

Paper Writing

EGCL Research Manual

“A paper is the result of scientific thinking, not scientific writing.”

1. A Paper Begins Long Before Writing

I can often predict, even before receiving a student's first manuscript draft, what level of draft they are likely to bring. The basis for that prediction is neither their English proficiency nor the amount of experimental data they have. More than 90% of the time, I can tell simply by watching how they explain their research during individual meetings.

A student who cannot explain why an experiment was performed, interpret what the result means, or articulate why the next experiment is necessary will face exactly the same difficulty when writing a paper. By contrast, a student who has already built the logic of the study during meetings can produce a strong draft even if their English is not perfect.

A paper does not begin when you start writing the manuscript. It begins when you start thinking about the research. Individual meetings are not merely occasions to report results; they are where the backbone of the paper is built. In the era of GPT, the most important element of a paper is not English. It is logic.

2. Results Are Not a Narration of the Figure

One of the most common mistakes students make is treating the Results section as an instruction manual for reading figures. For example, an entire paragraph may be filled with statements such as, “CO₂ uptake increased from 1.24 to 1.57 mmol g⁻¹.” But the reader has already looked at the figure and can read the numbers.

Simply repeating the numbers contributes very little to the value of a paper. The purpose of the Results section is not to read the figure aloud, but to explain what the figure means. Why did the value increase? What mechanism does it suggest? How does it connect to the previous figure? What is new when compared with the existing literature? The Results section should answer these questions.

A good Results section does not stop at observation.

Observation -> Interpretation -> Scientific implication -> Previous literature -> Next question

Students often try to separate Results and Discussion completely. In a strong paper, however, interpretation begins the moment a result is presented. Discussion is not a separate chapter detached from the Results; it begins within the Results and gradually becomes deeper.

3. Revision Is Not About Writing a Letter

Students sometimes mistake revision for the process of writing a reply to reviewers. In reality, they often do not think deeply enough even about the response letter itself. After receiving reviewer comments, one of the statements I hear most often in the lab is, “I think the reviewer did not understand the paper.” Whenever I hear this, I ask again:

“Did the reviewer really fail to understand it?”

A paper is ultimately an act of persuasion. If a reviewer did not understand something, the responsibility often lies more with the author than with the reviewer. Of course, reviewers can be wrong. But before assuming that, the author should first ask why the manuscript was read that way.

Students often treat each reviewer comment as a single question. They think that if they prepare an answer to that question, the revision is complete. But the reviewer is not merely asking one question; the reviewer is pointing to something that was missing or weak in the logic of the paper.

And the process does not end once an answer has been written in the response letter. Think of a paper as a building. Suppose the original manuscript is a traditional Korean hanok, and the reviewer suggests installing a large modern window. If you simply attach that window without reconsidering the rest of the structure, the building may become an awkward hybrid that is neither a hanok nor a modern house. To add a new window properly, the position of the columns may need to change, circulation may need to be redesigned, and even the roof structure may need to be reconsidered.

A paper is the same. When new data are added, the order of the figures may need to change, the logic of the Introduction may need to be rewritten, and the Discussion and Conclusion may need to be rebuilt as well.

Revision, therefore, is not the process of answering reviewer questions one by one. It is the process of using the reviewers' perspective to remake the paper into a better piece of work. The response letter is only a letter explaining that process. The best way to persuade reviewers is not to write a clever letter, but to make the manuscript they read substantially better than before. If the revision itself is strong, the response letter will follow naturally. A strong response letter alone cannot create a strong revision.

Closing Note

A paper is not merely a means of gaining Impact Factor, nor is it simply an achievement that adds one more line to a CV for employment. A paper records what question a researcher asked, what evidence they used to make judgments, and how honestly they arrived at their conclusions. And that record remains with the researcher's name for life.

Of course, publication records affect graduate admissions, employment, and career development. But they should not be the starting point of research. Publishing in a prestigious journal and doing good science are not always the same thing. A high Impact Factor does not compensate for insufficient scientific thinking, and a large number of papers does not mean that a researcher truly understands and owns the work.

Even if people in other laboratories treat research mainly as a credential for employment or as a competition for output, that attitude is not acceptable in EGCL. If papers are viewed only as tools for obtaining Impact Factor and building a publication record, then no matter how many papers are written, it will be difficult to be recognized as a genuine researcher.

What I expect from a student is not a certain number of papers. I expect the ability to explain why the research is necessary, to understand what the data mean, and to take responsibility for one's interpretation and conclusions to the end.

A person who does not have ownership of their research is not a researcher. Ownership does not mean that you performed a large number of experiments. It means that you understand every figure, can explain every sentence, and do not avoid unexpected results or uncomfortable questions. Treating reviewer criticism not as an annoying obstacle but as a question that forces you to reconsider your own science is also part of ownership.

A good researcher is not simply someone who submits papers. A good researcher is someone who remains responsible for their research and their name to the very end.