

So you want to write a paper...

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Informal Lab Presentation

This is not a 'how to write' presentation...see:

- Elements of Style (Strunk & White)
- On Writing Well (Zinsser)
- They say, I say: The Moves that Matter in Academic Writing (Graff & Birkenstein)
- Writing Science (Schimel)
- Scientific Writing = Thinking in Words (Lindsay)
- How to Write a Lot (Silvia)
- Line by Line - How to Edit Your Own Writing (Cook)
- The Craft of Research (Booth, Colomb, Williams)

People who read regularly are better writers...

Reading papers helps you identify what works / does not work,
and what to emulate in style and content

The format of a paper is like a lab report...

- Authors and affiliations
- Abstract
- Introduction
- Purpose / hypothesis
- Methodology
- Results
- Discussion
- Conclusions
- References
- Acknowledgements
- Data sharing statement
- Author contributions

Journals have specific requirements:

- Word count (type of paper)
- Order of sections (subtitles)
- Grammar (Oxford comma)
- Reference format
- Number of figures, format, fonts
- Number of tables, format, fonts
- Supplementary information

Different approaches:

- Use the target journal(s) to structure writing, or edit according to the target journal(s)
- Read other papers from journal(s) of interest to get a sense of what information is important / how things are structured

When to start?

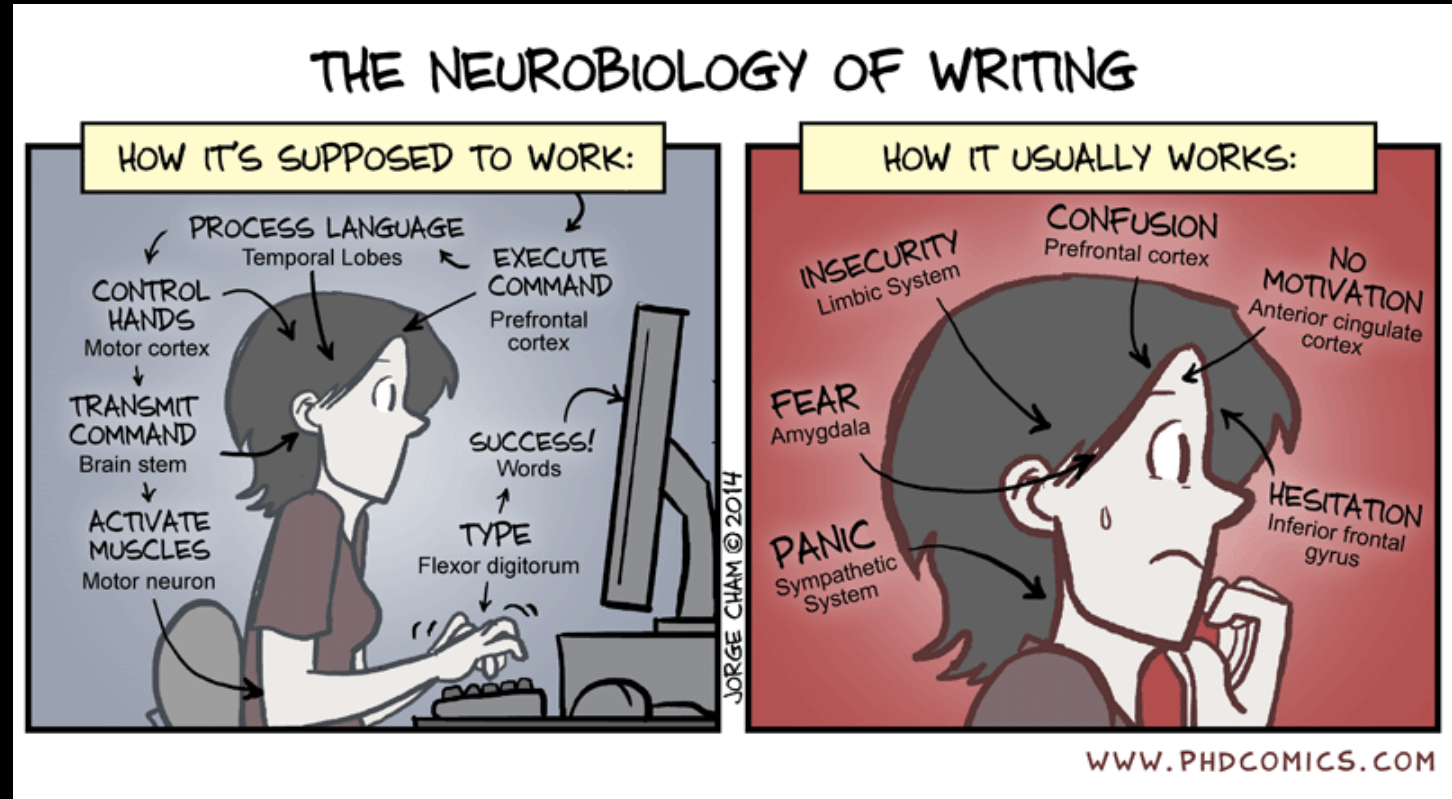


For your thesis – start at the beginning

For manuscripts: *in media res* – start from the middle

Why start 'early'?

- It is often easier to edit than it is to write
- Writing helps you organize your thoughts and refine your 'to-do' list
- Papers are the currency of scientific research



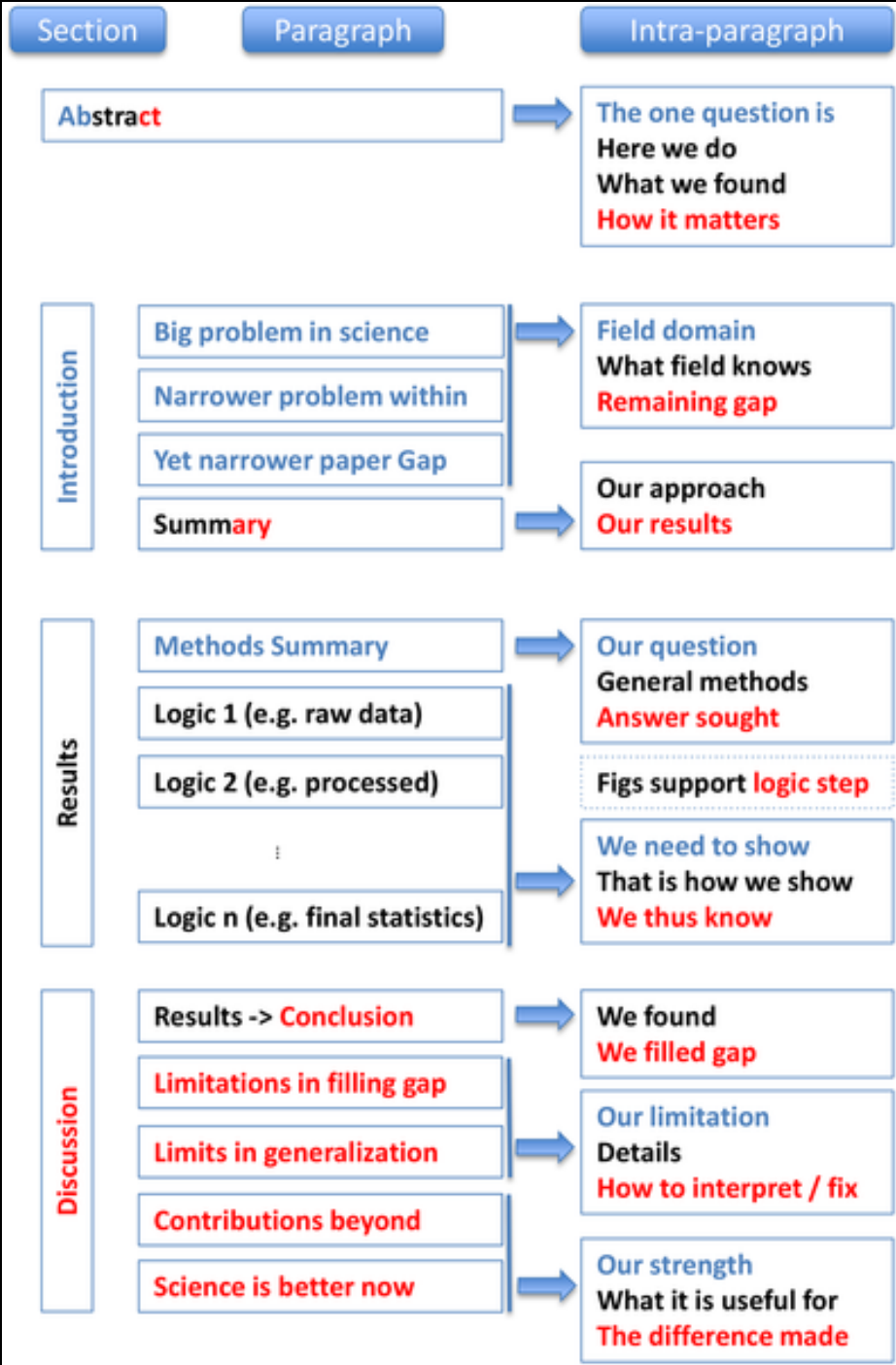
Inspiration usually comes during work, rather than before it (Madeleine L'Engle)

Before you start – think – make a plan

- Identify topic and focus
- Identify main points and associated details
- Arrange in logical order
- Evaluate and revise

The outline should consider:

- What question are you asking? (introduction)
- What do you need to convey to explain why it's important to study?
 - What will your audience know / should be reminded of
 - What is known and what is not known (introduction)
- How you approached / answered the question (results / discussion)
 - Explain the WHY before the HOW
 - Experiments should support your goal
- Why your answer to the question is important / what it adds (discussion)



Mensh B, Kording K (2017) Ten simple rules for structuring papers. PLOS Computational Biology 13(9): e1005619.
<http://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1005619>

Fig 1. Summary of a paper’s structural elements at three spatial scales: Across sections, across paragraphs, and within paragraphs.

The discussion is an interpretation of your results in context of prior literature in the field, NOT a repetition of the findings from the results section.

- How did your study advance understanding?
- What was previously unknown?
- How does this contribute to approaches for future studies?
- Some speculation is appropriate

Start with an outline:

- Key messages
- Ideas to introduce
- Hypotheses/purpose
- Results
- Conclusions

While you are making the outline, write down some possible titles and revisit them throughout the writing process - the title should be your main take-away message for readers

‘Guts’

- TNF or the intestinal microbiota do not mediate effects of diet-induced obesity in female C57BL/6J mice
- Effects of diet-induced obesity in female C57BL/6J mice on intestinal macrophages and permeability in female mice are not mediated by TNF or the intestinal microbiota

Premise/Introduction:

- Effects of DIO on gut homeostasis – role of macrophages
- Acute intestinal inflammation – does it also apply with DIO?
- Evidence of changes to peripheral monocyte and intestinal macrophage populations in obesity
- Effects of DIO on intestinal macrophage may be mediated by the microbiota, or TNF, and may be linked to intestinal permeability

Hypotheses:

- DIO increases intestinal permeability, pro-inflammatory Ly6C^{high} monocyte infiltration into intestinal tissues, accumulation of pro-inflammatory monocyte-derived macrophages, and changes tissue-resident macrophage phenotype and function in WT female mice
- These effects may be mediated by TNF-associated inflammation or the microbiota

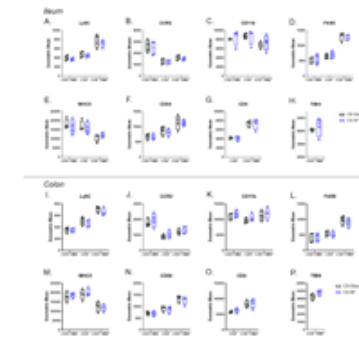
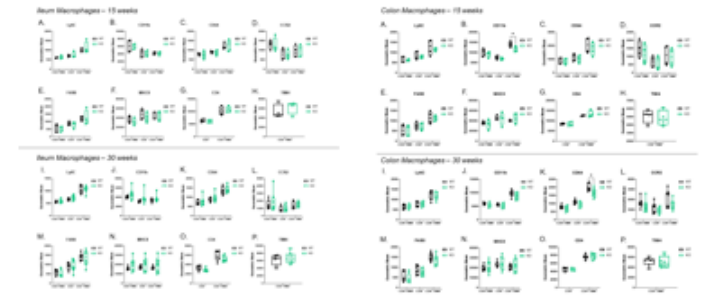
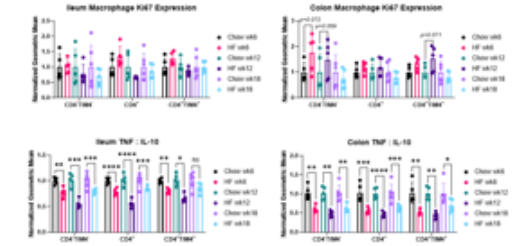
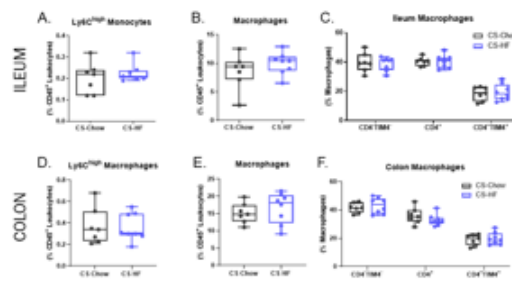
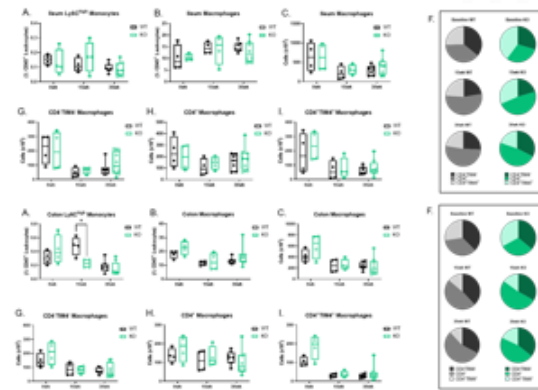
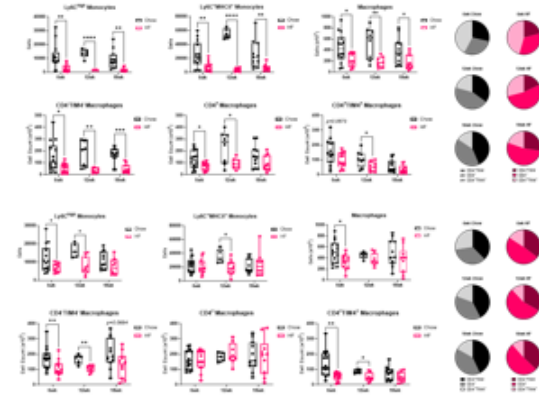
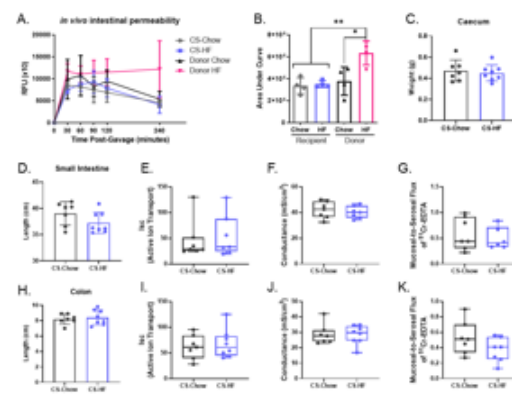
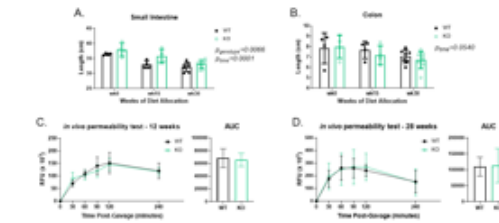
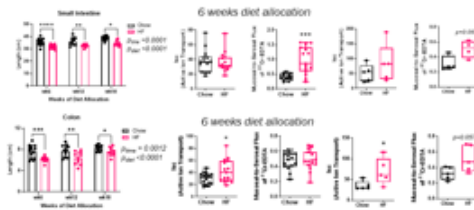
‘Guts’

Results:

- **HF vs chow diet WT female mice**
 - Body weight (or adiposity), intestinal permeability (FITC and/or Ussing chambers), intestine lengths
 - Monocyte, transition, and total macrophage changes – ileum and colon
 - Macrophage population breakdown - %,# - ileum and colon
 - Macrophage surface phenotype, Ki67 expression, TNF:IL-10 expression ratio
 - **WT vs TNF^{-/-} littermates on HF diet**
 - Body weight (or adiposity), intestinal permeability (FITC), intestine lengths
 - Monocyte, transition, and total macrophage breakdown % and # – ileum and colon
 - Macrophage surface phenotype – ileum and colon (*Supplementary? not different*)
 - **HF vs chow microbiota with chow diet**
 - Body weight (or adiposity), intestinal permeability (FITC and/or Ussing chambers), intestine lengths, caecal weight
 - Monocyte, transition, and total macrophage breakdown % and # – ileum and colon – *could show other populations as well?*
 - Macrophage surface phenotype – ileum and colon (*Supplementary? not different*)
- Supplementary:*
Other immune cell populations
- Supplementary:*
SPF vs naïve GF vs colonized gut macrophage comparison

Conclusions:

- DIO increases intestinal permeability, decreases intestinal lengths, and has tissue-specific temporal effects on ileum and colon monocyte and macrophage populations
- Removal of TNF is not protective from effects of DIO
- Microbiota in absence of diet is not sufficient to recapitulate phenotype





Why make your figures and tables early?

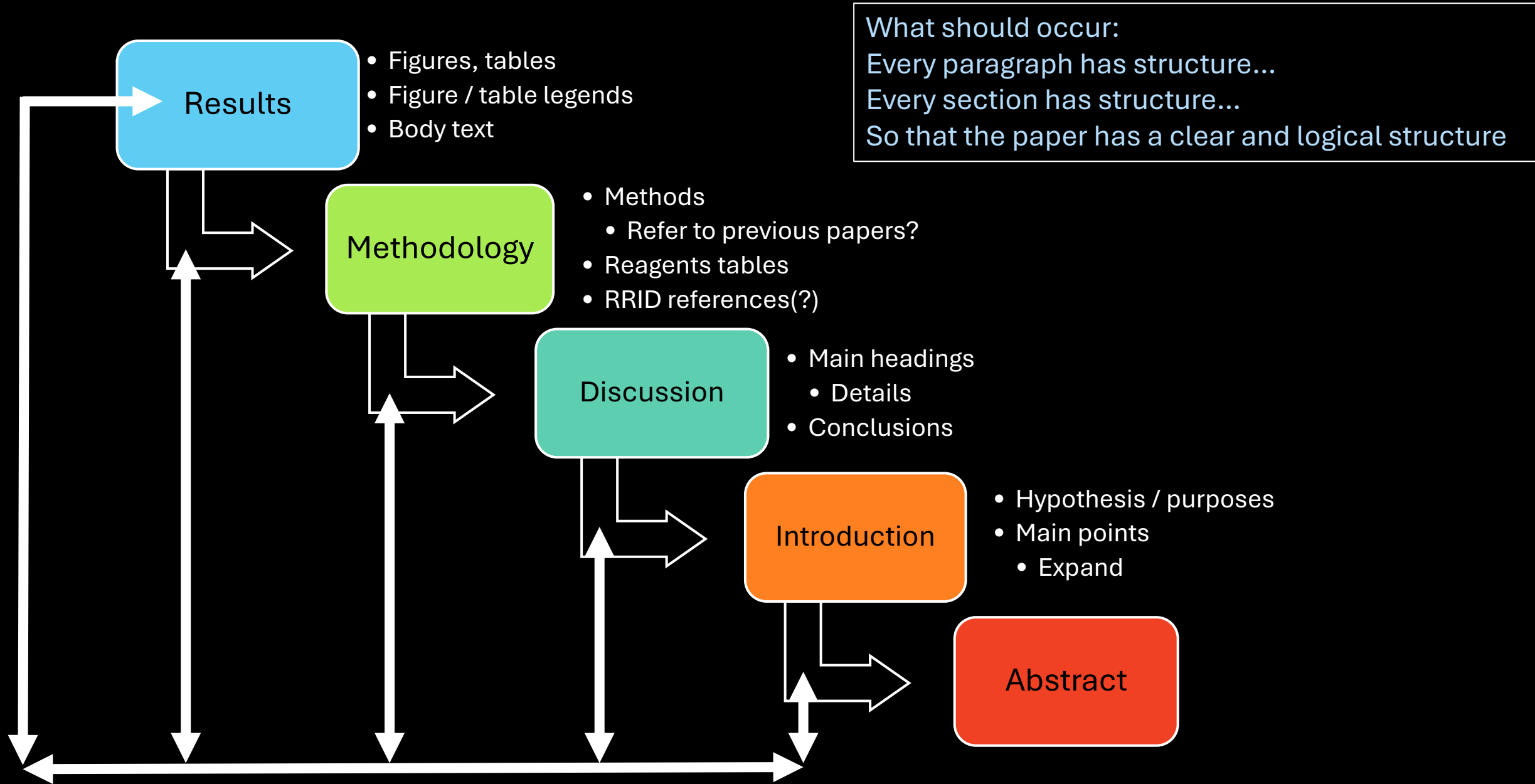
Visualization can (literally) help you see the big picture:

- Main take-aways
- Appropriate order of presentation (as opposed to experiment order)
- 'Missing' data – things to do, additional experiment data to include
- 'Mismatched' data – things to leave out

This helps you to write:

- Methodology – what is included / not – how much detail
- Hypothesis – redefine based on data
- Introduction – key points
- Discussion/conclusions - key points / issues / what is next

The writing of a paper is very iterative...



Once you have a draft...



Something to work on while the paper is ‘out for edits’ (or even before!):

Letter to the Editor / Cover Letter *aka* ‘*why you should publish my research*’

- Brief introduction to area of research
- Outlines what is known / unknown
- Addresses what your paper adds to field (why results are important)
- Summarizes main findings
- Reiterates importance of data in moving the field forward / interest to others
- Express gratitude for reading and consideration