Bioinformatics and Bioengineering Summer Institute
How to lead a discussion on a research article

I. Purpose of a discussion

Your highest goal is to engage your colleagues by a scientific issue, through the consideration of one or more experiments. If they come away just understanding some bottom line – that X causes Y – you have not succeeded. They can get that from the morning newspaper. Yours is the more difficult task of helping them see the nature of a question, the range of possible answers, and the limits of each answer, based on results that are themselves limited by the specific procedures that produced them.

You may think it picky to focus on the details of an experiment. And of course if you're talking, say, about the molarity of salt used in isolating the DNA, then maybe you're right. On the other hand, our view of nature is determined by the lens through which that view arrives. It is essential we know the properties of that lens and its limitations before interpreting what we think we see. Help us see what the lens of this experiment is and how the results are shaped by it.

On one hand, it is no trivial matter to find a scientific issue that can be explained and examined within the short time available to you. On the other hand, you have a friendly audience. If your colleagues don't thrill to the challenge of a scientific mystery, they're probably in the wrong field.

II. Steps preparing the way
<u>Choose a topic that will engage your colleagues</u>

Choose a topic and a research article that addresses an interesting question that admits of multiple plausible answers. If you are presenting along with someone else, you may choose to present articles whose ideas seem at odds with one another. Either way, make sure that you grasp the overarching question and can help us see how the experiments you present fit into the struggle to answer that question.

<u>Prepare a short summary</u>

At least two days before your presentation, provide your colleagues with a copy of the article or articles you will focus on, either in the form of photocopies or a link to an electronic version of the article(s). At the same time, send out to them a summary of the major question at the core of your presentation and how the experiments you will consider bear on that question. Give us some advice as to what part of the article to focus on and what may be critical questions to ask of it. The summary should probably be two or three meaty paragraphs.

II. How to engage your audience

If I knew how to capture the creative energies of a group of people and induce them to join me in analyzing a research article, I would write a book and become rich and famous. As I am not rich and famous, all I can do is offer you some general principles and some specific ideas that sometimes have worked and may be effective in your case. Or maybe not. Perhaps you can think of something better.

A. Choose an article that describes actual experiments

A *research article* describes how experiments were done and the results that were produced by them. A *review article* describes the results obtained from a large number of research articles. DO NOT try to present a review article. Doing so will unavoidably reduce the discussion to the level of supposed facts. We have no basis for resolving conflicts between results.

In contrast, presenting an *experiment*, why the experiment was done, how it was done, and what can be derived from it, gives us a firm basis for discussion. If you understand what was done, then you are as competent as anyone else – the author or the president of the National Academy of Sciences – to assess the legitimate conclusions that can be drawn from the experiment.

B. Set one article against another

Precede the discussion of experiments with expectations based on prior experiments. Conjure up an argument between the views implicit in one paper with those implicit in another

C. Focus our attention on critical detail

If two experiments give at first glance incongruous results, help us identify the experimental differences that may explain them.