

Journal Club Exercises

I. Project overview. These exercises are rooted in the belief that the abilities to critically read, understand, and discuss the scientific literature are valuable and essential outcomes of a good undergraduate science education. To try to accomplish these goals, I have structured several kinds of activities (see directions below) to accompany our reading of scientific papers from the biomolecular literature. These activities are intended to promote a high degree of preparation for discussion of specific papers, their results, and the implications thereof. They are aimed at encouraging a high level of participation and providing a unique and high quality Journal Club experience.

II. Learning Objectives.

- Develop depth in selected topics by reading recent or illustrative papers
- Learn to critically read the primary literature in biochemical and related fields
- Develop proficiency at discussing the primary literature and applying biochemical principles to addressing problems and proposing experimental ideas

III. Directions.

The week for which you signed up. For each Journal Club meeting, a team of you will serve as a resource for the class discussion. When it is your turn, you will need to prepare to be a resident expert on the assigned paper through background research on the topic and paper. Depending on your individual preparation in the topic you choose, this may involve some additional reading in Lehninger's Principles and other biochemistry texts. However, it must also involve working with your team to identify key background and/or follow-up papers (≥ 6) from your reading of the assigned paper, to obtain these papers, and for each of you to read them in preparation for your role in the Journal Club. You may consider me a consultant for the difficult aspects of these papers. Your group must produce an annotated bibliography of the papers you have read as preparation on the day of the journal club. In addition, your team should compose a three-question quiz (that can be answered from having read the assigned paper) and a corresponding key. Your quiz should have a very straightforward question, a question of medium difficulty, and a more difficult one. This should be readily grade-able (developing the key helps in assessing this quality). You may consult with me in person or via e-mail in this development process, and I would like to preview the final draft of your quiz not later than the day before Journal Club. During the meeting, you will administer the quiz over the first 10 minutes or so. During this time, you may review questions (see below) of participants to identify useful themes. Your team should start the discussion with a review of your quiz key, note any themes from participant questions and then let the discussion proceed. You are to serve as the resident experts on the paper/subject only as needed. Thus, while you may need to re-start the discussion during a lull, it is by no means your role to carry the discussion or to provide an immediate answer to every question. You may defer questions to the group. Also, feel free to contribute as a discussion participant.

The weeks you are a participant. For the weeks you are not a resident expert, you are required to provide two questions about the paper. These are due at the beginning of class to encourage and assess your preparation. The two questions about the paper should be good ones. If they could be answered by a glance at our texts, they won't receive full credit. Vast, un-searchable questions will also not receive full credit. Solid, legitimate questions originating from your reading of the paper will receive full

credit. They should be of the type focusing on whether the data support the conclusions, why the conclusions are important, and what to do next.

You will be part of a small group (2-3) that takes the short 3 question quizzes developed by the week's expert team. In addition to encouraging preparation, quizzes are intended to promote your participation in group work and initiate discussion about the paper. Following review of the quiz key, you will come together as a large group with your resident experts and, for the rest of the meeting, discuss the paper.

Discussion. Discussion should aim at understanding the context, content, and significance of the paper. "How to read a scientific paper" (<http://www.biochem.arizona.edu/classes/bioc568/papers.htm>) suggests key questions: what questions does the paper address?; what are the main conclusions of the paper?; what evidence supports the conclusions and what is the quality of the evidence?; do the data actually support the conclusions and why are the conclusions important? The resulting discussion should include critically thinking and sharing ideas about the appropriateness of the conceptual and/or experimental approach, the appropriate controls, the implications of the results and resulting research, and future conceptual and/or experimental directions for the research. The goal is ultimately to add to your knowledge, increase your understanding, and critically evaluate the merits of the paper. Your full participation will **require** that you prepare in advance for these discussions by reading the papers carefully (and probably repeatedly). You are welcome to consult with me in your preparation.

IV. Assessment.

Point Breakdown

Questions about the paper (3 pts/pair x 4)	12 pts
Quizzes, 3 questions answered by group, (9 pts @ x 4)	36 pts
Performance as resident experts	14 pts
Annotated bibliography of expert group's reading	12 pts
Quiz written for peers & key (9 pts @ x 2)	12 pts
Peer and self evaluation (7 pts @ x2)	14 pts
Total	100 pts

You, individually, will receive the quiz score of your group for a particular week's Journal Club. My consultations with the week's team of experts about their quiz should monitor the quality of the quiz to insure that it is feasible, *with good preparation*, given the assigned paper. Good preparation should include using texts or methods manuals to answer basic and methods questions, thorough and (likely) repeated (≥ 2 times) reading of the assigned paper, consultation with me if necessary (*but not necessarily reading additional supporting papers - although you may*).

The team of experts will each receive the team's score for the bibliography, quiz, and key. The performance as resident experts, including being able to answer reasonable questions about the paper based upon background reading, will be evaluated individually, considering both group and individual performance. The means it is the group's responsibility that the whole group participates. A peer and self-evaluation completes the assessment, and will be used to inform performance scores as needed.

Notes: This exercise continues to develop each time I try it. Please feel free to make suggestions; I'll incorporate them when possible to improve your experience.