

STEM articles workshop

an NSF ADVANCE-LUC program

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- 1 .
- 2 The Title and Abstract
 - Focus and Goals
 - The title and abstract
- 3 Introduction
 - Motivation and learning objectives
 - The Introduction (as a funnel)

Live copy: [link](#) (use at your own risk)

The Title and Abstract

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2 The Title and Abstract

- Focus and Goals
- The title and abstract

Focus and Goals

- Deconstruction of a paper: The abstract (≈ 5 min)
 - We are all 'experts', but there is no one way
 - Focus on the canonical pieces, but also other considerations (submission, rebuttal, rejection, ...)
- Open discussion on personal/best practices (≈ 5 min)
 - Collecting new ideas
 - (will assemble a list for later dissemination)
- Goal setting (≈ 5 min)
 - What will you attempt to accomplish today?

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 - Primary: To succinctly summarize the study and its findings

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 - Secondary: To hint at snippets of information that can further the readers' interests and studies

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 - Primary: To succinctly summarize the study and its findings
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 - Secondary: To hint at snippets of information that can further the readers' interests and studies
 - Tertiary: To enable search engines (google scholar, web of science, pubmed) to group an article with its closely-related studies.
- The title attempts to hit all 4 points in 1 sentence

The title and abstract, con't

Purpose:

- 1 Rationale for why study was performed
- 2 Approach specifics of the study
- 3 Results from the approach
- 4 Impact of the study and its results

Adapted from <https://www.wiley.com/network/researchers/preparing-your-article/how-to-write-a-scientific-abstract>

The title and abstract, con't

- ① Rationale: Background into the problem and (generally) open questions(s)
- ② Approach: High level detail (survey, wet lab experiment, specific tools)
- ③ Results: 2-3 main and unambiguous findings
- ④ Impact: How the 2-3 results advance the field or open new questions

The title and abstract

My framework

- I start my projects with a draft abstract (albeit without the results)
- Usually the last part of the paper I will finalize
- Keywords seem to be important for having paper show up in pubmed searches

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Let's write!

- Don't forget to enter your goal in the chat box

Introduction

3 Introduction

- Motivation and learning objectives
- The Introduction (as a funnel)

Motivation and why important?

- The introduction provides the necessary background to motivate and describe the system or problem studied in the research paper

Motivation and why important?

- The introduction provides the necessary background to motivate and describe the system or problem studied in the research paper
- Objectives:
 - to provide a general guide to structuring an introduction
 - to introduce a template paper I use
 - to collect your ideas on the introduction

Next time

- The Method section

The Introduction (as a funnel)

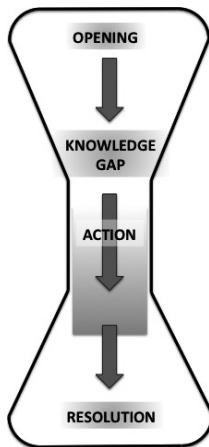
- Reminder of the abstract structure:
 - ① Rationale for why study was performed
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The Introduction (as a funnel)

- Reminder of the abstract structure:
 - ① Rationale for why study was performed
 - ② Approach specifics of the study
 - ③ Results from the approach
 - ④ Impact of the study and its results
- The introduction extends this framework
 - I typically focus on 1 and 2 in my intros
 - Occasionally I will add a final paragraph summarizing 3 and 4

The Introduction (as a funnel), con't

- Guide the reader along the path of the 'general' toward the 'specific'
- 'General' will depend on the audience.
 - C.N.S. assume almost a layperson's level of scientific understanding
 - Specialized journals permit domain-specific knowledge
'Microglia reside in the CNS, where they serve roles in neurological development, as well as surveillance of the CNS'
- Aim for one paragraph



INTRODUCTION

*INTRODUCE RELEVANT LITERATURE
EXPLAIN WHY YOUR STUDY IS NOVEL
HYPOTHESIS*

MATERIALS AND METHODS

*INTRODUCE STUDY SYSTEM
EXPLAIN METHODS SUCH THAT A READER
COULD RECREATE YOUR STUDY*

RESULTS

*OBJECTIVELY STATE FINDINGS
FOCUS ON BIOLOGICAL RESULTS
USING STATISTICS FOR SUPPORT*

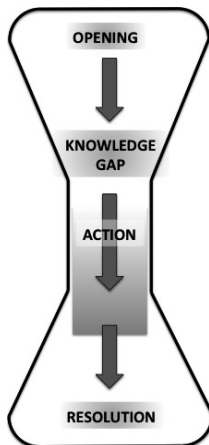
DISCUSSION

*INTERPRET YOUR RESULTS
TIE YOUR RESULTS BACK TO THE LITERATURE
BY ANSWERING THE KNOWLEDGE GAP*

CONCLUSIONS AND IMPLICATIONS

The Introduction (as a funnel), con't

- 'Specific' will transition to the problem of interest and the open challenge (one paragraph)
 - *'A primary goal of our study therefore was to develop a quantitative model of P2X-dependent signalling in microglia, utilizing experimental data largely collected from cultured cells.'*



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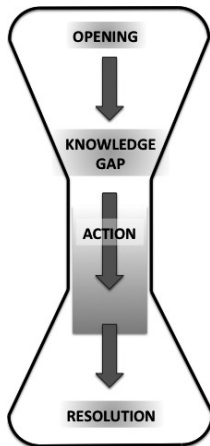
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The Introduction (as a funnel), con't

- A background paragraph on prior approaches can be helpful in some circumstances
- Can comprise a mini-review of what's been done
 - *Computational systems biology has emerged as a powerful tool toward bridging external stimuli with phenotypical outputs (Winslow et al. 2012)*



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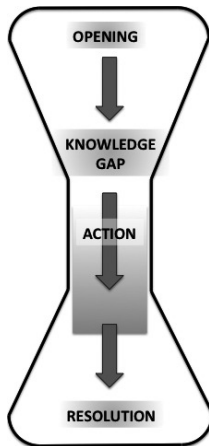
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The Introduction (as a funnel), con't

- Last paragraph
 - At a minimum, I generally discuss what was done and leave the rest as a 'mystery'
 - Sometimes and minisynopsis of key findings and implications can be helpful



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