

How to write a scientific report

General

Always consider who is your audience in every report you write. Here, you should address a fellow scientist, a PhD-student, which is familiar with lab work and different methods, but has no insight into your particular area of research.

Use the format of a scientific paper.

1. Title
2. Introduction
3. Materials and methods
4. Results
5. Discussion
6. References

Remember this when separating information between *Materials and methods*, *Results and Discussion*:

- *Materials and methods* describe **HOW** you did your experiment.
- *Results* describe **WHAT** you have done and what the figures show.
- *Discussion* tells what your results **MEAN**.

Example:

Materials and Methods

“Samples were loaded on a 10 % polyacrylamide gel and run at 150 V for 1 hour using Tris-Glycine-SDS buffer.”

Results

“Proteins were separated on a gel and the results are shown in Fig. 1. Bands could be seen in lanes 2,3 and 5, while lanes 4 and 6 were blank.”

Discussion

“The binding assay (Fig.1.) shows that protein X binds to protein Y but not to protein Z.”

Hint: Look at published papers on how they describe a particular experiment, then rewrite it to fit your project and your conditions.

Title

The title should not be too long; generally less than ten words and it should reflect the report. A good title is straightforward, and uses keywords that scientists (and databases) can recognize.

Introduction

The introduction defines the subject of the report. It should give the reader sufficient background to understand the rest of the report. Previously published results and “old truths” should be described in present tense. Limit the background to whatever is relevant to the experiment. A good introduction should answer several questions, including the following:

What is the aim of the study?
Why was this study performed?
What knowledge exists about this subject?
What is the hypothesis?

Materials and Methods

The difficulty in writing this section is to provide enough detail for the reader to understand and repeat the experiment without overwhelming him or her with unnecessary details. Remember; whom are you writing for? The whole section should be written in past passive tense; i.e. “Cells were centrifuged...” and NOT “We centrifuged the cells...” Avoid recipe-type of writing (“take 1 ml of this and put in 10 ml of that”).

What you need to specify is the concentration of reagents in the reaction, amount of product loaded on gels, physical conditions like pH or temperatures, time of incubations (unless these facts are very obvious or described otherwise). If you have worked with cells; type of cells, type of media, sizes of the cell plates, number of cells, method for harvest etc.

If you did not do a procedure yourself, for example your supervisor gave you a plasmid or a purified protein, you do not need to specify how it was made. It is enough to state the name and that it was given to you by that person. When you are doing procedures with commercial kits and reagents, it is enough to specify the name of the reagent and the producer, because then everyone can easily obtain information about the procedure.

You also need to write about the ethical side of the project. For an example in this section, did you use patient samples or other material that needs an ethical consideration?

Results

The results section should summarize the data from your experiments without discussing their implications. You should start with a short description on what you have done and why as an introduction to each figure. The main text must have a description of what the figures are showing. It must be possible for the reader to understand the described results without looking at the figures.

The data should be organized into tables, figures, graphs, photographs, and so on. All figures and tables should be numbered and have descriptive titles. They should have a legend explaining any symbols, abbreviations, or special methods used. They should be self-explanatory, so that the reader can understand them without having to read the text, BUT there should be NO analysis in the main text of the figure legend only descriptive information.

Focus on general trends - don't get stuck on details. Ask yourself, is this relevant for my report?

Discussion

In the discussion you should interpret your data and relate them to other similar data, theories or other knowledge. Speculations (unless wild) are warranted.

You can include suggestions for improvement, sources of error, and suggest future experiments to clarify something.

Can you accept or reject your hypothesis? If so, what is the logic/rationale for doing so? If you can't, explain why you can't.

Can you draw any conclusions?

Does the research you have been involved in have any other ethical side that needs to be considered and discussed?

References

Whenever you introduce a fact in your report that is not general knowledge you must back it up with a reference. This also goes for methods that you have used that have been published in detail. The reference lists should thus include all articles or books cited in your report.

Different scientific journals require different formats for citing literature. Here we recommend the following style (Virology):

Andersson A.B., Bengtsson B.C, 1999. Regulation of transcription in adenovirus type 5. *J. Virol.* 14 (5), 947-955.

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