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."

Picture courtesy of http://www.paramountcomedy.es/series/seinfeld/jerry.htm

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[1,2], E.R. Chapman[3], and R.S. Zucker[1,2]

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?

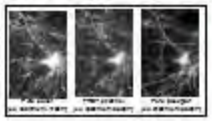
2) Do conformational changes occur in the SNARE complex during/after membrane fusion?

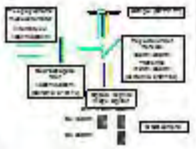
3) Can the cycle of SNARE complex assembly and disassembly be directly measured in a dynamic way (assembly - docking, priming, fusion/exocytosis and disassembly - endocytosis)?

3. Methods: FRET Imaging

Time-lapse FRET imaging based on sensitized emission

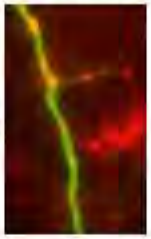
Experimental system: "3-cube" FRET with 1-cube





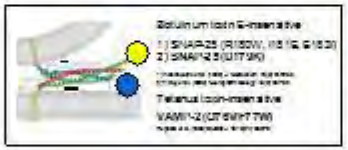
4. GFP-SNAREs target properly in neurons

mcerulean-vamp2 (red)
mcitrine-snap25 (green)



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



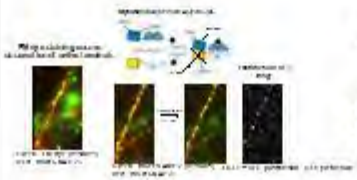
Toxin-insensitive GFP-SNARE proteins rescue exocytosis in cells treated with cognate toxin as judged by FM dye

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

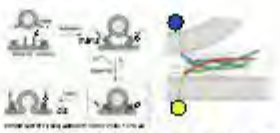
FM destaining is slightly slower with GFP-tagged SNARE mutants

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?

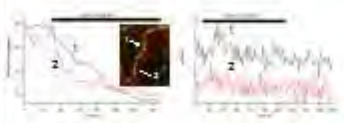


3. In vivo, cis complex can be distinguished by competition with an alternative pair of GFP-SNAREs

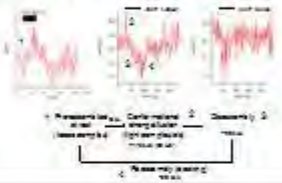
C-terminal GFP fusions of VAMP2 and Synaptobrevin-2

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.

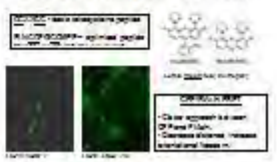
C) Our assay reports an increase in FRET shortly after onset of stimulation which may reflect a conformational change or accumulation of assembled complex; rate of initial increase is consistent with rate of vesicle release.

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

Tetracysteine motif appended to VAMP-2 and SNAP-25 reacts with FlAsH-EDT$_2$



10. Acknowledgements

1. Funding from NSF grant 0332968 and NIH grant 048016.
2. Jihong Bai for preparing initial constructs and helpful discussions.
3. Kevin Staras who started this project.

3. Simple, effective, attractive graphics

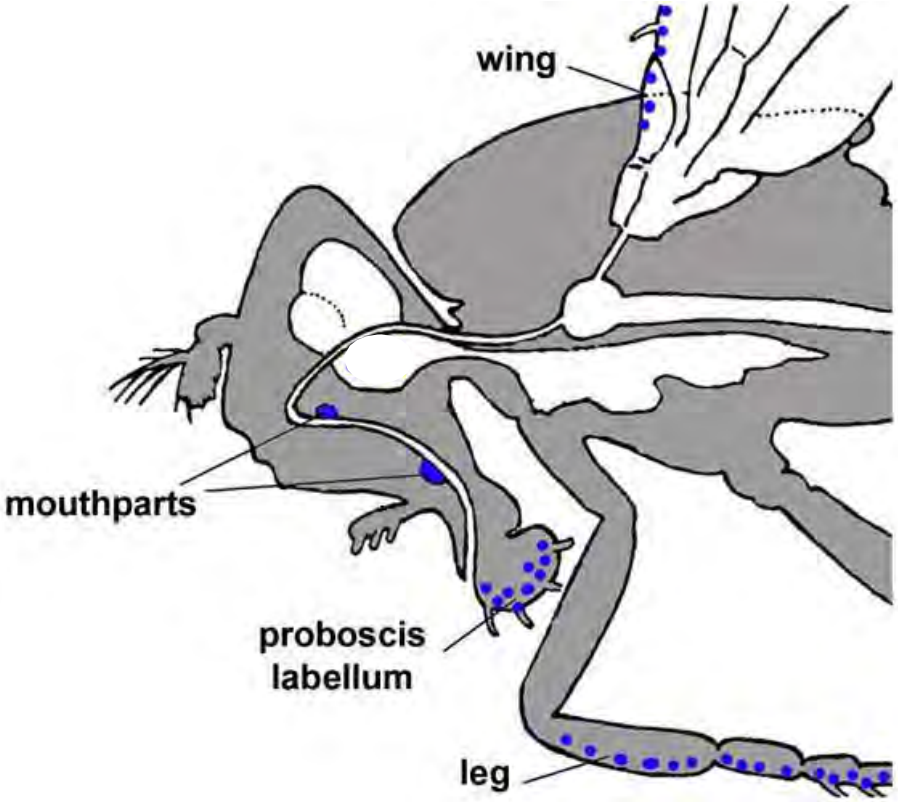
Each slide or poster panel has a title that states the general scientific question, topic, or conclusion.

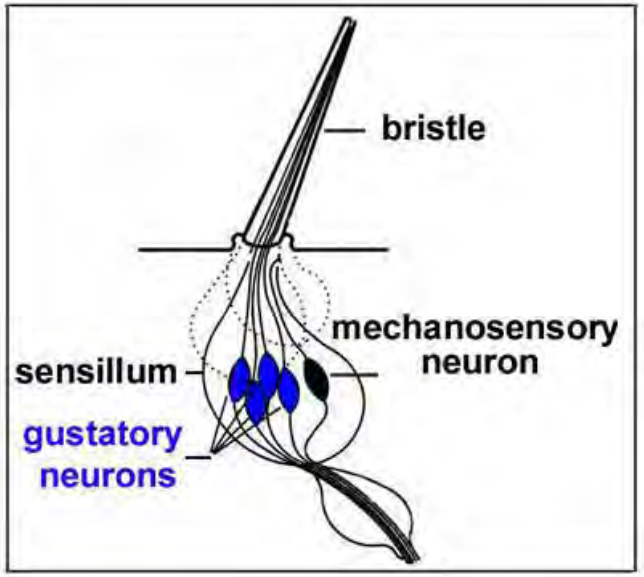
Easy-to-read figures. Delete unessential elements. Label important elements.

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

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

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

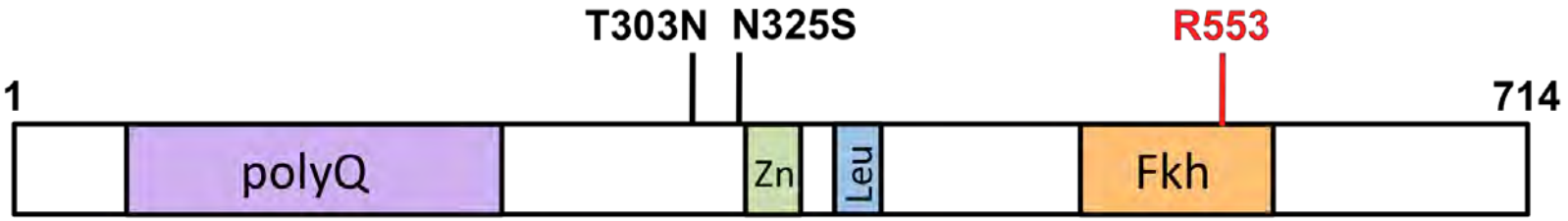
Why study itch?

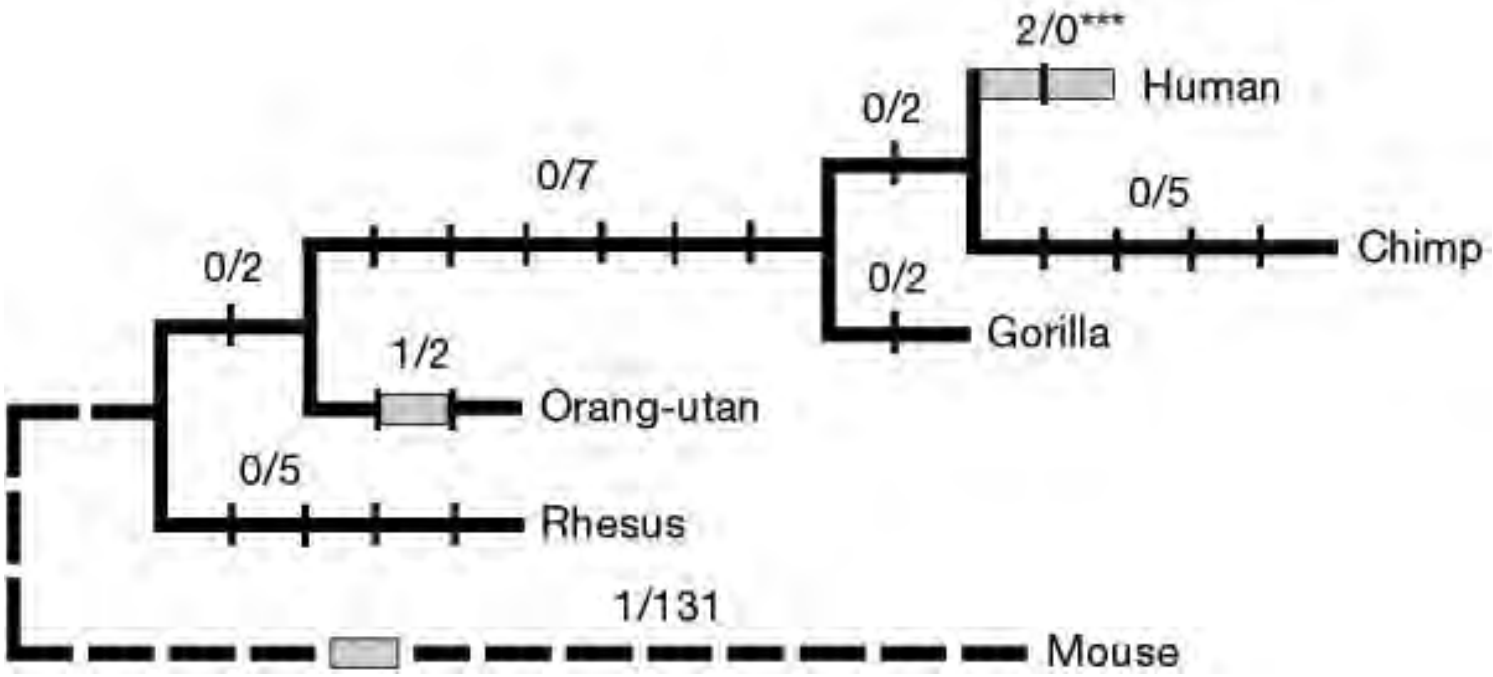
- Common symptom
- Can be debilitating in some cases

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

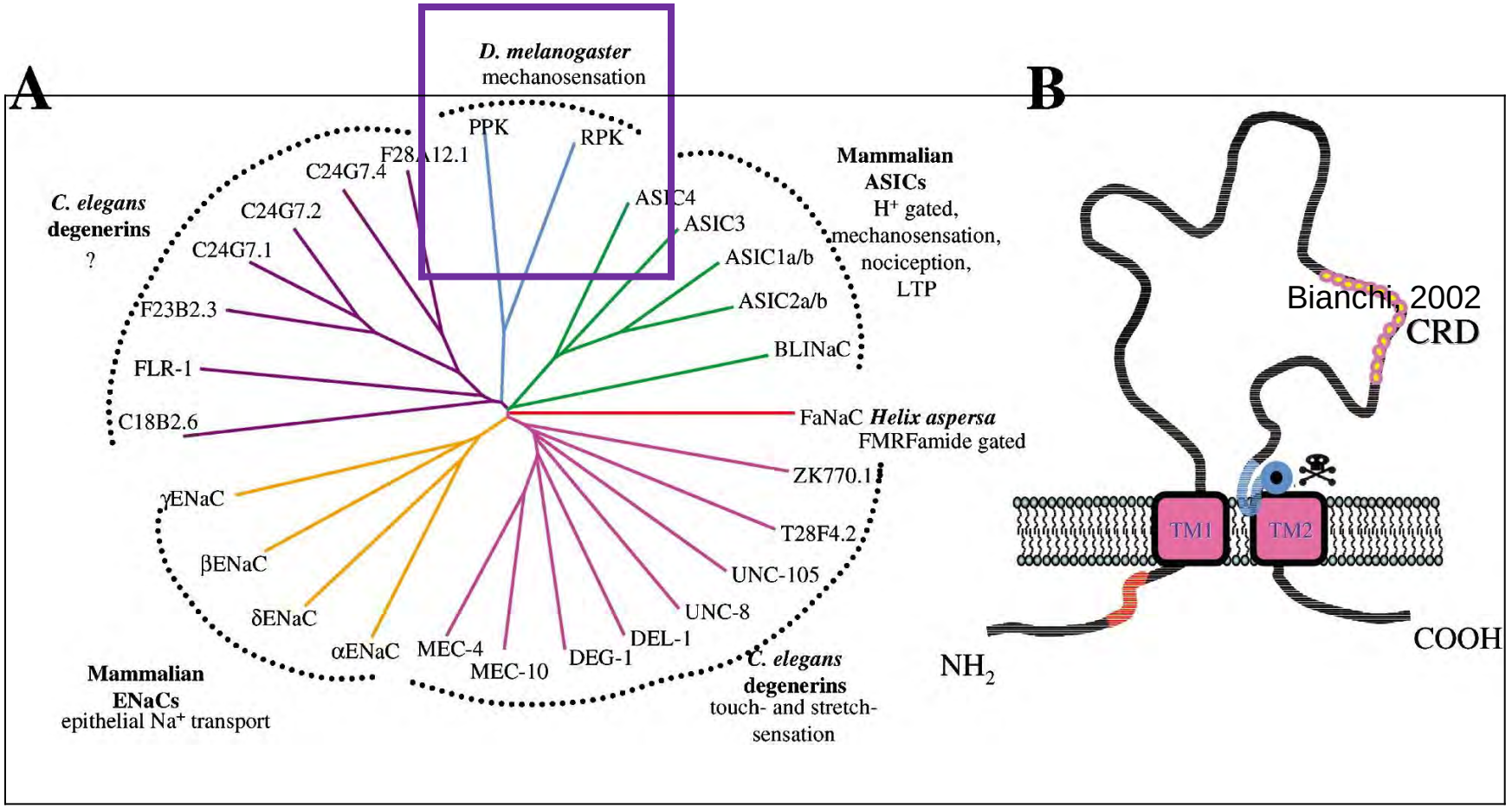
Two amino acid substitutions unique to humans





Enard et al. 2002

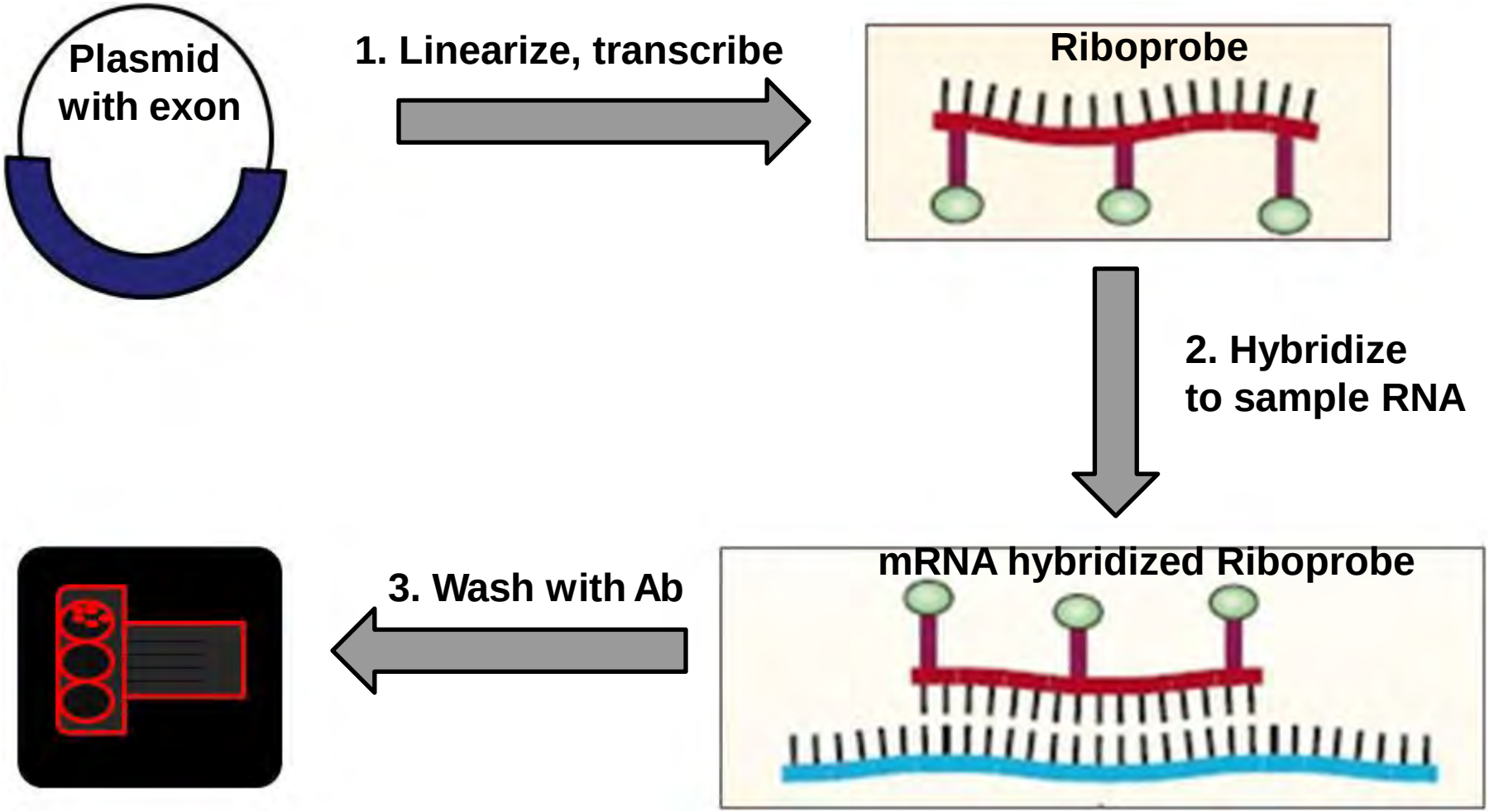
pickpocket (*ppk*) is related to Epithelial Na Channels (ENaC)



Epithelial Na^+ Channel (ENaC) Tree

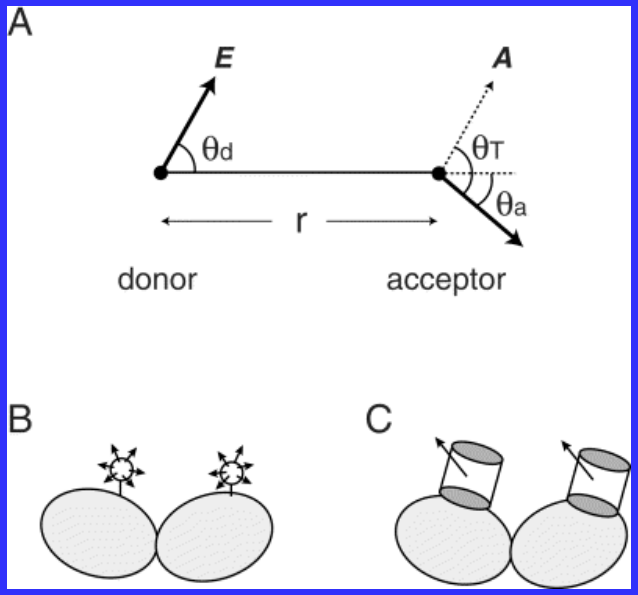
Conserved ENaC Channel

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

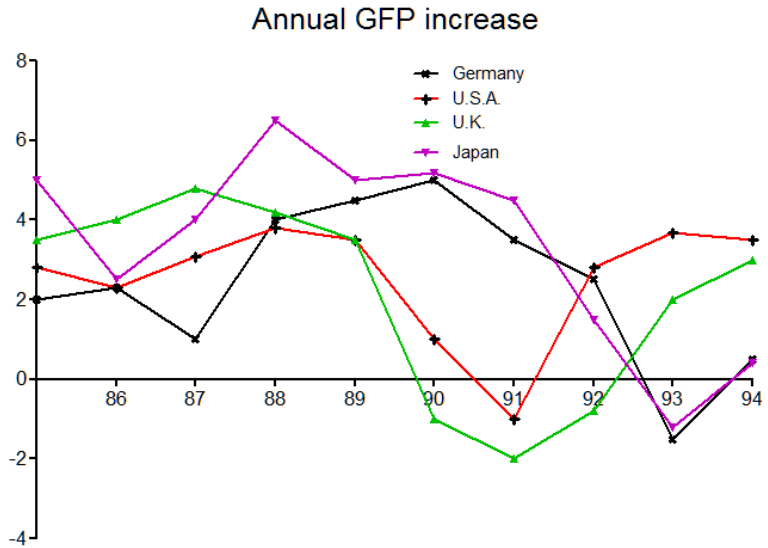
Good!

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

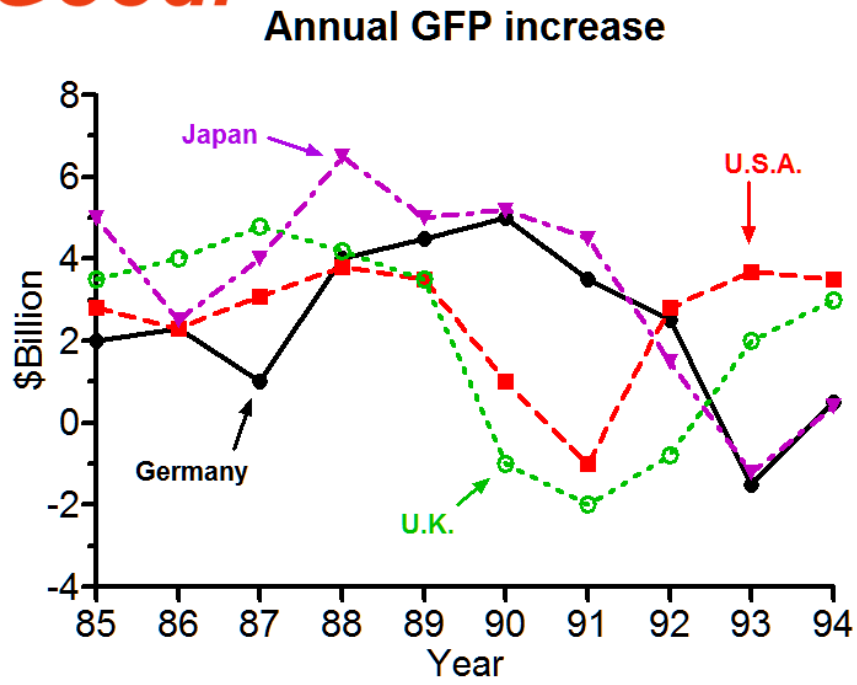
Easy-to-read graphics

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!



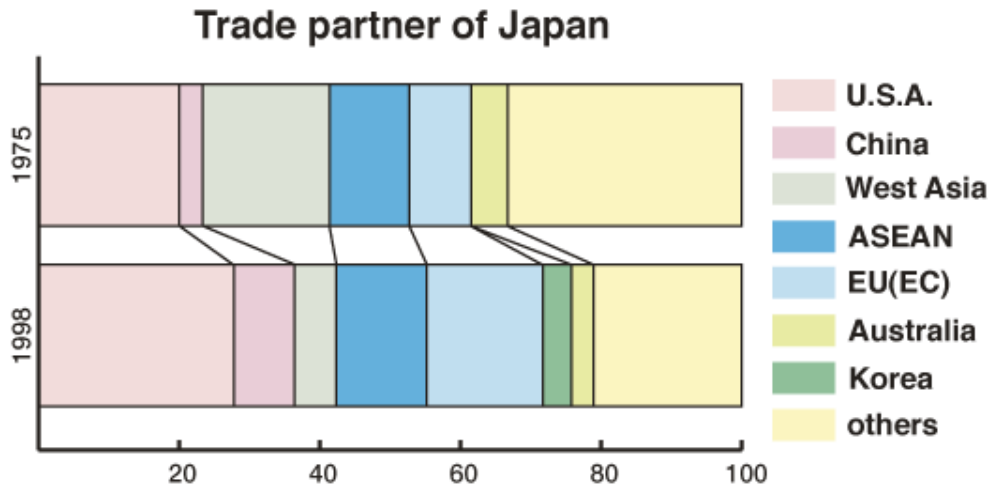
Good!



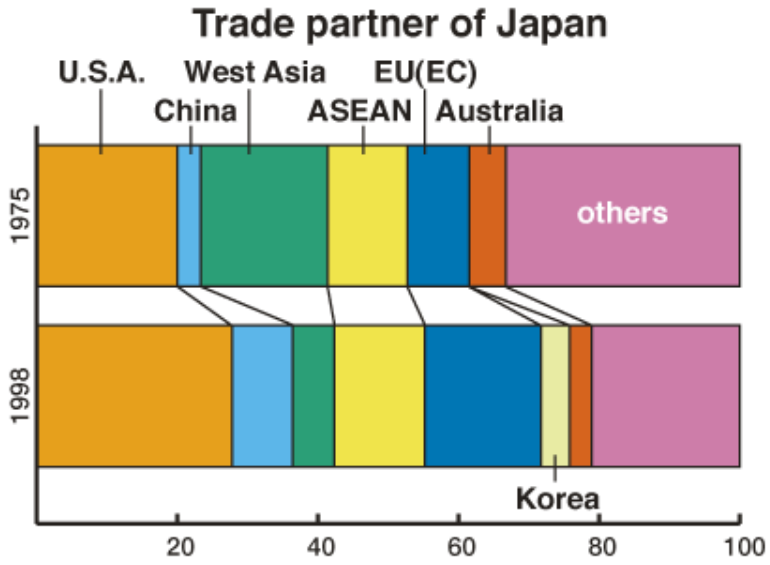
This slide uses PowerPoint's animation features.

Easy-to-read graphics

Bad!



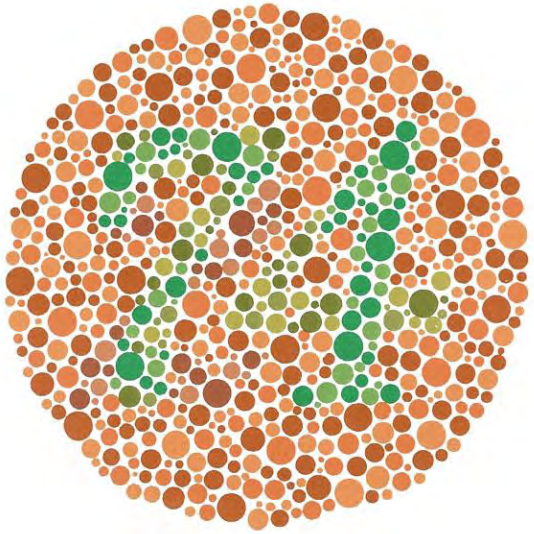
Good!



1. **Use vivid colors with different brightnesses.**

2. **Avoid separate keys. Add labels within the drawings.**

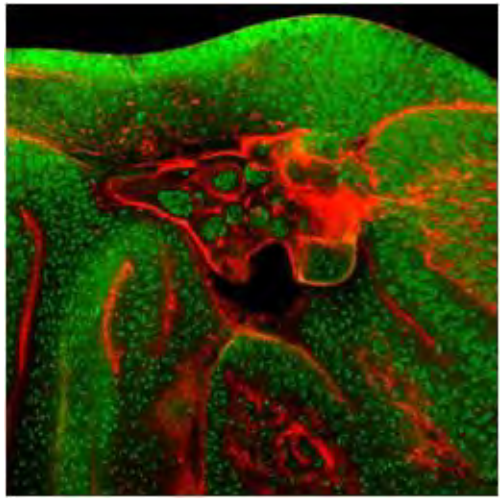
Easy-to-read graphics



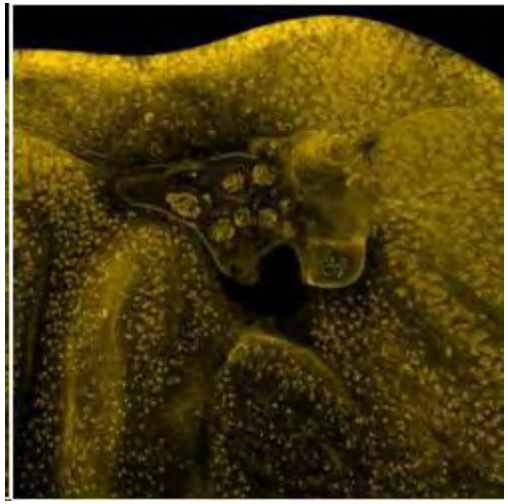
7% of males in your audience are color blind

Color Blind Simulator
Vischeck
http://vischeck.com/

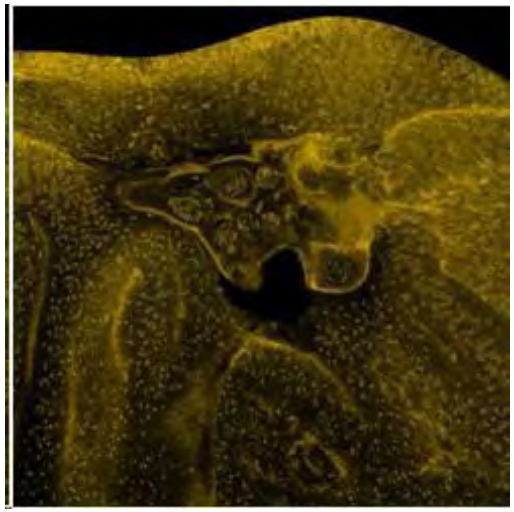
Double-staining with red and green signals.



normal vision

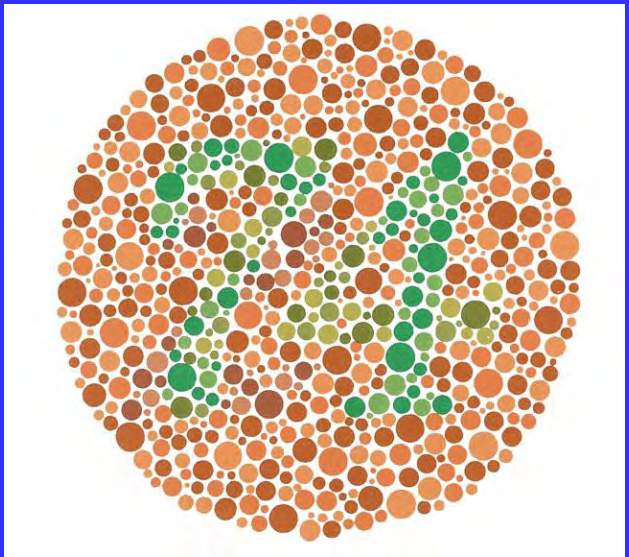


protanope (red)



deuteranope (green)

Easy-to-read graphics



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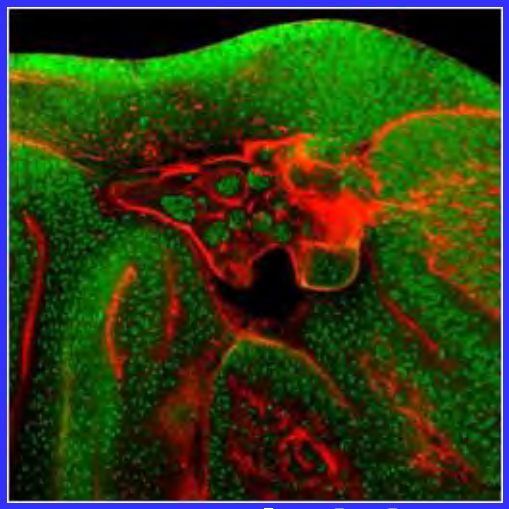
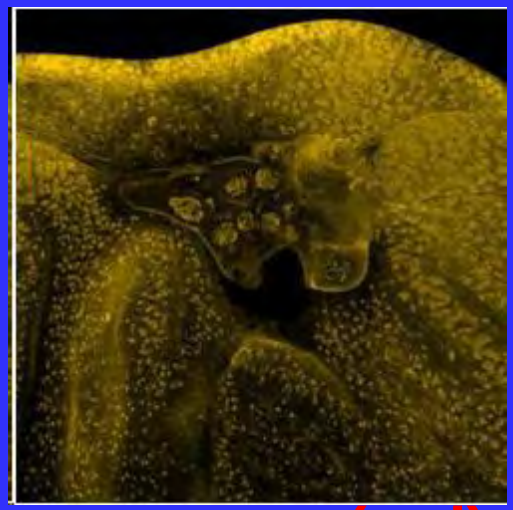
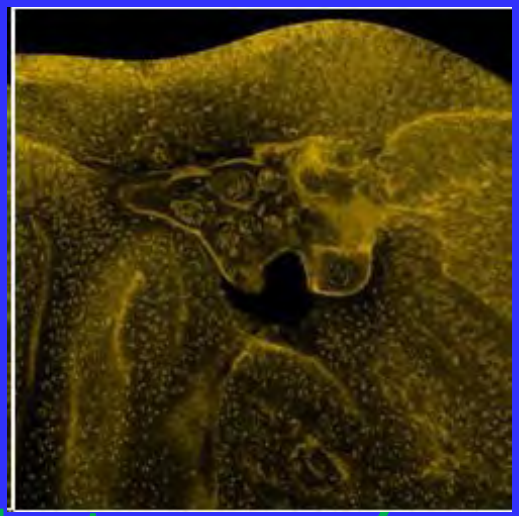


normal vision



protanope (red)



deuteranope (green)

Dark backgrounds work best for dim color images

“3-cube FRET” with a single cube

TILL polychrome monochromator

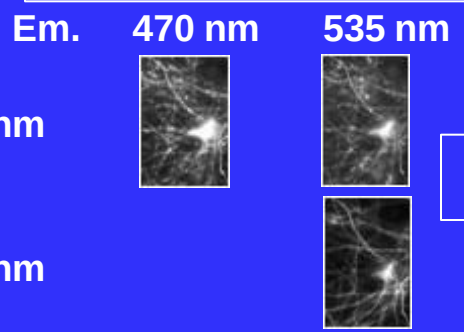
Alternate ex. 436nm/500nm

Sample (CFP/YFP)

Polychroic filter
Reflects
436 nm/500 nm
Transmits
470 nm/535 nm
(Chroma; 51017bs)

Dual-bandpass filter
436nm/500nm
(Chroma; 51017x)

Optical Insights Image Splitter with 505 nm dichroic



CCD camera

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

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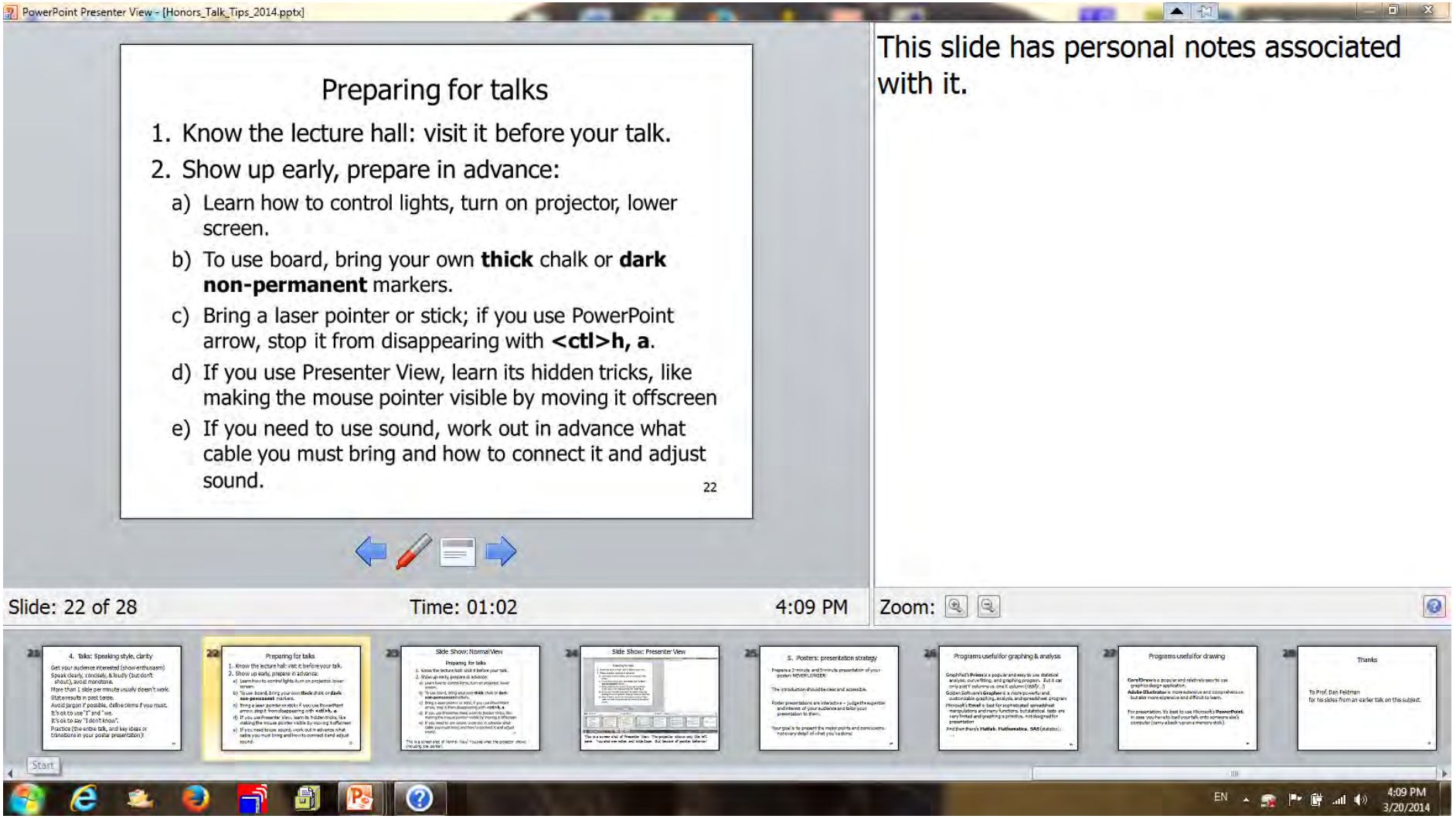
   e) If you need to use sound, work out in advance what cable you must bring and how to connect it and adjust sound.

22

This is a screen shot of Normal View: You see what the projector shows (including the pointer).

Slide Show: Presenter View



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!

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.