

## **Discussion Section for Molecular Cell Biology**

The goal of discussion section is the same as the overall goal of the course - to help first-year PhD students in the Molecular Cell umbrella graduate program become graduate students and learn how to do research in cell biology. Discussion section is a place to learn how to read papers and evaluate the science in them. In addition, discussion section is an opportunity to learn how to present and explain experiments to colleagues, to listen to their points of view, and to discuss differences. Learning about these processes is more important than acquiring additional facts about cell biology.

The topics of papers that will be discussed are not coordinated with the topics or material in the lectures. The material in lecture is not required and may not even help one understand the paper. Research scientists often read papers on topics in areas for which they have little background and expertise. To acquire that background information, we often consult other sources, such as textbooks, reviews, previous papers, and colleagues. Discussion section is a good place to learn and practice this skill.

The role of faculty leader of the discussion section is to facilitate and manage the discussion, not provide answers. They are not experts on the topics of the papers. Their major goal is to ensure that every student gets an opportunity to participate in the discussion. However, the student is expected to take the initiative to participate. Knowing how to present and discuss science with colleagues is an essential skill. Again, discussion section is a good place to learn and practice this skill.

**Time and Location.** Discussion sections are free to change the time and location of their meeting, on any given week. The faculty leader should decide this, based on a consensus of the group.

### **Suggestions for critiques**

The summary and critique of the assigned paper should be 2-5 pages, in a single-spaced format with 12-point type. Summarize the important aspects of the paper, analyze experiments that are flawed in design or interpretation, determine the extent to which the authors have proven their hypothesis, indicate the importance of the work, and offer suggestions for further studies. Do not provide a "Cliffs notes" detailed blow-by-blow recounting of every method, experiment, and figure in the work. You won't have enough space to do this; more important, we want you to evaluate, not just describe, the paper.

### **The overall design of your critique can be dictated by your needs.**

For instance, if you find that a paper offers definitive proof for its hypothesis, you might begin with a summary of the area and the hypothesis tested, state briefly the strategy taken and the important result, dwell upon the ramifications of the work for the area, and focus on future questions the study raises and how you would approach them experimentally. In passing, you would point out any minor errors in design or inconsistencies between results and conclusions.

On the other hand, if you find that the study is sufficiently flawed so that the conclusions are not warranted then you might begin with the same summary and statement of hypothesis, mention the strategy the authors attempted to pursue, and then provide a more detailed analysis of the major problem in concept, method, or interpretation and what you would do to correct it. You could contrast the authors claims for the paper with your own analysis of what they have really demonstrated, and perhaps offer a different approach to test the hypothesis or even reformulate the hypothesis in a way that makes more sense to you.

### **Here are some of the questions you might wish to address:**

**Background:** What basic area is being addressed and what is the previous "state of the art" understanding in that area? Is there an ongoing debate that the study attempts to resolve? What is the hypothesis the authors are testing?

**Methods:** What is the experimental strategy employed? Is this strategy a good approach to test the hypothesis? If not, what approach would you have taken? Are there design flaws? Are the experiments adequately controlled? If not, what is missing? To what extent do these design flaws weaken or invalidate the conclusions?

**Results and conclusions:** What are the basic results of the paper, and what is the import of these results for the hypothesis in question? Did the authors prove their point? Are the authors' interpretation of the results supported by the data and if so, with what strength (merely consistent, somewhat convincing, formal proof, etc.)? Are there alternative interpretations of the data that the authors have failed to consider? If you were a reviewer of the work, what other experiments would you demand before publication? If you were the author, what other experiments would you do to test the stated hypothesis and strengthen your conclusions?

**Significance:** What are the ramifications of the paper for the field? Why is the paper important or significant and why should it be published?

**Future directions:** What further hypothesis do the results of the study suggest? What are the important next questions? If you were working on the project, what would you do next?