

BIL 151: Mechanisms of Mitosis

Creating an Effective Scientific Presentation

It's not enough to be a good scientist. You also must be a good communicator. Brilliant research is of little use if you can't effectively explain your findings to colleagues. Your job is to create a streamlined, effective presentation, worthy of a professional symposium. Your colleagues/classmates should be able to critique your work and help you to improve your next scientific endeavor. Papers published in scientific journals usually include

- **Title**
- **Abstract**
- **Introduction**
- **Methods**
- **Discussion**
- **Literature cited**

With some modifications, these same sections can be used in a Power Point presentation. Be creative, but heed the advice here if you wish to create a truly professional presentation.

At the in-class symposium, each team will have 10-15 minutes to give a PowerPoint presentation and about five minutes for questions afterwards. Every member of the team should present part of the slide show, to get public speaking experience.

Before you start working on your presentation, have a look at the two rubrics (one for students, one for instructors) linked to the online syllabus to get an idea of how your work will be judged.

I. Infrastructure: The Style

Remember: your research, not your PowerPoint, is the star of the show. Use your PowerPoint to teach others what you have learned, not distract them from your message.

One of the most common errors seen in PowerPoint presentations is an overuse of special effects, sounds, animations, and other distracting "gadgets." Although they may be cute, such things can become tiresome and even annoying if not used judiciously.

Don't give PowerPoint center stage. This is the biggest mistake I see speakers make. They forget that PowerPoint is a tool designed to augment their presentation, not *be* their presentation. You are the presenter. You are the focus. Not your slides. Not your props. And not your handouts. You are in the lead role and you need to retain that role. No amount of "razzle dazzle" can overcome a weak presentation. If you don't do your job, PowerPoint can't save you. It only makes a bad presentation worse.

**-- Michael Hyatt,
Author of *Working Smart***

A. Slide Style

Constantly changing backgrounds that have nothing to do with the show's content distracts from your information. Use a simple professional-looking template slides, a single font, and a constant color scheme. In short:

- **Choose a single background, and stick with it.**
- **Choose a single font and stick with it.**
- **Choose a single color scheme and stick with it.**
- **Text and background should contrast strongly**
 - **Test backgrounds of different *brightness* and *saturation***
 - **Show colleagues and ask what works best.**
 - **Dark text on a light background is the easiest to read.**
 - **Images or patterned backgrounds tend to reduce readability.**
 - **Keep decorative elements to the borders, not the slide field.**

It's fine to modify the text format of individual slides, using bulleted lists, images, text with images, etc. But keep the infrastructure of your presentation constant so that when you have something important to say, it doesn't get lost in the "noise."

B. Slide Format

The idea is to inform, not confuse. Both text and images should be large enough to read, but not so large as to give the impression that you're yelling.

- **Keep the format as simple as possible.**
- **Do not use too many words on a single slide!**
- **Use key words and simple phrases.**
- **Exclude all but the most essential information.**
- **Empty space on a slide is okay: it enhances readability.**
- **Don't use ALL CAPITALS.**
- **Don't use Title Capitalization if it's not a title.**
 - **Wrong: MITOSIS IS INHIBITED BY TRIFLURALIN.**
 - **Wrong: Mitosis is Inhibited by Trifluralin.**
 - **Right: Mitosis is inhibited by trifluralin.**
- **Limit punctuation.**
- **Use bullets and phrases that quickly convey your ideas.**

C. Special Effects

Avoid using sound, flashy animations, text fly-ins, or "cute" effects.

These may seem grand at first, but they get old quickly, only to become distracting and annoying. Humor is fine, but don't stray so far afield that your presentation seems more fit for an elementary school than a college classroom. Treat your colleagues with respect by creating a professional presentation that is meaningful, not filled with trite, extraneous material.

Special effects can be informative and provide emphasis, if used properly. Use good judgment, and make sure they are related to your subject.

D. Images

High-quality, high-resolution images complement your work.

For figures and tables, **.jpg images** work well.

For photographs, **.png images** offer greater clarity and versatility in layering and other effects.

E. Presentation Style

Familiarize yourself with PowerPoint navigation.

You probably have used Power Point (or similar software) before, and it's likely that you'll use it again. Learn to move forward or back without having to pass through every slide. Practice! In many cases, audiences will ask a presenter to return to a particular slide during the question-and-answer period. Be able to swiftly access the slides in question, and you will convey a professional, competent impression.

- **Limit the number of slides.** A good rule of thumb is one slide per minute.
- **Rehearse** with someone other than your teammates, and preferably someone who has not seen your presentation. Ask for honest feedback about colors, content, and overall efficacy of the presentation.
- **Don't read from your slides.** Your slides are there for the audience, not you. You should already know what's there, and be able to speak extemporaneously about your slide topic.
- **Don't speak to your slides.** One of the most common mistakes Power Point presenters make is to face the screen as they deliver a presentation. Few things make as bad an impression. Not only can your audience not see your face, but they usually will not be able to hear you.
- **Don't apologize** for anything in your presentation. If a slide is hard to read or understand, *then don't use it.*

If you are not running the presentation from your own computer, download it to the projection computer's **desktop**. It will run much faster than if you try to run it from a CD (how retro!) or external drive.

II. Presentation: The Content

Remember that you are presenting the results of your scientific investigation, not a corporate speech, nor entertainment. Follow the format generally used in scientific publications, with a few minor modifications.

A. Title

When you eventually publish your work, more people will read the title of your paper than any other part of the work. In fact, your title can determine whether the rest of your paper will be read at all! So use it to describe *specifically* the content of your paper, as well as your findings. Here's what we mean.

Inappropriate title: "The effect trifluralin on mitosis in onion root cells."

Appropriate title: "Trifluralin inhibits mitosis at metaphase in onion root cells."

Under the title, list the names of all authors, as well as the institutional affiliation of each. (Yours is the University of Miami Department of Biology.)

B. Abstract

Power Point and poster presentations in scientific meetings rarely include an abstract. However, an abstract is a crucial part of any scientific paper submitted for publication in a journal. For this reason, we include it here.

The purpose of an abstract is to allow a reader to determine, with a very quick scan, what your research is about, how you did it and what you discovered. Although the abstract appears *first*, it is written *last*. It is generally a brief paragraph, offset from the text of a published paper, in which the investigators give a skeletal outline of the purpose (one sentence), methods, (one to two sentences), results (one to four sentences) and conclusions (one to two sentences) of their research.

C. Introduction

This section should give the *specific* background of your experiment. Include such things as

- **What is your model organism, and why have you chosen it?**
- **What is the function of mitosis?**
- **Why is it important/relevant to study the effects of various substances on mitosis?**
- **What question did your team ask about mitosis?**
- **What variable did you choose to manipulate, and why?**
- **What is your overall hypothesis**
- **What are your predictions, and why?**

When making a statement that is not common knowledge, always cite the source of your information. **Do not include any methods, data, or conclusions in this section.**

D. Methods

The methods section should allow an interested observer to duplicate your experiment and try to reproduce your results. **Photographs of your set up are very helpful in this section.**

- **State your null and alternative hypotheses.**
- **Describe what you are testing**
- **How is your treatment group different from your control group?**
- **Describe all materials and procedures used.**
- **Include reagents, temperatures, pH, other relevant information.**
- **Don't get carried away with detail:**
 - **It is important that you used a 0.xx Molar solution of trifluralin**
 - **It is *not* important that you used a #2 pencil to record your data in a spiral notebook on a slate table in a spacious laboratory.**

Tell the audience which the statistical test(s) you will use to analyze your data, but...
Do not include any data or conclusions in this section.

E. Results

Present your results as concisely as possible. Your audience should be able to understand your data from the slides alone, even without your narrative. Figures and tables must be in large font, clear, and easy to decipher.

Do not include raw data! Start with your *analyzed* data, and end with your statistical analysis. Figures and Tables should be simple, high resolution and easy to read.

- **Label axes appropriately**
- **Include a brief legend with each Figure and Table**
 - **Table legend should always be *above* the image. (“table top”)**
 - **Figure legend should always be *below* the image.**

DO NOT explain how to perform the Mann-Whitney U test.

Assume your audience is composed of educated colleagues.

DO report your statistical results, including

- **Sample size of treatment and control groups**
- **the value of your statistic (Mann Whitney U)**
- **P value associated with your statistic**
- **Whether you reject or fail to reject your null hypothesis**

Report exactly what happened in your experiment, even if it is not what you expected. You will have ample opportunity to explain deviations from the expected in the next section.

F. Discussion

The discussion should be an *analysis and explanation* of your results, not merely be a re-statement of your results. This is arguably the most important section of your presentation. Follow these simple guidelines.

- **Re-state your overall hypothesis.**
- **Briefly re-state your research results in one or two sentences.**
- **Connect your results to your overall hypotheses.**
- **Why did you reject or fail to reject your null hypothesis?**
- **Explain your experimental observations in specific terms.**
- **Describe what has happened in terms of the mechanisms of mitosis and how your chosen reagent affected those mechanisms.**
- **The world will not stop turning if your results are not what you expected.**
 - **DO logically explain your observations.**
 - **DO NOT try to twist your observations to fit any preconceived notions of what you “should” have seen.**

- **Remember: Human error is NOT the same as experimental error. DO NOT INCLUDE HUMAN ERROR AS A REASONABLE EXPLANATION OF YOUR RESULTS.**
- **What is the importance of your work to the greater study of this area?**
- **Give an overall summary statement.**

G. Acknowledgements

Scientific research is not done in a vacuum. If you would like to thank particular persons or entities for any assistance given during the design of your experiment, its execution, or the preparation of your presentation, then an acknowledgement slide at the end of the show is a nice way to show your appreciation.

- **Thank appropriate persons or agencies who aided your research.**
- **Thank the audience for their attention.**

H. Questions and Answers

At the end of your presentation, open the floor to questions, and be ready to answer. Prepare yourself by reading all text references about mitosis, and also know all relevant information about your specific experimental variable and how it might specifically affect mitosis.

If you are in the audience, be an active participant in the question-and-answer period. Constructive criticism can help make future experiments more informative.