MIT BE BIOLOGICAL ENGINEERING | Communication Lab

20.109 Communication Workshop 2: Abstracts and Titles (+ some writing basics)

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Helping you communicate effectively.
be.mit.edu/communicationlab

Workshop structure

1. Why subject matters
2. Discuss an example from the field
3. Derive principles and strategies
4. Practice
5. Leave with a checklist/rubric

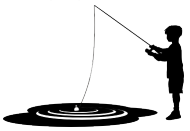
Untitled
Mark Rothko, 1968
Phillips Collection (Washington, DC)

Abstracts + Titles: Why do they matter?

Attracting your audience: first judgment

Influencing whether someone will read or cite your paper

Indexing – Will readers find your paper?

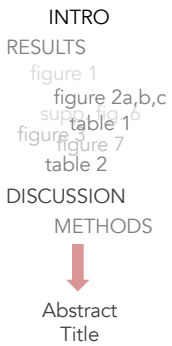


Abstract + title must appeal to a broad audience.

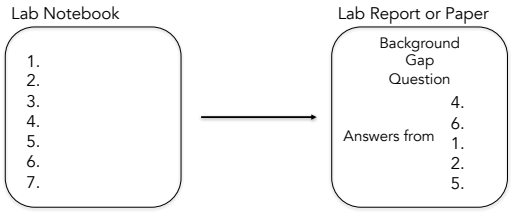
- People in your field
- Editors, reviewers
- Researchers outside your field
- Students
- Reporters
- Anyone looking for information

Titles and abstracts are read first

yet written *last*.



Your abstract conveys your final question and answer



Unscramble this real abstract

Clonal dynamics of native haematopoiesis.

Nature. 2014 Oct 16; 514(7522): 322–327.
Sun J, Ramos A, Chapman B, Johnnidis JB, Le L, Ho YJ, Klein A, Hofmann O, Camargo FD.

Assemble this abstract

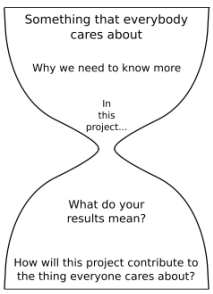
1. It is currently thought that life-long blood cell production is driven by the action of a small number of multipotent haematopoietic stem cells.
2. Evidence supporting this view has been largely acquired through the use of functional assays involving transplantation.
3. However, whether these mechanisms also govern native non-transplant haematopoiesis is entirely unclear.
4. Here we have established a novel experimental model in mice where cells can be uniquely and genetically labelled *in situ* to address this question.
5. Using this approach, we have performed longitudinal analyses of clonal dynamics in adult mice that reveal unprecedented features of native haematopoiesis.
6. In contrast to what occurs following transplantation, steady-state blood production is maintained by the successive recruitment of thousands of clones, each with a minimal contribution to mature progeny.
7. Our results demonstrate that a large number of long-lived progenitors, rather than classically defined haematopoietic stem cells, are the main drivers of steady-state haematopoiesis during most of adulthood.
8. Our results also have implications for understanding the cellular origin of haematopoietic disease.

Clonal dynamics of native haematopoiesis.

Sun J, Ramos A, Chapman B, Johnnidis JB, Le L, Ho YJ, Klein A, Hofmann O, Camargo FD.

Abstract
It is currently thought that life-long blood cell production is driven by the action of a small number of multipotent haematopoietic stem cells. Evidence supporting this view has been largely acquired through the use of functional assays involving transplantation. However, whether these mechanisms also govern native non-transplant haematopoiesis is entirely unclear. Here we have established a novel experimental model in mice where cells can be uniquely and genetically labelled in situ to address this question. Using this approach, we have performed longitudinal analyses of clonal dynamics in adult mice that reveal unprecedented features of native haematopoiesis. In contrast to what occurs following transplantation, steady-state blood production is maintained by the successive recruitment of thousands of clones, each with a minimal contribution to mature progeny. Our results demonstrate that a large number of long-lived progenitors, rather than classically defined haematopoietic stem cells, are the main drivers of steady-state haematopoiesis during most of adulthood. Our results also have implications for understanding the cellular origin of haematopoietic disease.

An effective abstract is an hourglass-shaped message.



General background

Specific background
Knowledge gap, Unknown

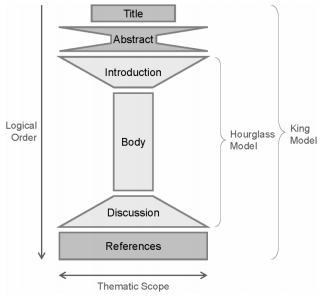
HERE WE SHOW…
Results

Implication

Significance

Successful scientific writing is fractal.

Figure 1 The 'Hourglass Model' (light-grey parts) and the 'King Model', which covers an extended set of parts in a typical paper's structure



http://dbis.rwth-aachen.de/~derntl/papers

Abstracts are a preview of the shape of a full paper.

General background	Something everyone in your audience cares about.	Introduction: beginning
Specific background	Zoom in from General Background to the thing you did.	Introduction: middle
Knowledge gap, Unknown	Question that will be answered by your research. Problem, phenomenon that is not understood.	Introduction: end
HERE WE SHOW	Conclusion, answer to the Unknown	Introduction: end Results: end Discussion: beginning
Results	Brief summary of approach + very high-level results. Common pitfall = too much Methods/Results.	Introduction (high level) Results (high level) Methods
Implication, Significance	So what? What do your results mean for the thing everyone cares about?	Discussion

Quick writing improvements

- Word choice
- Sentence structure
- Transition phrases and overall logic
- Concise = free of unnecessary words and phrases

Choose the right word for the context.

Choose the right word for the context.

- The response was blocked by phentolamine but was not *affected* by propanolol.
- The digoxin *concentration* was increased from 0.5 to 2.5 ng/ml.
- At frequent *intervals* we measured pH, P_{O_2} and P_{CO_2} in arterial blood, and during each *period* of study we measured pulmonary blood flow two or three times.
- 75 percent nitrous oxide *is* a subanesthetic concentration in the dog.

Simplify.

efficacious	effective
utilize	use
elucidate	explain
proximal	close

Be quantitative.

development rate was fastest at the higher temperature

development rate at 30°C was 10% faster than development rate at 20°C

Craft strong sentences.

- Make the topic the subject.
- Put the action in the verb.
  - "An increase in heart rate *occurred*."
  - "Heart rate *increased*."
- Avoid long noun clusters.
- Talk about one thing at a time.
- Use parallel construction.
  - "The enzyme neutralizes oxidative damage and has an apoptosis-suppressing effect."
  - "The enzyme neutralizes oxidative damage and suppresses apoptosis."
- Keep related words (subject and verb) together.
- Use the active voice.
  - "More protein was transported by mutant cells."
  - "Mutant cells transported more protein."

Make the topic the subject.

The patient showed no change in symptoms.

The patient's symptoms did not change.

Use transition statements to provide a logical relationship between the sentences in a paper.

As a result,…
Given this observation,…
According to this theory,…
In order to accomplish…

Avoid novelty claims.

- Unless you've read every paper, you don't really know if you're the first to discover something.
- A surprising result: unanticipated, or against common dogma, but not unprecedented
- Appropriately qualified, there are certain "firsts" you do know…

Titles
What did you find? So what?

Inulin modulates conspecific antagonism towards vancomycin-resistant *B. subtilis* strain BF819 in the human gut microbiome

vs.

A human gut commensal exhibits targeted antagonism towards an antibiotic-resistant clinical counterpart

Simplify your title by identifying key terms

KEY NOUNS | KEY VERBS

Novel methods for early prediction of undesirable interference by microbial inhabitants of the human gut with metabolism of the cardiac drug digoxin give rise to strategies for alleviating drug inactivation

NEW AND IMPROVED TITLE:

"Predicting and alleviating drug interference by human gut microbiome"

LESS INFORMATIVE IF TOO SIMPLIFIED:

"Novel methods for prediction of drug interference"

How do we improve this one?

Surveying somatic mutations in P53, EGFR, BRCA1, and HRAS for impact on MCF7 tumors with heterogeneous cell composition.

Substitute jargon to attract a broader audience

NEW AND IMPROVED TITLE:

"Surveying the impact of breast cancer oncogenes on tumor heterogeneity"

Directly connect your key terms to create an efficient title.

Key nouns
- Human gut microbes
- Drug

Key verbs
- Predicting (of interference)
- Interfering (microbes, with drug)
- Alleviating (interference)

Predicting + alleviating… | …drug interference… | …by human gut microbiome

Take-homes:

- Identify your research question & answer.
- Be brief.
- Be quantitative.
- Focus on findings, not methods.

Exercise: Draft your Mod 1 Abstract (and Title, if you have time!)

1. What is the problem?
2. Where is the gap?
3. What are you doing?
4. What is the implication?