Giving an effective presentation: Using Powerpoint and structuring a scientific talk

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We may not be experts at public speaking, but we are all experts at listening to talks.
What do you want from a talk?
Here are some of the things many listeners want from a talk:

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This presentation focuses solely on ways of using Powerpoint and organizing a talk to achieve:

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What do you think of the following slide?
Emk1 knockdown inhibits lumen formation in MDCK cells:

- RT-PCR: EMK1 is effectively knocked down in MDCK cells 24 hours after transfection with P-SUPER (control) or P-SUPER-siEMK1 plasmid; knockdown confirmed on the right with antibodies to EMK1.

- Collagen overlay assay: cells cultured 24 h on collagen I before being overlaid with additional collagen on the apical surface, analyzed 24 h later. Note the lack of lumen in EMK1-KO cultures.

- Ca switch: control or EMK1-KO cells were plated in low Ca medium 24 h upon transfection with pSUPER or pSUPER-KO. After 12 h, cultures were switched to normal medium for 24 h. Transmission EM of cells sectioned perpendicular to the substratum shows lack of microvilli in EMK1-KO cells.
Is this better?
Emk1 knockdown inhibits lumen formation in MDCK cells
Not much.
Powerpoint basics:
Powerpoint basics:
1. What font to use
Powerpoint basics:
1. What font to use

Use a Sans Serif font:
Powerpoint basics:
1. What font to use

Use a Sans Serif font:

This font is Arial.

This font is Comic Sans.

This font is Trebuchet.
Powerpoint basics:
1. What font to use

Use a Sans Serif font:
- This font is Arial.
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- This font is Trebuchet.

Serif fonts take longer to read…
Powerpoint basics:
1. What font to use

Use a Sans Serif font:
This font is Arial.
This font is Comic Sans.
This font is Trebuchet.

Serif fonts take longer to read…
This font is Times New Roman.
This font is Courier.
This font is Didot.
Powerpoint basics:
1. What font to use

Some fonts look super in **boldface:**
Powerpoint basics:
1. What font to use

Some fonts look super in **boldface**:

- Arial vs. **Arial bold**
- *Comic Sans* vs. **Comic Sans bold**
- Trebuchet vs. **Trebuchet bold**
Powerpoint basics:
1. What font to use

Type size should be 18 points or larger:

- 18 point
- 20 point
- 24 point
- 28 point
- 36 point

* References can be in 14 point font
Powerpoint basics:
1. What font to use

AVOID USING ALL CAPITAL LETTERS BECAUSE IT'S REALLY HARD TO READ!
Powerpoint basics:
2. Color
Dark letters against a light background work.
Powerpoint basics:

2. Color

Light letters against a dark background also work.
Many experts feel that a dark blue or black background works best for talks in a large room.
Powerpoint basics:
2. Color

Dark letters against a light background are best for smaller rooms and for teaching.
Powerpoint basics:
2. Color

Avoid red-green combinations because a large fraction of the human population is red-green colorblind. 

Lots of people can’t read this – and even if they could, it makes your eyes hurt.
Powerpoint basics:

2. Color

Other color combinations can be equally bad.
Powerpoint basics:
2. Color

View your slides in grayscale to ensure that there is adequate color contrast in each slide.

Other color combinations can be equally bad!
Powerpoint basics:
3. Layout
Every slide should have a heading.

Sentences are preferred if it’s possible to make a statement.
Powerpoint basics:
3. Layout

Limit text blocks to no more than two lines each.
The reason for limiting text blocks to two lines is that when the text block goes on and on forever, people in the audience are going to have to make a huge effort to read the text, which will preclude them from paying attention to what you are saying. Every time you lose their focus, your presentation suffers!
Powerpoint basics:
3. Layout

Lists should contain no more than 3 items:

- Item 1
- Item 2
- Item 3
Powerpoint basics:
3. Layout

It is often effective to “unveil” your list one by one:

• Item 1
• Item 2
• Item 3
Powerpoint basics:
3. Layout

Avoid sublists!

• Item 1
  - Item 1a
  - Item 1b
  - Item 1c
• Item 2
  - Item 2a
  - Item 2b
• Item 3
Powerpoint basics:
3. Layout

Be generous with empty space.
If you try to cram too much into a slide, and place things too close to the sides, they can get cut off if you’re using a poor projector. In any case, the slide looks all cluttered and junky.
Powerpoint basics:
4. Style
Powerpoint basics:

4. Style

Try your best to include a simple image on every slide.
Limit the number of items on each slide.

Each slide should make just one or two points!
Powerpoint basics:
4. Style

This is just too much. Arrrgh!
Powerpoint basics:
4. Style

Here is a simple rule for showing figures and images:

If you’re not going to take the time to explain it, get rid of it.
Avoid fancy transitions between slides unless you have a good reason.
Powerpoint basics:
4. Style

Here is a sensible use of a “wipe” transition:
Powerpoint basics: 4. Style

Here is a sensible use of a “wipe” transition:
Powerpoint basics:
4. Style

Don’t try to show too many slides.

Often, less is more.
It’s very easy to use Powerpoint really badly
Emk1 knockdown inhibits lumen formation in MDCK cells:

- RT-PCR: EMK1 is effectively knocked down in MDCK cells 24 hours after transfection with P-SUPER (control) or P-SUPER-siEMK1 plasmid; knockdown confirmed on the right with antibodies to EMK1.

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It takes some work and forethought to use PowerPoint well.
It takes some work and forethought to use Powerpoint well

Let’s break down the previous slide into its minimum essential components
EMK1 / Par1 can be knocked down in MDCK (kidney) cells using siRNA methods
EMK1 / Par1 can be knocked down in MDCK (kidney) cells using siRNA methods.
MDCK cells form a lumen following a change in extracellular $[Ca^{++}]$
MDCK cells form a lumen following a change in extracellular $[\text{Ca}^{++}]$.

- **Surface view from lumen**
- **Side view of lumen**

- **gp135**
- **β-catenin**
- **ZO-1**
Lumen formation is blocked in EMK1 knockdown cells

MDCK cells

EMK1 knockdown

gp135  β-catenin  ZO-1
EMK1 knockdown cells also fail to form microvilli

MDCK cells
EMK1 knockdown cells also fail to form microvilli

MDCK cells

EMK1 knockdown
The structure of a good talk: start broad, get specific, and end broad
The structure of a good talk: start broad, get specific, and end broad.

Start with the biggest questions and get progressively more specific.
A powerful tool in a talk is a “home slide”

Design and introduce a “home slide” that you’ll come back to at each major transition in your talk.
A powerful tool in a talk is a “home slide”

Now we’ll build an introduction and a home slide that puts the previous data into context.
Our bodies are full of tubes
Our bodies are full of tubes

Intestine

digestive enzymes
How do cells become polarized and form a lumen?

Intestine

digestive enzymes
MDCK cells are a model system for a polarized cell type (from the kidney)
MDCK cells are a model system for a polarized cell type (from the kidney)

Apical proteins
MDCK cells are a model system for a polarized cell type (from the kidney)

- apical proteins
- centrosome
MDCK cells are a model system for a polarized cell type (from the kidney)
MDCK cells are a model system for a polarized cell type (from the kidney)
MDCK cells are a model system for a polarized cell type (from the kidney)
MDCK cells lose their polarity in low $[\text{Ca}^{++}]$
MDCK cells regain their polarity in normal [Ca$^{++}$] and reform a lumen.
MDCK cells regain their polarity in normal \([Ca^{++}]\) and reform a lumen.
EMK1 (also known as Par1) is a serine-threonine kinase that regulates polarity in many cells.
EMK1 (also known as Par1) is a serine-threonine kinase that regulates polarity in many cells.

EMK1 localizes to tight junctions in MDCK cells.
Questions addressed today:
Questions addressed today:

- Is the kinase EMK1 essential for polarizing kidney cells?
Questions addressed today:

• Is the kinase EMK1 essential for polarizing kidney cells?

• Is EMK1 important for lumen formation?
Questions addressed today:

- Is the kinase EMK1 essential for polarizing kidney cells?
- Is EMK1 important for lumen formation?
- How do different tissues form different types of tubes?
The middle is the meat of the talk...
...but talks are delivered to audiences with limited attention spans.
The middle is the meat of the talk

The middle is also the time at which the audience tends to zone out
Enabling the audience to tune back in

After going into depth, come back to your home slide to make transitions
Enabling the audience to tune back in

After going into depth, come back to your home slide to make transitions

Nontechnical
General technical
Specialist
Enabling the audience to tune back in

Let’s review “episode 1” (which we’ve already designed) and add a home slide
Questions addressed today:

- Is the kinase EMK1 essential for polarizing kidney cells?
- Is EMK1 important for lumen formation?
- How do different tissues form different types of tubes?
EMK1 / Par1 can be knocked down in MDCK (kidney) cells using siRNA methods
Lumen formation is blocked in EMK1 knockdown cells

MDCK cells

EMK1 knockdown

gp135  β-catenin  ZO-1
EMK1 knockdown cells also fail to form microvilli
EMK1 is required for cell polarization

Normal MDCK cells:

low $[Ca^{++}]$ → normal $[Ca^{++}]$
EMK1 is required for cell polarization

EMK1 knockdown cells:

low \([Ca^{++}]\)  \rightarrow \text{normal } [Ca^{++}]
Use your home slide repeatedly to build a theme over time and enable the audience to catch up.
Over the course of the talk, you can progressively build a fairly complex model.
EMK1 regulates microtubules and cell polarity in two steps
Increasing the level of EMK1 can alter the type of lumen formed in step 2.
The structure of a good talk: start broad, get specific, and end broad

Focus now on conclusions
Audience attention increases as you signal the end of the talk - so avoid false endings!
End with the most specific conclusions then build back out to the “big picture”
EMK1 regulates microtubules and cell polarity in two steps
Increasing the level of EMK1 can alter the type of lumen formed in step 2.
The type of lumen formed by epithelial cells varies among different tissues

Intestine  Liver

digestive enzymes  bile
EMK1 may enable cells to make different types of tubes in different organs.
Organizing a great talk
Organizing a great talk

• Be smart about Powerpoint
Organizing a great talk

• Be smart about Powerpoint

• Introductions should start broad then get specific
Organizing a great talk

- Be smart about PowerPoint
- Introductions should start broad then get specific
- Think of your talk as consisting of episodes
Organizing a great talk

• Be smart about Powerpoint

• Introductions should start broad then get specific

• Think of your talk as consisting of episodes

• Use a home slide to make transitions effectively
Organizing a great talk

- Be smart about Powerpoint
- Introductions should start broad then get specific
- Think of your talk as consisting of episodes
- Use a home slide to make transitions effectively
- Conclusions should start with specifics but end broadly
Is this all you need to know to give a great talk?
Is this all you need to know to give a great talk?

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No, but it’s a good first step!

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A great resource for additional information is:

**The Craft of Scientific Presentations**

by Michael Alley