Defending Your Research Proposal & Critiquing Those of Others
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Defending your research proposal, finding a good idea, evaluating your progress, and becoming a scientist

How do you decide what to work on?
- It must interest you and you should be able to convince others that they should be interested as well.
- Location, publications, training history
- Answer questions, create hypotheses, and test them
- Techniques help you answer questions but they have a shelf life

How do you evaluate your project, your progress, and your decisions?
- Are you still asking interesting questions?
- Are your experiments designed to confirm your hypotheses or to test them?
- If you don’t get regular advice/evaluation, seek it out
- Give seminars/journal clubs/arrange student group meetings
- If you hate public speaking do it more
- If you hate writing do it more
- Apply for your own independent funding regardless of whether your PI has funds.

What do you do if you’ve made a mistake and how do you know if you’ve made a mistake?
- Research is hard, but it’s not impossible. Sometimes you have to change projects and sometimes labs
- When data are inconsistent with your hypothesis – your hypothesis might be wrong (the likelihood that your hypothesis is correct bears not relationship to the intensity with which you desire it to be correct)
- What do you do if you make a mistake in the lab?

Critical thinking
- What is it?
- Do you need it?
- How do you learn it?

How do you evaluate others?
- Always constructively
- Tell them what you think not what you think they want to hear

Resources:
“Advice to a Young Scientist” B.P. Medawar
Mole’s columns in Journal of Cell Science
Objectives and overall goals
At the end of this module I hope you will have an appreciation of how to select a strong thesis topic, how to evaluate your progress, and how to get and give advice. You will also learn how to critique your own work and that of others.

Specifically
1. You should have a better understanding of what distinguishes a strong from a weak thesis topic. Are you asking important questions or are you focused on a technique?
2. You will understand the importance of self evaluation and who to go to for outside assessment. Are you thinking critically about your work and your results or are you focused on completing a list of experiments? Can you take constructive criticism?
3. You will understand the meaning and value of scientific criticism. Do you know how to critically evaluate results and data on the one hand and discussion on the other? Can you give constructive criticism?

Success in research requires certain skill sets that are prescribed while others are illusive and ill-defined. It is these ill-defined “you know it when you see it” skills that we will discuss in this module. Think of the adjectives that we’ve all hear to describe the “ideal” graduate student:

- Self critical
- Critical thinker
- Independent starter
- Low maintenance
- Sharp/on the ball
- Committed/enthusiastic

Some features are part of our personality but others can be acquired, we’ll discuss how.

Tools
We’ll read some of my favorite science writers, we’ll design an “ideal” grad student and a student “from hell”, we’ll review lab scenarios and discuss how to recognize problems as well as where to go for help, and we’ll discuss how to provide constructive criticism. There will be a web site where students can access readings and find useful links.

Exercises/assessments
- In class discussion.
- Brief assignments
- Critical review/evaluation of a manuscript