

5 Steps to writing your results and discussion

The results may stand alone in their own section or may be combined with the discussion. Please check the convention of your target journal.

RESULTS - What did I find out?

This is an objection description of your findings, where you

INTRODUCE ⇒ DESCRIBE ⇒ PRESENT ⇒ HIGHLIGHT

DISCUSSION – Why did this happen?

This is where you consider the results, looking for:

REASONS ⇒ MEANINGS ⇒ SIGNIFICANCE

For example

You will describe and present your most relevant/important data; and will highlight an interesting finding, relationship, pattern, or correlation – these are results! Suggesting why this may have occurred and what this means, the significance of the work should be placed in the discussion section.

A combined results and discussion section

Some journals combine the results and discussion sections, e.g. *The International Journal of Pharmaceutics*. When this is the case, one result of interest is taken at a time and reported, presented and discussed before consideration is given to the next.

The most important result is described first and presented (e.g. figure, table) and interesting observations are highlighted. This is followed with a paragraph that analyzes and discusses it ... potential causes or reasons behind it, together with its meaning and significance.

The next most important result is presented next and considered in the same way until the key results you wish to focus on have been covered.

Separate results and discussion sections

Some journals have separate results and discussion sections, e.g. *The British Journal of Pharmacology*. For these journals, it is important to draw a very clear distinction between what goes in the results section and what goes in the discussion.

In the **results section** you introduce your results, describe them, present them in an appropriate format, and highlight interesting or key findings. **DO NOT be tempted to discuss their meaning or significance or implications here.**

Save ALL discussions for the **discussion section**, which is where you analyze and discuss the significance of the results you have presented.

Start the discussion with a general **first paragraph** that gives an overall picture of the results and summarizes them and also links them to the research question.

Paragraphs 2 and 3 (plus) take the key presented results (in the same order as in the results section) and discuss each in turn – their meaning, significance and implications, etc., and referring to and drawing comparisons with current related results available in the literature. Present both sides to an argument and add your views in line with your results to develop these further (likely coming down in support of one side).

Any lesser results can be discussed together, again relating to literature sources. Finally, mention any study limitations and make suggestions for future work.

Tips for writing your results

- Always **begin with text** and write in the **past tense**
- Be **accurate** – take care in transcribing and representing findings
- Include key results only ... **not all results (!)** ... and relate specifically to the research question - positive and negative results can be equally important!
- **Order** it with the most significant result first
- Use the **text to describe results**, and a **table, figure or graph to illustrate them** (convention for the IJP is to have all tables and figures separately at the end)
E.g, “*The release of drug from the matrix followed a squared root dependence on time (Figure 3)*”.
- Include **fully annotated** tables, figures or graphs – including: a descriptive title, labelled columns or axes, units, legends with a key if necessary
- Ensure any curve fitting is appropriate to the data
- Consistently give all the correct SI units as appropriate
- **Number equations**
- **Describe** the results - what did you see?
- **Highlight** interesting findings.
- **Show calculations**, where appropriate – check these and ensure a consistent approach to the use of significant figures (that it follows through the calculation and is appropriate to the measurement taken – don’t quote a level of precision that you can’t support)
- Indicate the **statistical significance** of your results, if relevant

Tips for your discussion

- **Relate to your research question**
- **Relate to the literature** and your introduction, and use published work to support or contrast with your findings and meanings
- Write in the **present tense**
- **Relate directly to the results** you have documented and presented
- **Focus** on one or two key findings in detail
- **Say why** you think this happened, what possible explanation(s) there are for a particular result ... there may well be more than one possible explanation, so include both!
- **Support, explain and defend** your interpretations
- **Discuss the unexpected** - *What does it mean, why did it happen what are the implications?*
Continuing with the example above (under 'Tips for your results'), you should note that the second sentence is clearly an explanation:
"The release of drug from the matrix followed a squared root dependence on time (Figure 3). Such root time kinetics are often exhibited by other controlled release systems of this type, and is generally attributed to the fact that a zone of depletion arises at the interface of the polymer".

Do NOT:

- Speculate, e.g. "... if I had done this, it might have ..."
- Find things that really aren't there!
- Overstate the importance of the results
- Get carried away or go off on a tangent - stay focused on your results



Look at the literature available in some of the 'results' and 'discussion' or 'results and discussion' sections of papers (in your field). Notice how sections are written. Scrutinize their format and content, and notice how closely they are aligned, or how different they are, to our recommendations below.

Look at articles from, for example:

Journal of Pharmaceutical Sciences (combined results and discussion)

International Journal of Pharmaceutics (combined results and discussion)

British Journal of Pharmacology (separate results and discussion sections)

Journal of Microbial & Biochemical Technology (separate results and discussion sections)



5 steps to writing up your results

		✓
STEP 1	DECIDE Which of your results to include <ul style="list-style-type: none">• Be selective (pages of data and tables are not appropriate)• Which results are the most interesting? It may be that a negative result is as significant as a positive one• Order the results with the most significant/interesting first	
STEP 2	PRESENT your results: <ul style="list-style-type: none">• Describe them using narrative text and be succinct – this is no place for waffle• Represent them in a table, figure and/or graph...• Directly link what you say in narrative to the table/figure/graph - what does it show?• Highlight points of interest	
STEP 3	CHECK STEP 2: <ul style="list-style-type: none">• Is every table, figure or graph preceded by explanatory text?• Is your writing clear and to the point? – edit it now• Is your representation of data clear – have you chosen the correct form to represent it?• Have you checked that every table, figure or graph is fully annotated and has a title, column headings, axes labelled, units specified, a key ...?• Is your table/graph/figure the right size and to the correct scale?	
STEP 4	IDENTIFY <ul style="list-style-type: none">• What is particularly significant?• How big is the change (quantify it ... percentage??); how steep is the gradient?? How fast did it happen?? ...• Indicate statistical significance where relevant	
STEP 5	CHECK and EDIT for readability and accuracy <ul style="list-style-type: none">• Consider organising the text using sub-headings to help the reader navigate the information• Can these sub-headings mirror those that you used in your methods section?• Ask a colleague or two to check to see if they can understand your results ... is there anything that needs explanation or any omissions to figures or graphs? Etc.	



5 steps to develop your discussion (separate discussion section)

		✓
STEP 1	OPEN: <ul style="list-style-type: none">• Lead in with a paragraph to broadly summarize your results• Link to your research question and aim.	
STEP 2	FOCUS on one or two key finding(s) from the results that you have presented. <ul style="list-style-type: none">• What do (might) these key findings mean? ... explain them.• What is their significance?	
STEP 3	DISCUSS: <ul style="list-style-type: none">• These key results and link to the literature (using different references to that of the introduction)• How are your results similar/different? Why?• Do your results confirm or dispute what has gone before?• What do your results add that is new to the research subject?• Are there any key study differences or limitations?	
STEP 4	MENTION <ul style="list-style-type: none">• Any lesser results that you want to include but do not warrant particular focus. Do this all together in one or two paragraphs.	
STEP 5	FUTURE <ul style="list-style-type: none">• Are there any limitations to this study?• Are there things that you would do differently next time?• Are there questions that remain unanswered?• Have any new questions emerged as a result of your project?	