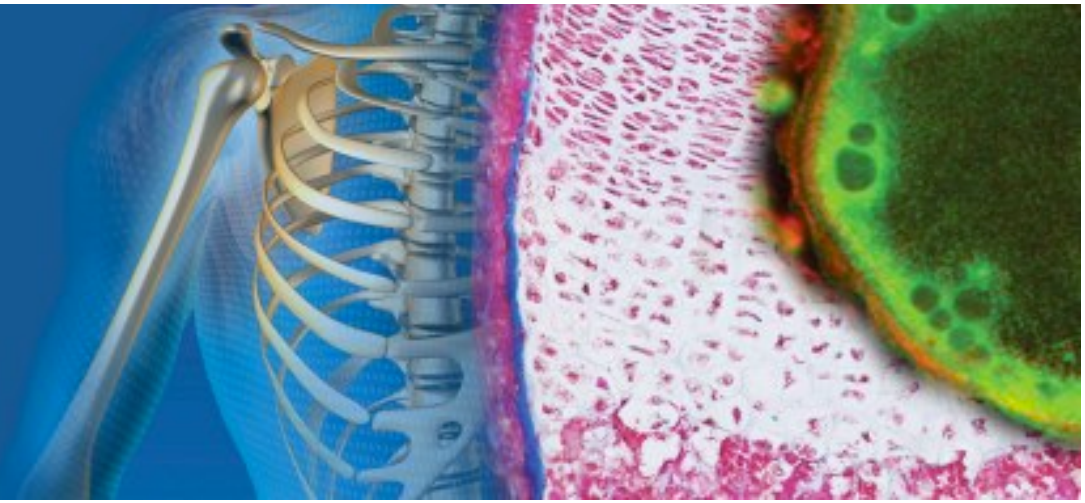
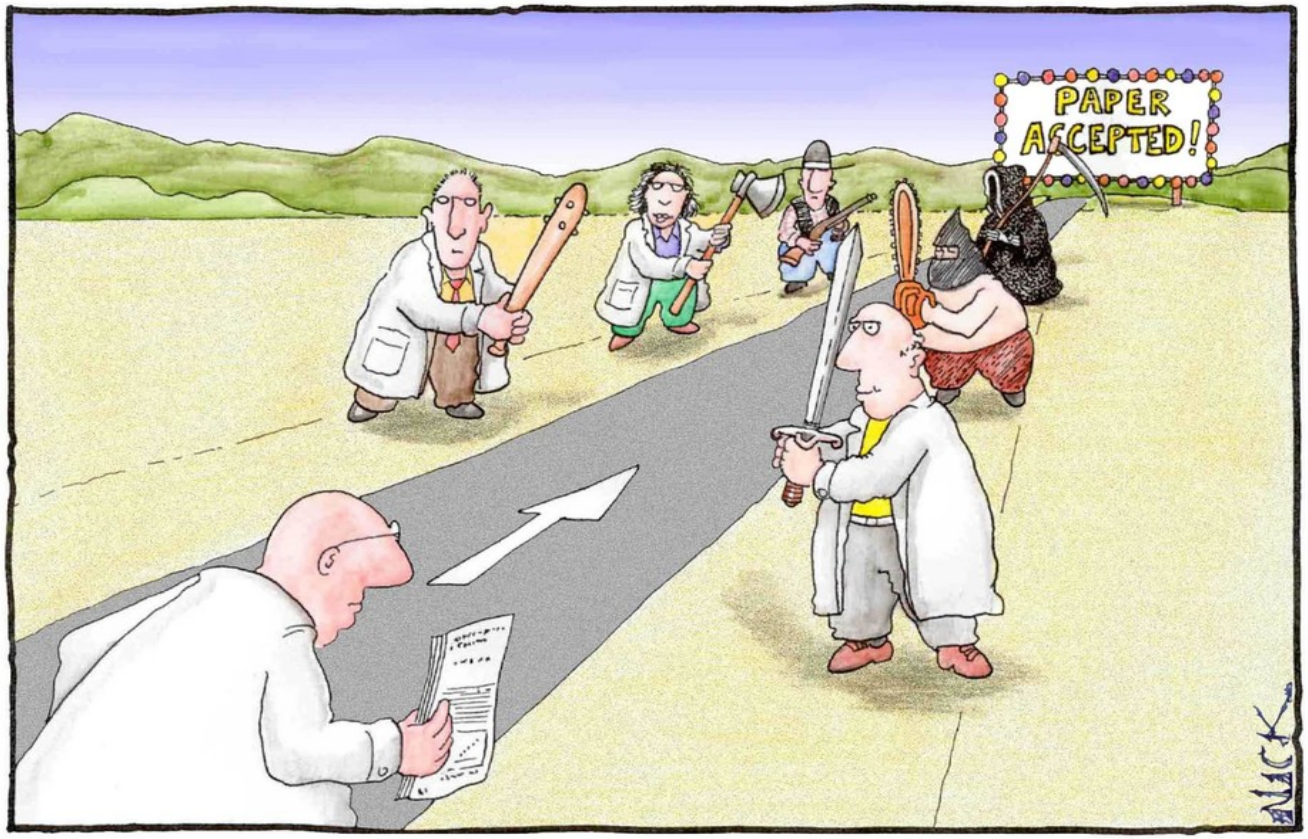
CENTER *for* MUSCULOSKELETAL RESEARCH



Publish or Perish: Step by Step Process for Writing a Manuscript

Alayna E. Loiselle, PhD

September 17, 2018



Most scientists regarded the new streamlined peer-review process as "quite an improvement."

Think like a reviewer

- Abstract- write last, write well
- Write clearly, concisely and clearly
- Figures- use as a road map
  - Point should be clear with minimal interaction with legend

Where to Start

Outline

- What is your central message? Always come back to this
- What are the methods you used?
- Summarize the Q's and problems- why did you do this study?
- What are your results?
- What are the implications of these data?
- Where does this fit in to the 'big picture', literature?

Figures

Let your figures be your guide

1. Know your audience
   - Broad or sub-specialty journal?
2. Identify your message
   -use the figures to your advantage
3. Adapt to the medium
4. Captions are not optional
5. Do not trust the defaults
6. Use color effectively
7. Do not mislead the reader
8. Avoid 'chartjunk'
   -everything must have a purpose
9. Message trumps beauty
10. Get the right tool


PLOS | COMPUTATIONAL BIOLOGY

OPEN ACCESS

EDITORIAL

Ten Simple Rules for Better Figures

Nicolas P. Rougier, Michael Droettboom, Philip E. Bourne

Published: September 11, 2014 • http://dx.doi.org/10.1371/journal.pcbi.1003833

Abstract

- Write this last
- Usually the first interaction w/ reviewers

Introduction

Funnel: Big picture to small detail

- Audience-specific
- What was the motivation for the study?

  Convince me this is an important problem

  What is the ‘gap in knowledge’?

  What have you done to address this gap?

  Briefly, what are you going to show me?

Materials & Methods: ARRIVE

	ITEM	RECOMMENDATION
Title	1	Provide as accurate and concise a description of the content of the article as possible.
Abstract	2	Provide an accurate summary of the background, research objectives, including details of the species or strain of animal used, key methods, principal findings and conclusions of the study.
INTRODUCTION		
Background	3	a. Include sufficient scientific background (including relevant references to previous work) to understand the motivation and context for the study, and explain the experimental approach and rationale. b. Explain how and why the animal species and model being used can address the scientific objectives and, where appropriate, the study's relevance to human biology.
Objectives	4	Clearly describe the primary and any secondary objectives of the study, or specific hypotheses being tested.
METHODS		
Ethical statement	5	Indicate the nature of the ethical review permissions, relevant licences (e.g. Animal [Scientific Procedures] Act 1986), and national or institutional guidelines for the care and use of animals, that cover the research.
Study design	6	For each experiment, give brief details of the study design including: a. The number of experimental and control groups. b. Any steps taken to minimise the effects of subjective bias when allocating animals to treatment (e.g. randomisation procedure) and when assessing results (e.g. if done, describe who was blinded and when). c. The experimental unit (e.g. a single animal, group or cage of animals). A time-line diagram or flow chart can be useful to illustrate how complex study designs were carried out.
Experimental procedures	7	For each experiment and each experimental group, including controls, provide precise details of all procedures carried out. For example: a. How (e.g. drug formulation and dose, site and route of administration, anaesthesia and analgesia used [including monitoring], surgical procedure, method of euthanasia). Provide details of any specialist equipment used, including supplier(s). b. When (e.g. time of day). c. Where (e.g. home cage, laboratory, water maze). d. Why (e.g. rationale for choice of specific anaesthetic, route of administration, drug dose used).
Experimental animals	8	a. Provide details of the animals used, including species, strain, sex, developmental stage (e.g. mean or median age plus age range) and weight (e.g. mean or median weight plus weight range). b. Provide further relevant information such as the source of animals, international strain nomenclature, genetic modification status (e.g. knock-out or transgenic), genotype, health/immune status, drug or test naïve, previous procedures, etc.
Housing and husbandry	9	Provide details of: a. Housing (type of facility e.g. specific pathogen free [SPF]; type of cage or housing; bedding material; number of cage companions; tank shape and material etc. for fish). b. Husbandry conditions (e.g. breeding programme, light/dark cycle, temperature, quality of water etc for fish, type of food, access to food and water, environmental enrichment). c. Welfare-related assessments and interventions that were carried out prior to, during, or after the experiment.
Sample size	10	a. Specify the total number of animals used in each experiment, and the number of animals in each experimental group. b. Explain how the number of animals was arrived at. Provide details of any sample size calculation used. c. Indicate the number of independent replications of each experiment, if relevant.
Allocating animals to experimental groups	11	a. Give full details of how animals were allocated to experimental groups, including randomisation or matching if done. b. Describe the order in which the animals in the different experimental groups were treated and assessed.
Experimental outcomes	12	Clearly define the primary and secondary experimental outcomes assessed (e.g. cell death, molecular markers, behavioural changes).
Statistical methods	13	a. Provide details of the statistical methods used for each analysis. b. Specify the unit of analysis for each dataset (e.g. single animal, group of animals, single neuron). c. Describe any methods used to assess whether the data met the assumptions of the statistical approach.
RESULTS		
Baseline data	14	For each experimental group, report relevant characteristics and health status of animals (e.g. weight, microbiological status, and drug or test naïve) prior to treatment or testing (this information can often be tabulated).
Numbers analysed	15	a. Report the number of animals in each group included in each analysis. Report absolute numbers (e.g. 10/20, not 50%[2]). b. If any animals or data were not included in the analysis, explain why.
Outcomes and estimation	16	Report the results for each analysis carried out, with a measure of precision (e.g. standard error or confidence interval).
Adverse events	17	a. Give details of all important adverse events in each experimental group. b. Describe any modifications to the experimental protocols made to reduce adverse events.
DISCUSSION		
Interpretation/ scientific implications	18	a. Interpret the results, taking into account the study objectives and hypotheses, current theory and other relevant studies in the literature. b. Comment on the study limitations including any potential sources of bias, any limitations of the animal model, and the imprecision associated with the results[2]. c. Describe any implications of your experimental methods or findings for the replacement, refinement or reduction (the 3Rs) of the use of animals in research.
Generalisability/ translation	19	Comment on whether, and how, the findings of this study are likely to translate to other species or systems, including any relevance to human biology.
Funding	20	List all funding sources (including grant number) and the role of the funder(s) in the study.

ARRIVE

The ARRIVE Guidelines: Animal Research: Reporting of *In Vivo* Experiments. Originally published in *PLOS Biology*, June 2010[1]

Nc3rs.org.uk

Materials & Methods

- Provide enough information for someone to replicate your study
- Space can be limited
  - Consider a methods paper
    - Journal of Visualized Experiments (JoVE)
    - MethodsX
    - Scientific Data

Results

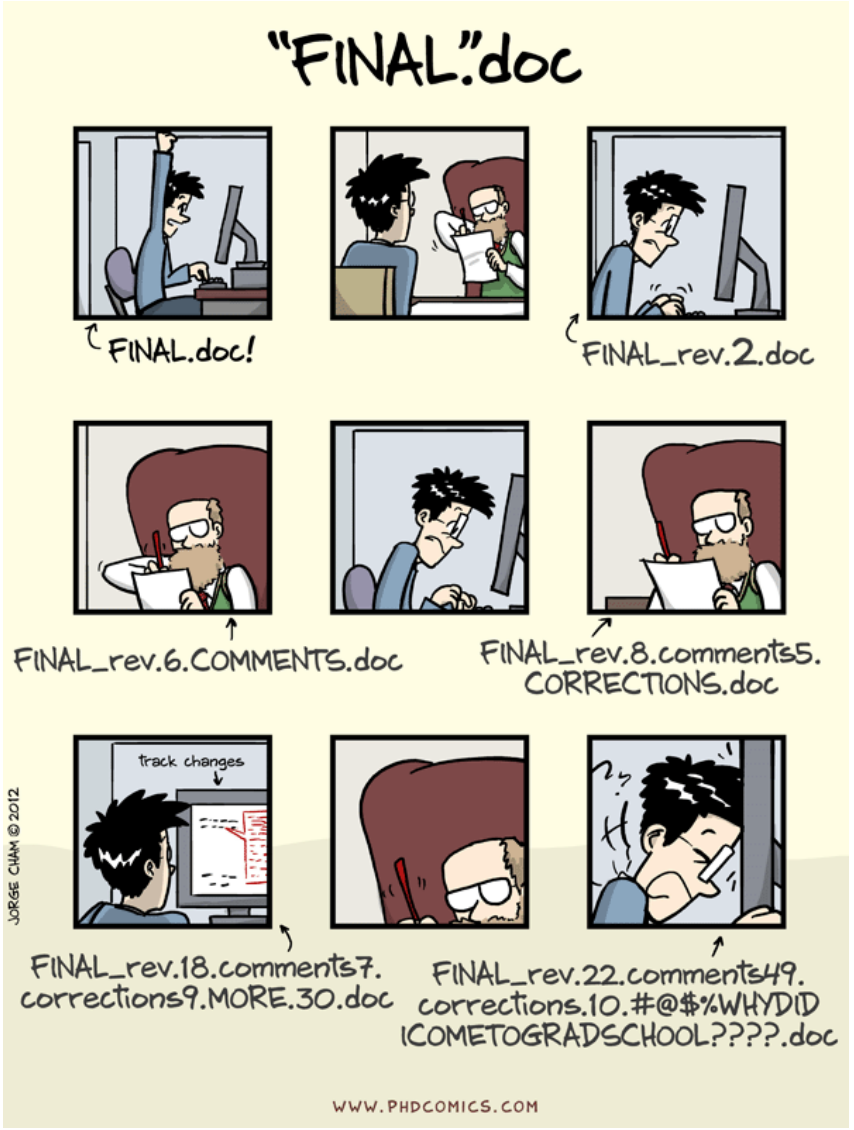
- NOT A DISCUSSION
- Provide a heading for each subsection
- Can provide brief context, but no interpretation
- Sequence should tell a story
- Proceed in the same order as your figures
- Refer to your figures in the text
- Objective

Discussion

- NOT THE RESULTS SECTION
- Don’t ignore things that are counter to your current data/ conclusion. Explain why they may be different and what your new interpretation is
- How did you fill in those gaps in knowledge from the intro?
- How did you address your hypothesis?
- Limitations
- What is the application/ translation?

Editing

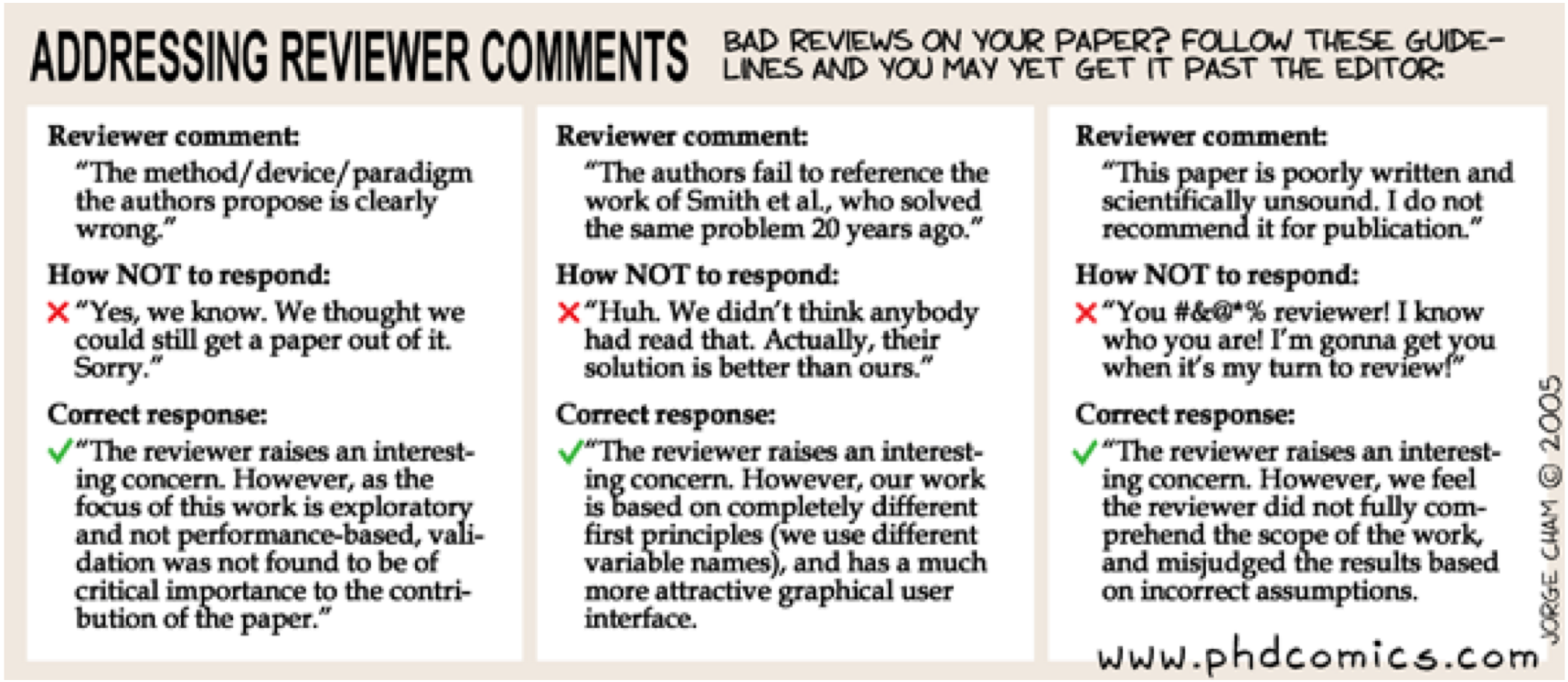
- Do not simply skim or edit lightly
- Read critically- think about each sentence and if it says precisely what you mean to say.



Choosing a Journal

- Consider: audience, editors, review times
- comparison vs papers you are referencing
- ‘Aims & Scope’

The Revision



Authorship

- An author should have made a *substantial, direct, intellectual* contribution
- The funding and provision of technical services, patients, materials alone are not sufficient
- Everyone making a substantial intellectual contribution to the work should be an author
- Everyone making other substantial contributions should be acknowledged
- All authors should review manuscript drafts and approve the final version
- Transparency
- Collaboration

ICMJE guidelines