

# Writing and presenting a research talk or poster

1. Message: what essential message do you want to convey?
2. Organization: logical, clear structure
3. Style: Simple, effective, attractive slides or poster figures
4. Talks: Speaking style, clarity
5. Posters: Presentation strategy

Why? You want people to UNDERSTAND your work, BE INTERESTED in your work, and RESPECT you as a young scientist

# Writing and presenting a research talk or poster

“Surveys show that the #1 fear of Americans is public speaking. #2 is death. Death is #2. That means that at a funeral, the average American would rather be in the casket than doing the eulogy.”

--Jerry Seinfeld



Sources: <http://www.glossophobia.com/>  
<http://www.irp.drugabuse.gov/PDFs/Scientific%20Talk-Heishman%20Dec2013.pdf>  
Picture courtesy of [http://media.salon.com/2012/08/seinfeld\\_rect.jpg](http://media.salon.com/2012/08/seinfeld_rect.jpg)

1. What is the essential message you want to convey?

Decide the essential scientific question that your thesis addresses.

State it in one sentence.

Now state it again with the absolute minimum jargon.

This is your title, and is the main point you will show convincingly in your talk or poster.

## 2. Organization

1. Title, authors, affiliation
2. Introduction – general area, specific question, and why your question is important
3. Goal of your honors thesis
4. Methods – equipment, technique, not detailed
5. Results – experimental design, observations, measurements, tables, figures
6. Conclusions – Could you answer your main question? Implications of your work for overall function of cells, organs, or organisms
7. Acknowledgements

# Overall organization of a poster

## Dynamics of Assembly of SNARE Complex in Hippocampal Presynaptic Terminals

I. Hafez<sup>1,2</sup>, E.R. Chapman<sup>3</sup>, and R.S. Zucker<sup>1,2</sup>

380.11

1. Molecular and Cell Biology Department, 2. Helen Wills Neuroscience Institute, University of California Berkeley, CA, USA. 3. HHMI, Physiology Department, University of Wisconsin, Madison, WI, USA

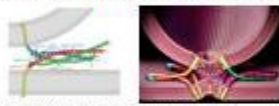
### 1. Introduction

Exocytosis is essential for chemical synaptic transmission



Exocytosis describes fusion of intracellular vesicles with the plasma membrane

Assembly of the SNARE complex is a key step in synaptic vesicle exocytosis



The neuronal SNARE complex is made from a 1:1:1 ratio of SNAP-25B, Syntaxin-1A, and VAMP-2.

### 2. Objective

Direct measurement of the spatio-temporal dynamics of the SNARE complex in neurons

Questions:

- 1) Are SNARE complexes assembled in nerve terminals prior to action potential firing and admittance of calcium?
- 2) Do conformational changes occur in the SNARE complex during/after membrane fusion?
- 3) Can the cycle of SNARE complex assembly and disassembly be directly measured in a dynamic way (assembly - docking, priming, fusion/exocytosis and disassembly - endocytosis)?

### 3. Methods: FRET Imaging

Time-lapse FRET imaging based on sensitized emission

\* 3 image frames must be applied to calculate FRET for each time-point (double method).

\* PSPF channel = mCherry - donor channel

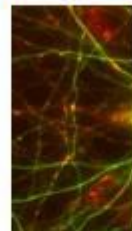
\* PSPF channel = mCherry - acceptor channel



Experimental system: "3-cube" FRET with 1-cube



### 4. GFP-SNAREs target properly in neurons



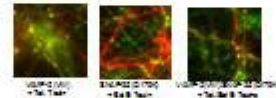
mCherry-vamp2 (red)  
mCherry-snap25 (green)

Overexpression of P25, reduced VAMP-2, but not SNAP-25, leads to a reduction in exocytosis.

### 5. mCit-SNAP-25B and mCer-VAMP-2 can function in place of endogenous proteins

Are fluorescent SNARE proteins functional? Double toxin KO and rescue assay

Toxin-insensitive GFP-SNARE proteins rescue exocytosis in cells treated with cognate toxin as judged by FM dye



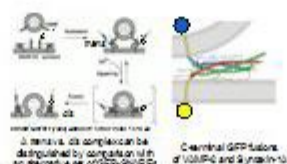
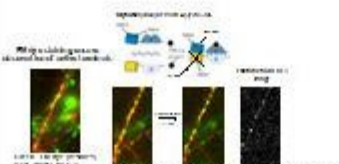
Strategy: Molecularly replace endogenous SNAP-25 and VAMP-2 with toxin-insensitive GFP-tagged SNAP-25 and VAMP-2

FM destaining is slightly slower with GFP-tagged SNARE mutants

### 6. A stable SNARE complex exists at rest

Acceptor photobleaching method of FRET measurement

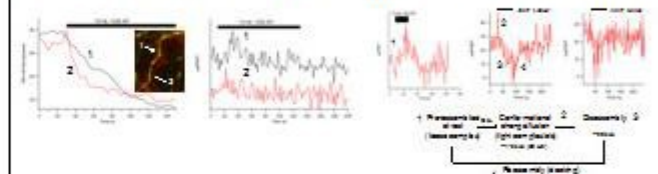
If a SNARE complex exists at rest, is it a trans or cis complex?



### 7. Time-lapse FRET reveals dynamics of complex formation

Time course of SNARE complex assembly correlates with exocytosis rate

Time-lapse FRET measurements may reveal timing of SNARE complex assembly



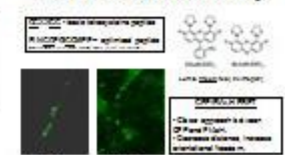
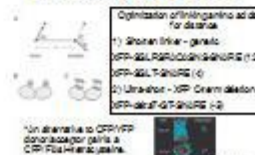
### 8. Conclusions

- A) GFP-tagged SNAP-25 and VAMP-2 can functionally replace endogenous SNARE proteins.
- B) A positive level of interaction is present in resting nerve terminals suggesting pre-assembly of the SNARE complex.
- C) Our assay reports an increase in FRET shortly after onset of stimulation which may reflect a conformational change or accumulation of assembled complex; rate of initial increase is consistent with rate of vesicle release.
- D) Timing of SNARE assembly and disassembly measured by FRET is consistent with estimates of lag between exocytosis and subsequent endocytosis.

### 9. Future technical refinements

GFP fluorophores are large and suffer from limited orientational freedom

Tetrasaccharide motif appended to VAMP-2 and SNAP-25 reduces with FRET-ED<sub>2</sub>



### 10. Acknowledgements

1. Funding from NSF grant 032568 and NIH grant 048016.
2. Jihong Bai for preparing initial constructs and helpful discussions.
3. Kevin Storer who started this project.

# A talk/poster is not a research paper

A research report includes:

- A *comprehensive* introduction
- Necessary *background* and *prior results*
- Methodological details *sufficient for repetition*
- Full presentation of *all* results
- Details of *all control* experiments
- *Exhaustive* discussion of
  - Limitations
  - Implications
  - Applications
  - Conclusions

A poster or talk has none of these *at this level of detail!*  
Rather, it is a summary of key points and findings.

### 3. Simple, effective, attractive graphics

Each slide or poster panel has a title that states the general scientific question, topic, or conclusion.

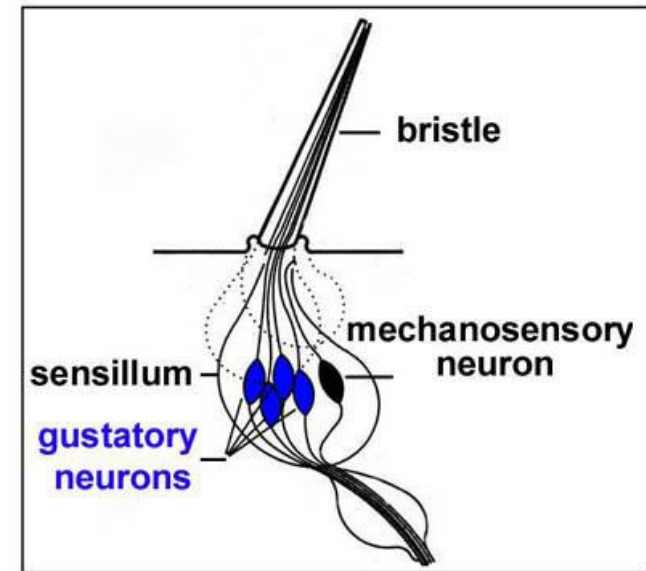
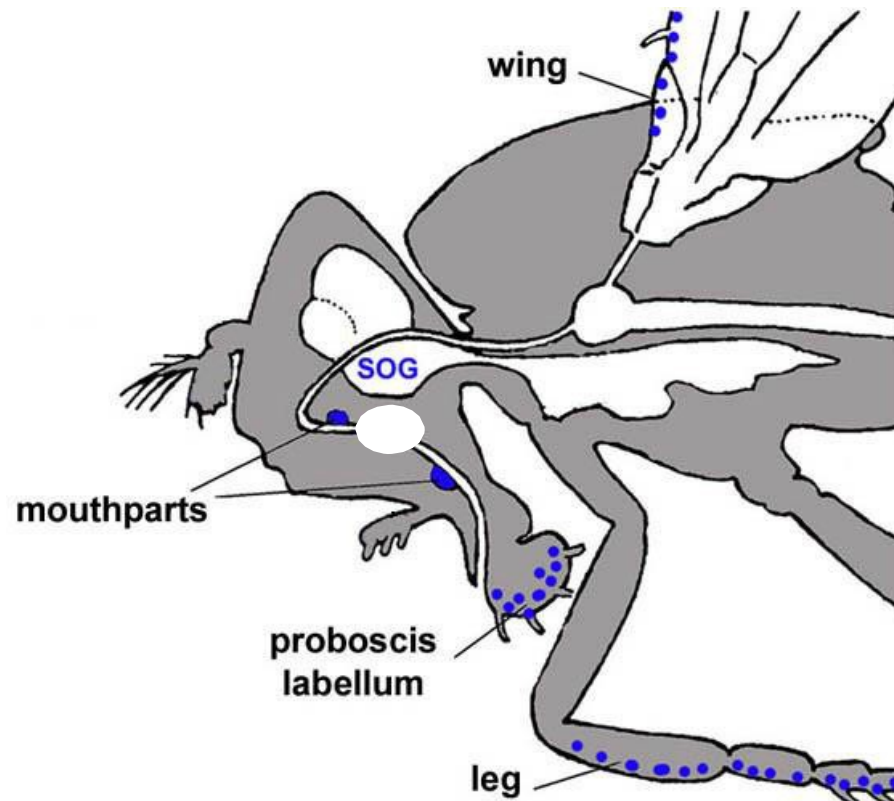
Easy-to-read figures. Delete unessential elements. Label important elements.

Maximize the information-to-ink ratio on all figures.

Relatively little text, that should be simple, well-defined, jargon-free.

Keep it simple and to the point. Do not get hung up on details. It's not a publication.

# Taste in the Peripheral Nervous System



Stocker, 1994

*Include proper attributions for borrowed graphics*



# What is Itch?



“The One With Chicken Pox”

An unpleasant sensation evoking the desire to scratch

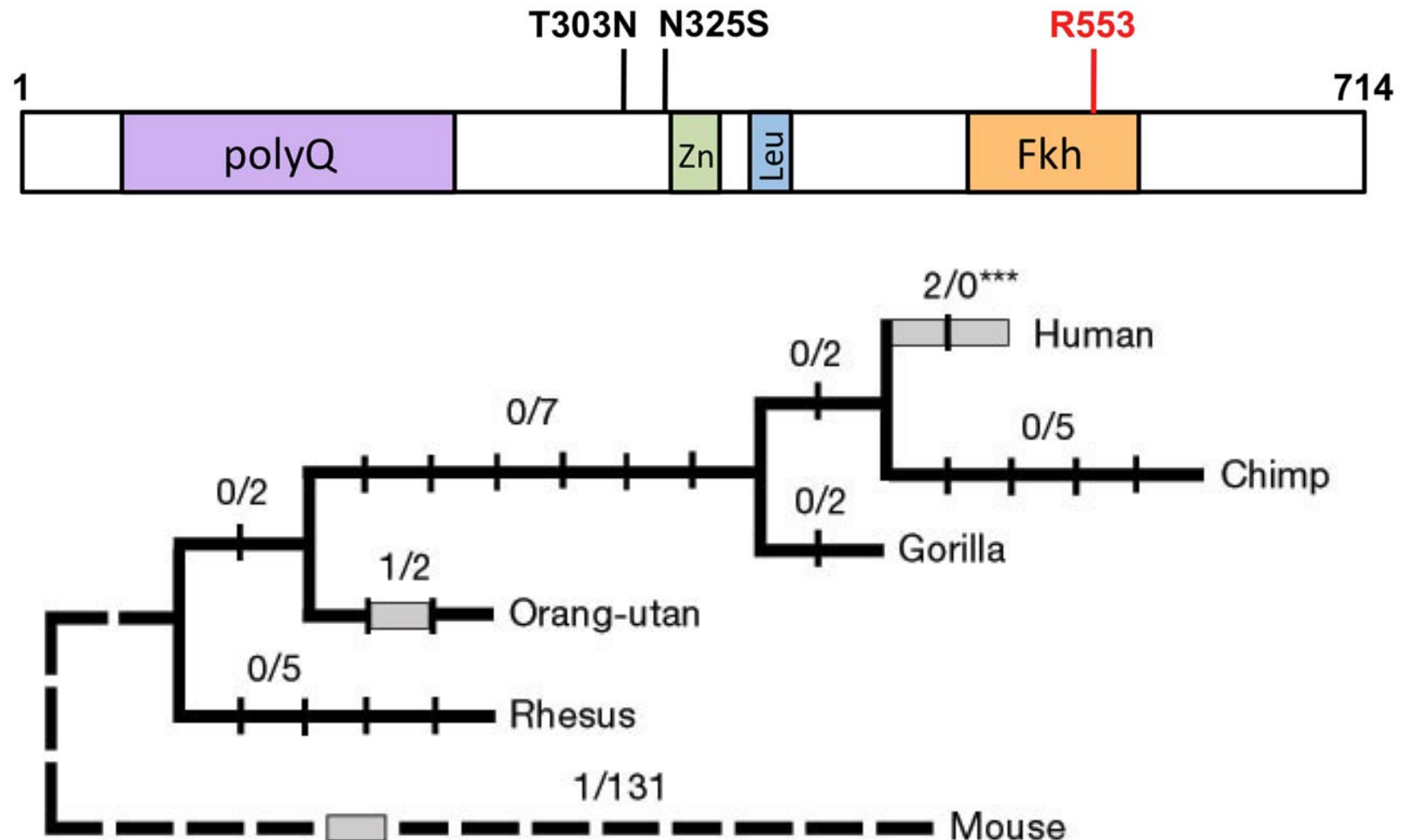
## Why study itch?

- Common symptom
- Can be debilitating in some cases

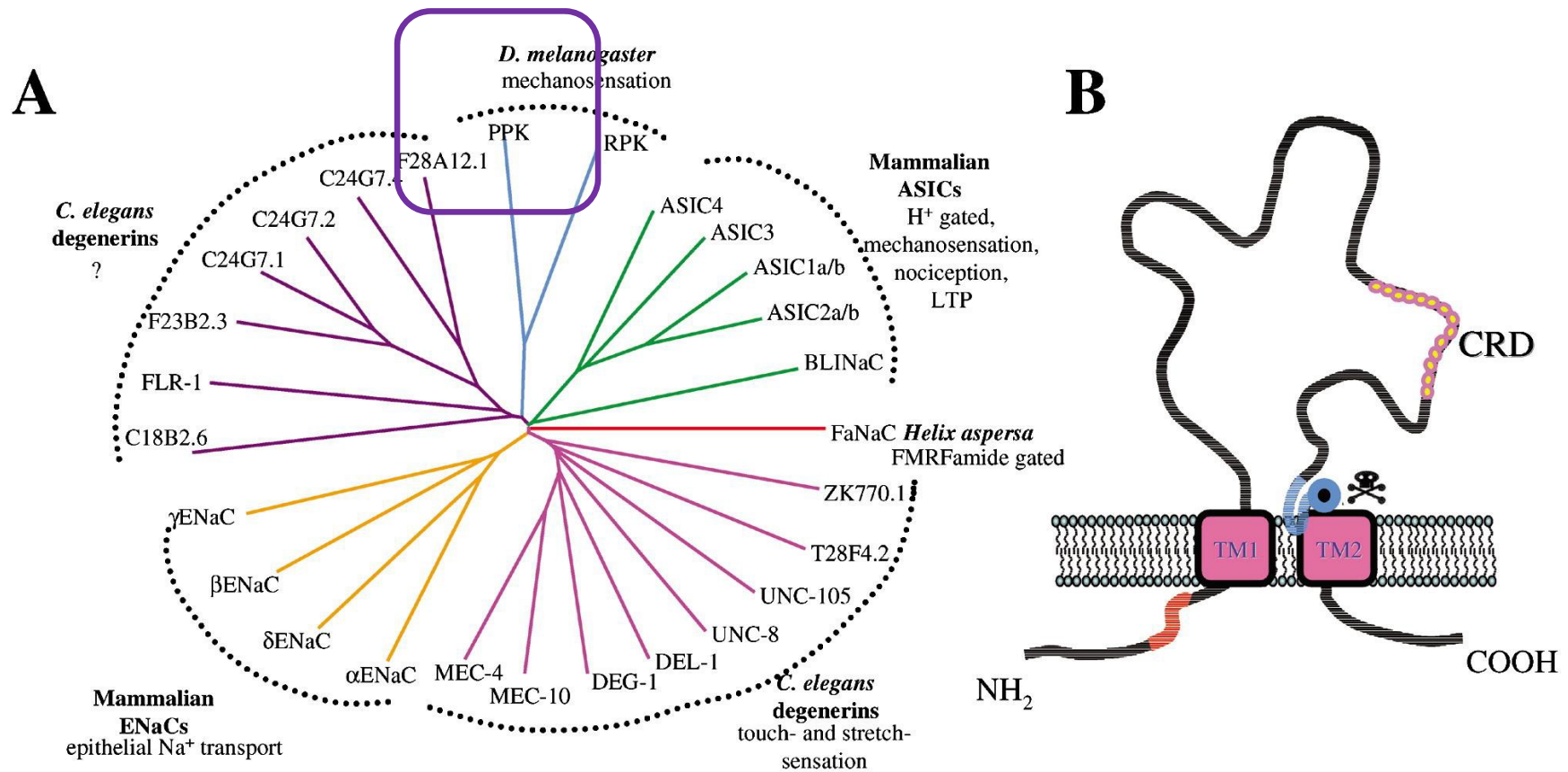
***Consider adding major points as text boxes to slides of graphs or graphics.***

# Evidence for positive selection on these amino acid changes in the human lineage

Two amino acid substitutions unique to humans



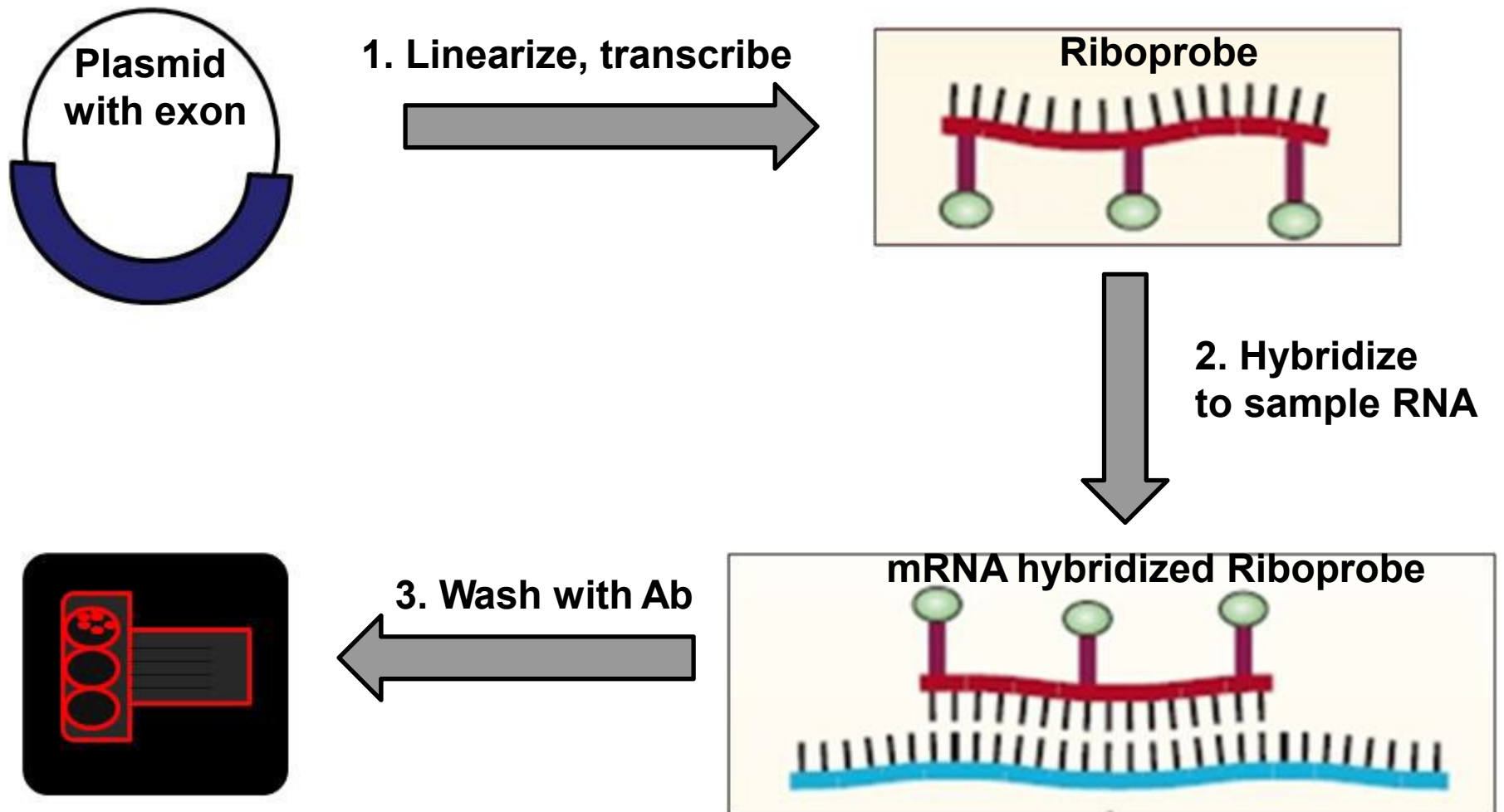
# *pickpocket* (*ppk*) is related to Epithelial Na Channels (ENaC)



Epithelial Na<sup>+</sup> Channel (ENaC) Tree

Conserved ENaC Channel

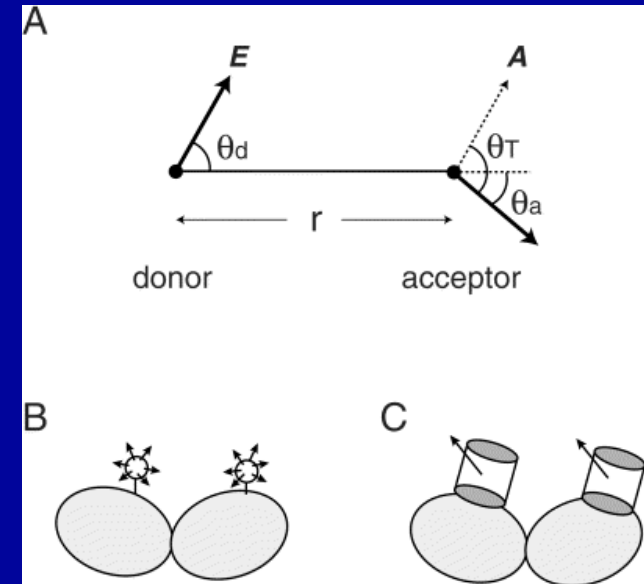
# In Situ Hybridization



# FRET - Football



CAL Football archives



Miyawaki (2003) Dev Cell 4:295.

- Pass success rate in FRET football goes with  $1/r^6$
- Orientation between donor/acceptor is crucial

***Referring to something familiar may be helpful.  
Consider using a dark background to reduce glare.***

# Goals of the project

- Determine if and when Foxp2 expression is induced during embryoid body (EB) formation. Establish whether it plays a role during early embryogenesis and cell lineage specification
- Determine the consequences of ectopic expression of Foxp2 in embryonic stem (ES) cells

# Large, readable fonts

Font Size: You are close to the screen or poster, your audience is far away. Use sans serif fonts.

## **Bad!**

Times	Courier
32 pt	32 pt
28 pt	28 pt
24 pt	24 pt
20 pt	20 pt
18 pt	18 pt
16 pt	16 pt
14 pt	14 pt
12 pt	12 pt
10 pt	10 pt

## **Good!**

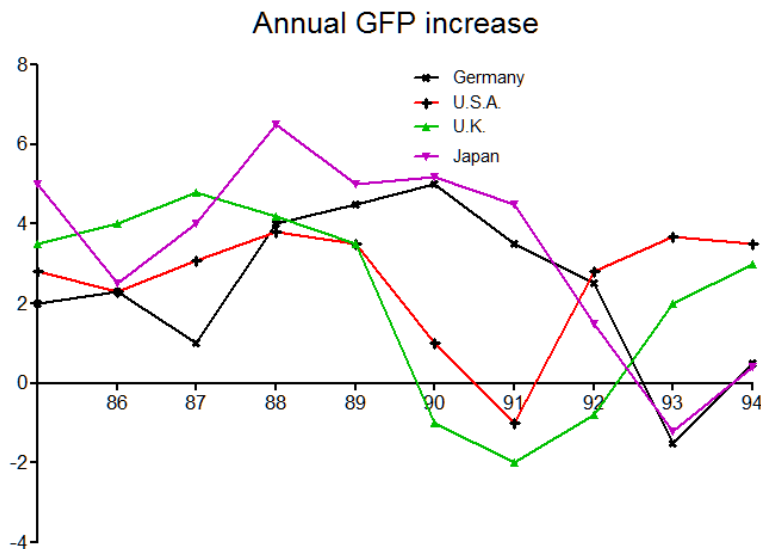
Tahoma	Comic	Lucida Sans
32 pt	32 pt	32 pt
28 pt	28 pt	28 pt
24 pt	24 pt	24 pt
20 pt	20 pt	20 pt
18 pt	18 pt	18 pt
16 pt	16 pt	16 pt
14 pt	14 pt	14 pt
12 pt	12 pt	12 pt
10 pt	10 pt	10 pt



# Easy-to-read graphics

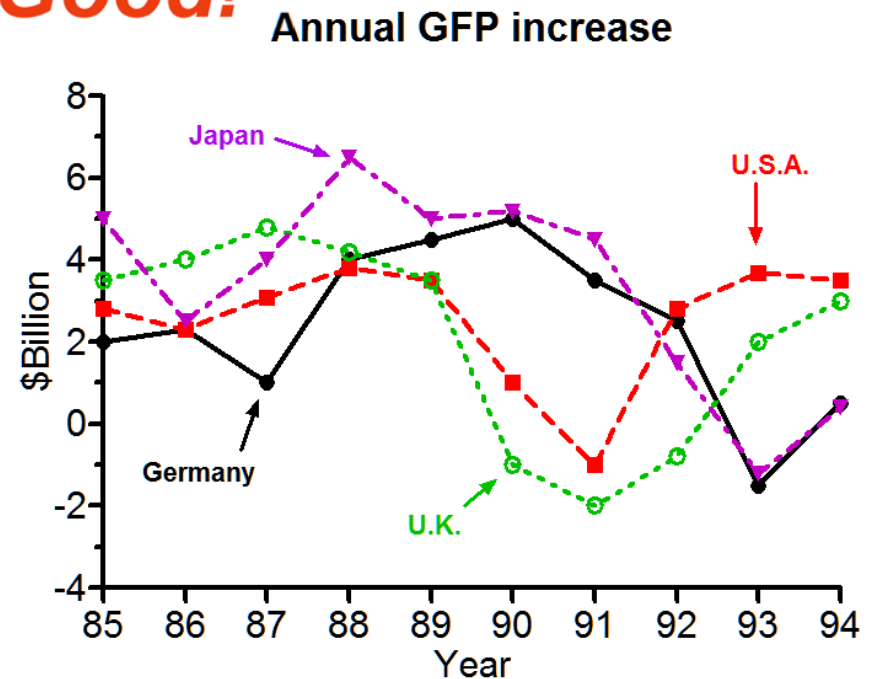
1. Make lines thicker, fonts & symbols larger.
2. Use distinct types of lines and symbols.
3. Make axis ticks visible; use appropriate minor ticks.
4. Use labels instead of legends.
5. Label the axes! Position them intelligently.

**Bad!**



*This slide uses PowerPoint's animation features.*

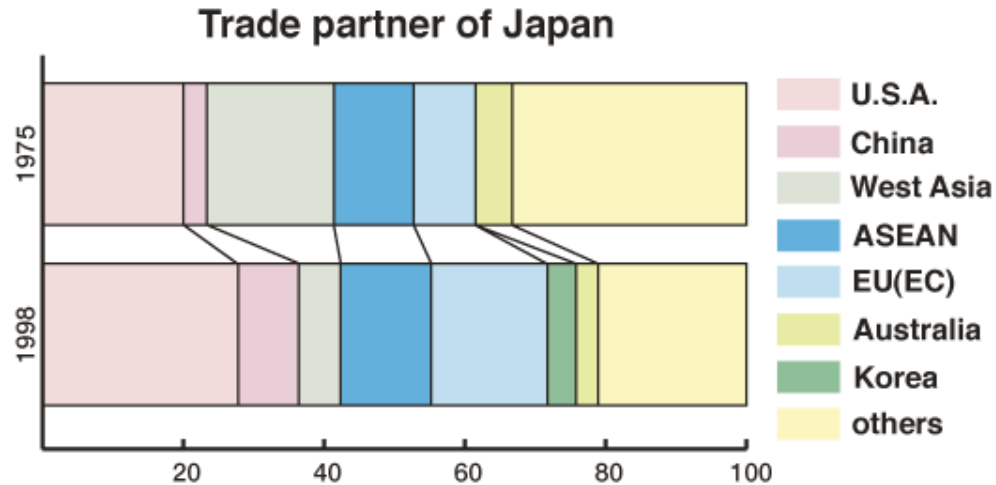
**Good!**



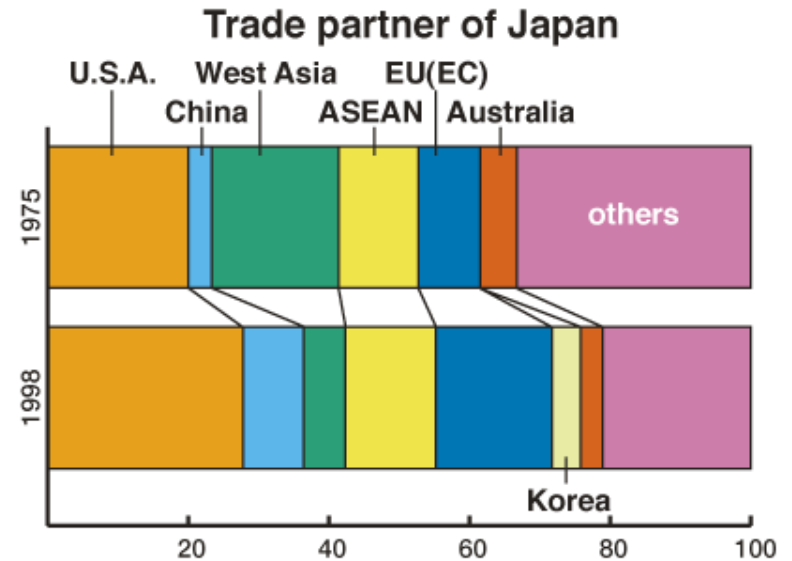


# Easy-to-read graphics

**Bad!**

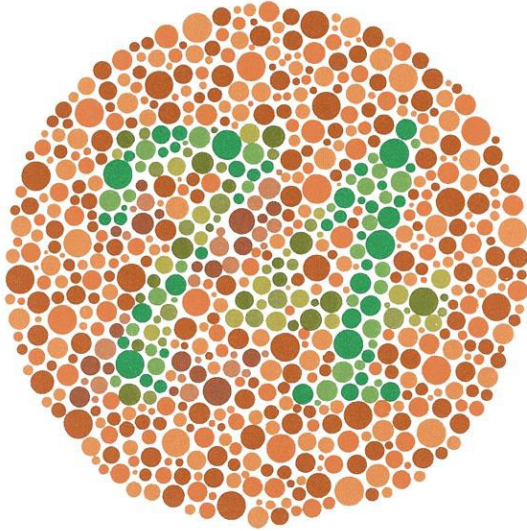


**Good!**



1. Use vivid colors with different brightnesses.
2. Avoid separate keys. Add labels within the drawings.

# Easy-to-read graphics



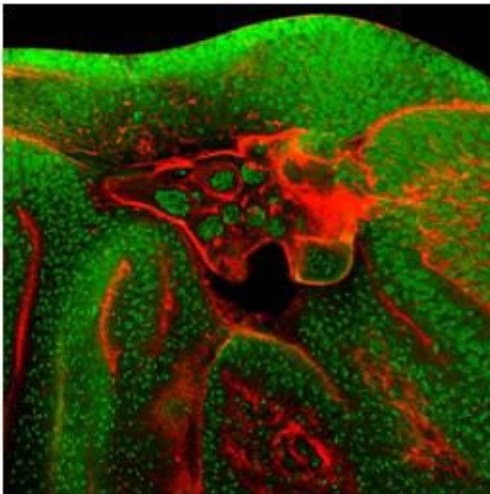
**7% of males in your audience are color blind**

Color Blind Simulator

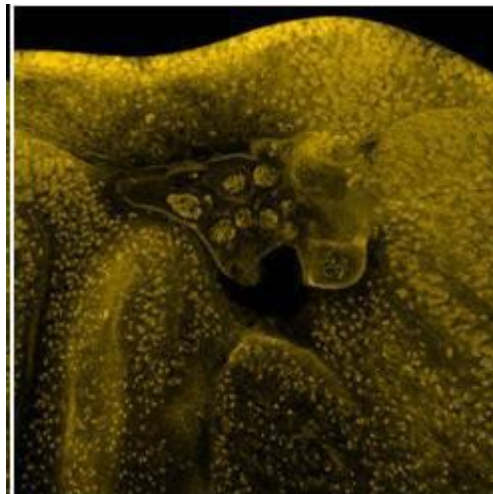
Vischeck

<http://vischeck.com/>

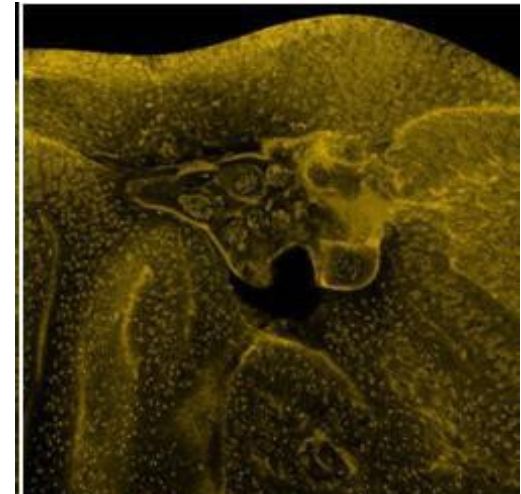
**Double-staining with red and green signals.**



**normal vision**

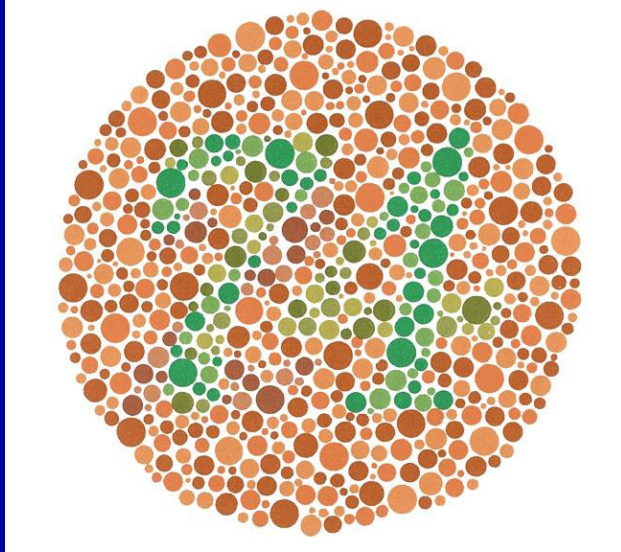


**protanope (red)**



**deuteranope (green)**

# Easy-to-read graphics

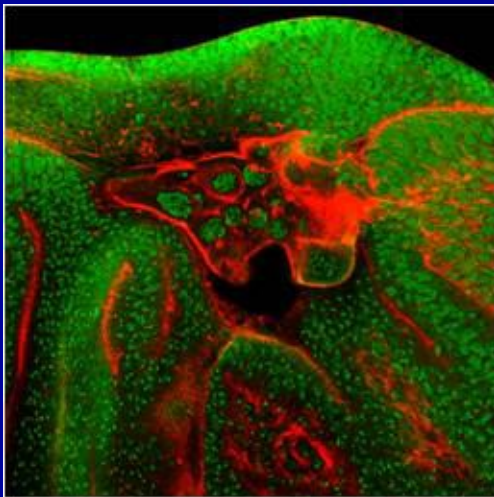


**7% of males in your audience are color blind**

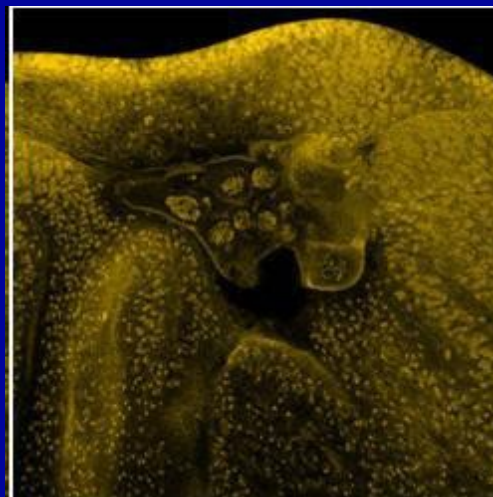
Color Blind Simulator  
Vischeck

<http://vischeck.com/>

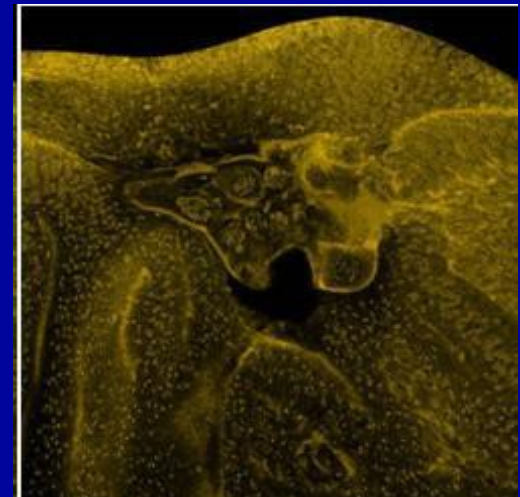
**Double-staining with red and green signals.**



**normal vision**



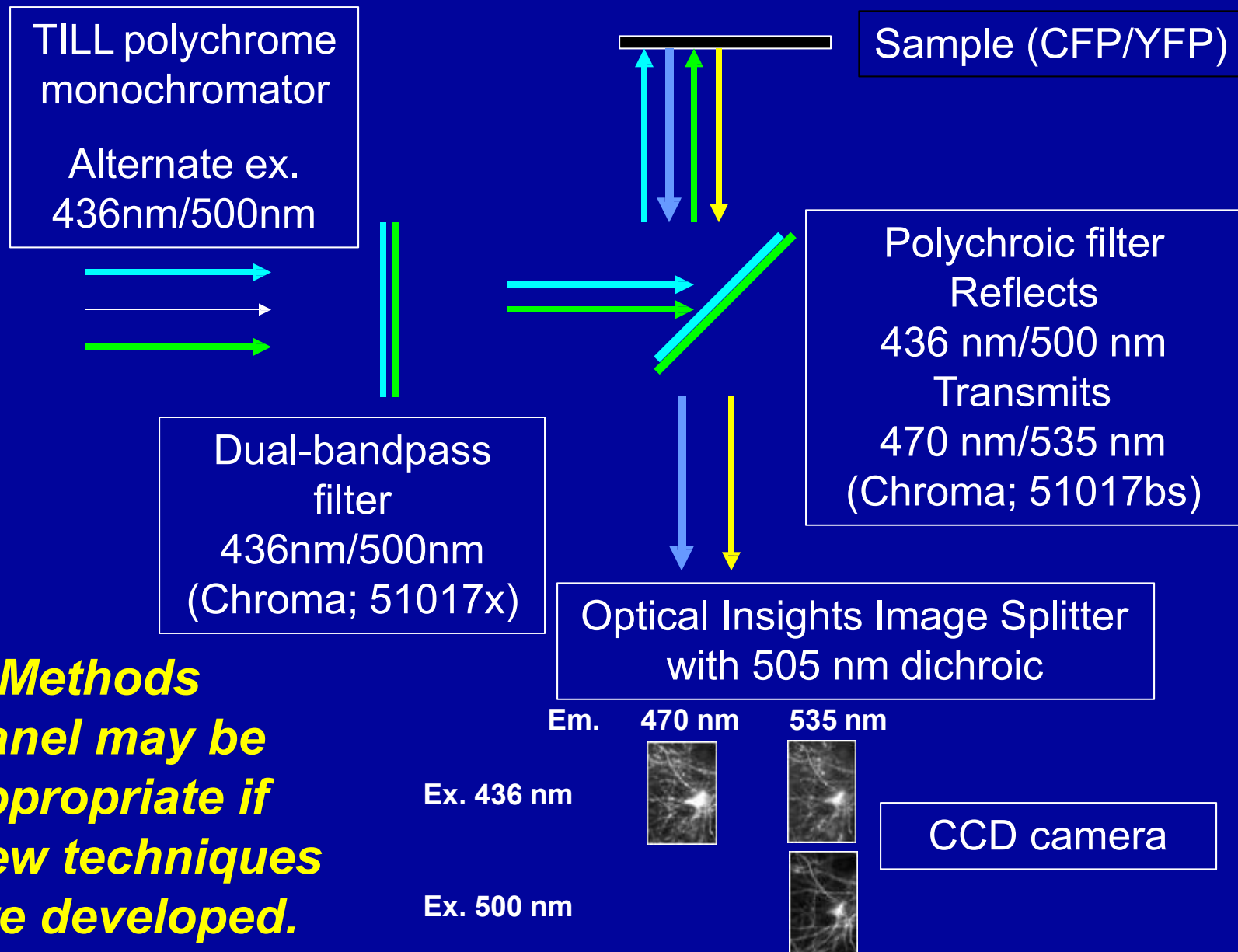
**protanope (red)**



**deuteranope (green)**

***Dark backgrounds work best for dim color images***

# “3-cube FRET” with a single cube



***A Methods panel may be appropriate if new techniques are developed.***



# Easy-to-read graphics

The two most common problems:

Too much information.

Simplify!

Avoid too much text, lists, long tables.

Jargon, unexplained terms or symbols.

Define, use plain English, or remove.

In talks, use movies and animations with care.

Make very certain they run properly.

## 4. Talks: Speaking style, clarity

Get your audience interested (show enthusiasm)

Speak clearly, concisely, & loudly (but don't shout), avoid monotone.

More than 1 slide per minute usually doesn't work.

State results in past tense.

Avoid jargon if possible, define terms if you must.

It's ok to use "I" and "we."

It's ok to say "I don't know".


Practice (the entire talk, and key ideas or transitions in your poster presentation)!

# Preparing for talks

1. Know the lecture hall: visit it before your talk.
2. Show up early, prepare in advance:
  - a) Learn how to control lights, turn on projector, lower screen.
  - b) To use board, bring your own **thick** chalk or **dark non-permanent** markers.
  - c) Bring a laser pointer or stick; if you use PowerPoint arrow, stop it from disappearing with **<ctl>h, a**.
  - d) If you use Presenter View, learn its hidden tricks, like making the mouse pointer visible by moving it offscreen
  - e) If you need to use sound, work out in advance what cable you must bring and how to connect it and adjust sound.

# Slide Show: Normal View

## Preparing for talks

1. Know the lecture hall: visit it before your talk.
2. Show up early, prepare in advance:
  - a) Learn how to control lights, turn on projector, lower screen.
  - b) To use board, bring your own **thick** chalk or **dark non-permanent** markers.
  - c) Bring a laser pointer or stick; if you use PowerPoint arrow, stop it from disappearing with **<ctl>h, a.** 
  - d) If you use Presenter View, learn its hidden tricks, like making the mouse pointer visible by moving it offscreen
  - e) If you need to use sound, work out in advance what cable you must bring and how to connect it and adjust sound.

23

**This is a screen shot of Normal View: Your computer shows what the projector shows (including the pointer).**



# Slide Show: Presenter View

The screenshot displays the PowerPoint Presenter View interface. The main window is split into two panes. The left pane shows slide 22, titled "Preparing for talks", which contains a numbered list of five items: 1. Know the lecture hall: visit it before your talk. 2. Show up early, prepare in advance: a) Learn how to control lights, turn on projector, lower screen. b) To use board, bring your own **thick** chalk or **dark non-permanent** markers. c) Bring a laser pointer or stick; if you use PowerPoint arrow, stop it from disappearing with **<ctl>h, a**. d) If you use Presenter View, learn its hidden tricks, like making the mouse pointer visible by moving it offscreen. e) If you need to use sound, work out in advance what cable you must bring and how to connect it and adjust sound. The right pane contains the text: "This slide has personal notes associated with it." Below the slide panes, a status bar shows "Slide: 22 of 28", "Time: 01:02", and "4:09 PM". At the bottom, a slide tape shows thumbnails of slides 21 through 28. The taskbar at the very bottom includes the Start button, several application icons (Internet Explorer, Firefox, etc.), and system icons on the right showing the time as 4:09 PM on 3/20/2014.

PowerPoint Presenter View - [Honors\_Talk\_Tips\_2014.pptx]

Preparing for talks

1. Know the lecture hall: visit it before your talk.
2. Show up early, prepare in advance:
  - a) Learn how to control lights, turn on projector, lower screen.
  - b) To use board, bring your own **thick** chalk or **dark non-permanent** markers.
  - c) Bring a laser pointer or stick; if you use PowerPoint arrow, stop it from disappearing with **<ctl>h, a**.
  - d) If you use Presenter View, learn its hidden tricks, like making the mouse pointer visible by moving it offscreen
  - e) If you need to use sound, work out in advance what cable you must bring and how to connect it and adjust sound.

22

Slide: 22 of 28 Time: 01:02 4:09 PM Zoom:

21 4. Title: Speaking style, clarity  
Get your audience interested (show enthusiasm)  
Speak clearly, concisely, & loudly (but don't shout), avoid monotone.  
More than 1 slide per minute usually doesn't work.  
Stories result in past tense.  
Avoid jargon if possible, define terms if you must.  
It's ok to say "I don't know".  
Practice ( rehearse talk, and lay ideas or transitions in your poster presentation)

22 Preparing for talks  
1. Know the lecture hall: visit it before your talk.  
2. Show up early, prepare in advance:  
a) Learn how to control lights, turn on projector, lower screen.  
b) To use board, bring your own **thick** chalk or **dark non-permanent** markers.  
c) Bring a laser pointer or stick; if you use PowerPoint arrow, stop it from disappearing with **<ctl>h, a**.  
d) If you use Presenter View, learn its hidden tricks, like making the mouse pointer visible by moving it offscreen.  
e) If you need to use sound, work out in advance what cable you must bring and how to connect it and adjust sound.

23 Slide Show: Normal View  
Preparing for talks  
1. Know the lecture hall: visit it before your talk.  
2. Show up early, prepare in advance:  
a) Learn how to control lights, turn on projector, lower screen.  
b) To use board, bring your own **thick** chalk or **dark non-permanent** markers.  
c) Bring a laser pointer or stick; if you use PowerPoint arrow, stop it from disappearing with **<ctl>h, a**.  
d) If you use Presenter View, learn its hidden tricks, like making the mouse pointer visible by moving it offscreen.  
e) If you need to use sound, work out in advance what cable you must bring and how to connect it and adjust sound.

24 Slide Show: Presenter View  
Preparing for talks  
1. Know the lecture hall: visit it before your talk.  
2. Show up early, prepare in advance:  
a) Learn how to control lights, turn on projector, lower screen.  
b) To use board, bring your own **thick** chalk or **dark non-permanent** markers.  
c) Bring a laser pointer or stick; if you use PowerPoint arrow, stop it from disappearing with **<ctl>h, a**.  
d) If you use Presenter View, learn its hidden tricks, like making the mouse pointer visible by moving it offscreen.  
e) If you need to use sound, work out in advance what cable you must bring and how to connect it and adjust sound.

25 5. Posters: presentation strategy  
Prepare a 5-minute and 15-minute presentation of your poster. NEVER LINGER!  
The introduction should be clear and accessible.  
Poster presentations are interactive - judge the expertise and interest of your audience and tailor your presentation to them.  
Your goal is to present the major points and conclusions, not every detail of what you've done!

26 Programs useful for graphing & analysis  
GraphPad Prism is a popular and easy to use statistical analysis, curve fitting, and graphing program. But it is only paid software (one-time purchase).  
SigmaPlot is a more powerful and sophisticated graphing, analysis, and spreadsheet program. Microsoft Excel is best for spreadsheet operations, manipulations and many functions, but statistical tools are very limited and graphing is somewhat tedious for presentation.  
And there's also MATLAB, Mathematica, SAS (statistics), ...

27 Programs useful for drawing  
CorelDraw is a popular and relatively easy to use graphics design application.  
Adobe Illustrator is more extensive and comprehensive, but also more expensive and difficult to learn.  
For presentation, it's best to use Microsoft PowerPoint. In case you have had your talk with someone's computer (carry a backup on a memory stick).

28 Thanks  
To Prof. Dan Feldman for his slides from an earlier talk on this subject.

This is a screen shot of Presenter View: The projector shows only the left pane. You also see notes and slide tape. But beware of pointer behavior! Presenter View is activatable only with projector connected!

## 5. Posters: presentation strategy

Prepare a 2-minute and 5-minute presentation of your poster; NEVER LONGER!

The introduction should be clear and accessible.

Poster presentations are interactive – judge the expertise and interest of your audience and tailor your presentation to them.

Your goal is to present the major points and conclusions, not every detail of what you've done!

# Programs useful for graphing & analysis

GraphPad's **Prism** is a popular and easy to use statistical analysis, curve fitting, and graphing program. But it can only plot Y columns vs. one X column (*really...!*)

Golden Software's **Grapher** is a more powerful and customizable graphing, analysis, and spreadsheet program

Microsoft's **Excel** is best for sophisticated spreadsheet manipulations and many functions, but statistical tests are very limited and graphing is primitive, not designed for presentation

And then there's **Matlab**, **Mathematica**, **SAS** (statistics),  
....

# Programs useful for drawing

**CorelDraw** is a popular and relatively easy to use graphics design application.

**Adobe Illustrator** is more extensive and comprehensive, but also more expensive and difficult to learn.

For presentation, it's best to use Microsoft's **PowerPoint**, in case you have to load your talk onto someone else's computer (carry a back-up on a memory stick).

# Thanks

To Prof. Dan Feldman  
for his slides from an earlier talk on this subject.