How to write a paper

Tony Hyman

This document deconstructs the process of writing a paper. It will not create wonderful English, but it will create a structure from which a nice piece of literature can be created.

There are four sections to any paper

In order of importance

Abstract
Results
Methods
Introduction
Discussion

Abstract

In theory an abstract should consist of five sentences

Motivation sentence
Ask the question
Do the experiment
Answer the question
Conclude.

Results

a) First prepare the figures. Is everything publication quality. How many figures will there be? Each figure should make one experimental point.

Each section of the results section should have a standard structure, and normally be supported by one figure.

The results section can be divided into the following types of sentences. When writing the paper, make sure each one of your sentences corresponds to one of these types of sentences.

MS Motivation sentence

Eg we wanted to...
We were interested in.....
Why does.....
Previous experiments had shown.....

GE General experimental outline
This should describe that sorts of methodology you will use.
SE1 Specific experiment 1.
R Results
SE2 Specific experiment 2 (if necessary)
R Results
C Conclusion

When you first write the results section, use these shorthands to label each sentence. In particular, do not worry about the English style. This will come later when you consolidate the phrases into text.

Examples

MS. We wanted to study the role of ATP in movement of kinesin.
GE. We used flow chambers together with Rhodamine labeled microtubules to assess velocity.
SE1. We adsorbed 100mM kinesin to the glass surface, flowed in 106 microtubules. We then flowed in 1mM ATP.
R The microtubules did not move without ATP, but moved at 10mm per minute after addition of 1mM ATP (figure 1a).
C We conclude that the motility of kinesin is dependent on ATP.

MS. We were wanted to know where the microtubule binding domain resides in Stu2p. **GE.** We decided to analyze this by microtubule cosedimentations using the recombinant Stu2p truncations.
SE. We incubated Stu2p truncation at 25 nM with 10 µM Taxol-stabilised microtubules, incubated the reactions for five minutes at room temperature and centrifuged the reactions to separate microtubule bound from unbound protein. Supernatants and pellets were analysed by SDS-PAGE and Western blotting using either an antibody raised against the C- or the N-terminus of Stu2p (figure 2A).
R. We found that the microtubule binding domain resides somewhere between residue 551 and 774, (see table 1).
C. We conclude that the microtubule binding domain is located directly upstream of Stu2p's dimerisation domain but does not overlap with it. This confirms previous results that fine-mapped the microtubule binding domain between amino acid 558 and 658 using in vitro translated Stu2p truncations.

Once you are sure that there is a logical flow through the paper, you can begin to combine the sentences and improve the English.

Introduction

The point of the introduction is to introduce enough information so that you can ask the question you want to ask. It is not to exhaustively summarize the literature. It should go from Broad to focussed

Point 1. Introduce the general question you are interested in.
eg mitotic spindle assembly.

Point 2. Introduce the specific aspect of the problem you are interested in.
Eg. The role of kinetochores in spindle assembly.
Point 3. More precisely state the problem from point 2.
Eg. What is the role of CenpA assembling a kinetochore capable of participating in spindle assembly

Point 4. Introduce the particular systems in which you are interested in point 2.
Eg. C.elegans is a good system to study kinetochore assembly because...
Point 5. Introduce the specific question in the specific system.
Eg. The phenotype of CenpA in C.elegans is unknown.

Then you have taken them down to your question.
What is the role of CenpA in kinetochore assembly in C.elegans, and how does this contribute to spindle assembly.