BIMM 194/BGGN 285
Advance Topics in Molecular Biology
Gene Regulation
Spring 2024

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Lecture: Monday, 9:30 – 10:50 AM, Bonner 2130

Office Hours: Monday (April 15 - June 3), 11:30-12:30 PM, Leichtag Biomedical Research Building room 414

COURSE SUMMARY

Gene regulation provides the instructions for making all cells within our bodies and organisms across the tree of life, by ensuring that the correct genes are transcribed at the in the right location, levels, time and space within an organism. Dis-regulation of gene expression results in disease and evolutionary adaptations. This course will focus on control of gene expression by regulatory elements known as enhancers. Enhancers are a critical and yet poorly understood aspect of our genome that provide the blueprint to build and maintain our bodies and the bodies or all animals. This class serves as a dynamic platform for exploring cutting-edge research, discussing seminal papers, and dissecting the fundamental principles that underpin the rapidly evolving field of gene regulation and enhancer biology. By critically analyzing and discussing landmark papers, students gain invaluable insights into the latest methodologies, tools, and breakthroughs driving advancements in gene regulation. With a focus on fostering critical thinking, debate, and a deeper understanding of gene regulation and its applications, this course empowers students to become adept in navigating the complex landscape of this revolutionary scientific discipline.

COURSE FORMAT

We will have weekly seminar-style presentations in person at Bonner 2130. You will be a member of a team of 3-4 students. Each group will be assigned one primary research paper to present. Presentations should be approximately 40 minutes followed by 20 minutes for questions and discussions. Please do not run over time!

The team members should collaborate to synthesize a cohesive presentation, and each student should present some portion of the paper. EACH presenter must be able to clearly explain ANY part of the assigned paper.

All the students (presenters or audience) are required to read the assigned paper carefully before each class.

PRESENTATION CONTENT

Presentations should be thoroughly prepared and clearly delivered. There should be several components of your presentation:

I.   **Background & Introduction:** You should begin with an introduction that provides the context of the work. Make sure to provide adequate background, so that the class can understand the rationale behind the study. For example, what is the biological significance of the research or methods that authors study? What is the question they were trying to address? Why was it an important question? It is likely that you will need to read additional articles, such as some of the citations in the article's introduction section, or a review article. Oftentimes, it is helpful to show a figure or two from review articles to describe the bigger context of the research.

II.   **Figures & Tables:** You should describe main figures and tables in the article, explaining the techniques they used and the results they obtained. It is important to highlight controls that are key for the data interpretation. You may also cover some supplemental material if they can help you convey the points. Inclusion of movies is usually a great way to engage the audience. For complex experiments, you are also encouraged to generate customized animations or cartoons to help your explanation.

III.   **Conclusion & Implications**: You should close the presentation with a discussion of the major conclusion of the paper. Showing a model to summarize the key findings is also helpful. Discuss the overall contribution to the field, the limitation of the work, and possible future studies that can build on this work.

There are four major questions should be addressed during the presentation:
1. What question is the paper addressing?
2. What is the main discovery in the article?
3. What is the most critical experiment that supports their conclusion?
4. What experiments would you like to see done to either extend the current study or to address limitations of the study

Please email your finalized powerpoint to Dr. Farley by 8am on the day of your presentation. This way, if your laptop fails to communicate with the projector, you will be able to use Dr. Farley's laptop for the presentation.

Presenters should arrive 15 min before the class starts to set your presentation up.

GRADING:
Your performance in the course will be evaluated based on three aspects:

1. Oral presentation of the assigned paper
2. Submission of audience peer evaluations
3. In-class quizzes
4. Active participation in class

Total: 100 pts

1. **Oral presentation of the assigned paper (40 pts):** Your peers in the audience will submit a Peer Audience Evaluation Form with via canvas to evaluate your presentation. The form asks you to evaluate nine aspects of the presentation on a scale 1 to 5. Every member of the team will share the same score.

2. **Submission of audience peer evaluation (15 pts):** For each seminar that you are not presenting, you are asked to submit a Peer Audience Evaluation Form to rate/comment on the quality of the presentation. There will be a total of 8 evaluation forms to submit for the course, and each submission will earn you 3 points, with a total of 15 points possible for the entire class. These are to be completed during class. A missed evaluation will receive zero points. Only three evaluations can be missed. Please be fair and respectful when completing this evaluation form as this will provide helpful feedback to your peers.

3. **In-class questions (25 pts).** The goal of these questions is to help you reflect on what aspects of the research paper you understand well and what aspects of the papers are unclear. These in class questions will also be used to record your lecture attendance. There will a quiz each lecture (except the first week). The first part of the quiz will be given before the presentation to check your understanding of the paper. The second part will be given after the presentation to check the improvement of your understanding. Within your

answer you need to illustrate that you have read the papers. Answers that bare no relationship to the paper or where it is clear you have not read the paper will get a 0 score. There will be no make-up quizzes (no exceptions). A missed quiz will receive zero points and will count as one of the dropped quizzes. Only three quizzes can be missed, so please attend class regularly.

4. **Participation in discussion (20 pts).** At the conclusion of the course I will assign up to 20 points for your participation in Q/A when you are not a presenter. To gain these points you must ask an informed and thoughtful question about the publication of the class, and do this in at least 3 classes.

There will be NO final exam and there is no extra credit.

Academic Integrity: Academic dishonesty will not be tolerated in this course. According to UCSD policy, academic dishonesty includes: • completing assignments for another student • allowing another student to complete an assignment for you • copying another student's work on an assignment • allowing another student to copy your work on an assignment • incorporating plagiarized material into an assignment. Using Chat GPT to create your presentation. Any issues with academic dishonesty will be reported to the UCSD Academic Integrity Coordinator and the Dean of the student's college. Confirmed cases of academic dishonesty will result in the student receiving an F as their final grade and other disciplinary actions determined appropriate by the Academic Integrity Coordinator.