriate planning for the provision of reasonable accommodations. OSD academic liaisons also need to receive current AFAs. For more information, contact the OSD at (858) 534-4382 (V); (858) 534-9709 (TTY), osd@ucsd.edu or http://osd.ucsd.edu. **You will need to coordinate scheduling of the exam with the instructor. All of these arrangements should be made within the first two weeks of the quarter.**