

# Writing Research Articles

## How to Write the Introduction Section

### Function of the Introduction:

1. Place your research into a broader context
2. State the importance/significance of your research
3. **State your question/hypothesis**
4. Give the reader enough information to appreciate the importance of your question and the logic of your approach.

A convenient model is the **Funnel shape**, going from background to specific question. (B→Q)

### A few questions to ask yourself before you start writing your Introduction:

1. **What is your article about?** Phrase your research in terms of a question you are asking or a hypothesis you are testing. What problem is your paper solving? What question are your experiments answering? What hypothesis are you testing? Sometimes, you cannot state that question or hypothesis clearly until you have carried out all the experiments and examined the “answer” that emerge your results. That’s alright. What it means is that you may not want to start writing your manuscript with the Introduction. Write your Methods and Results first, take a stab at the Discussion, and then the Why? and So What? of your paper will become clearer.
2. **What is the big picture?** What is the broader context of your question or hypothesis? What is the bigger problem that your experiments are tackling? Why did years of research leave that particular question unanswered? Why should anybody care about this research? What is the first word or concept you want your readers to encounter?
3. **How will you go from the big picture to your question/hypothesis?** One way is to narrow the focus of the “Big question” progressively until the problem your paper solves becomes understandable. Another is to provide progressively broader backgrounds to the problem you are solving. Easier said than done! In practice, the proper organization of the Introduction may not become obvious until you have written several versions! In any case, keep in mind that you are not writing an exhaustive review of your field. Ask yourself: “**what does the reader need to know to understand why my question matters and why my approach makes sense?**”

### Making an outline:

1. Make an **outline** using the **funnel shape**: “Big picture” at the top, your Question/Hypothesis at the bottleneck, experimental design, model system, summary of results, below the question.
2. Fill the funnel with the steps that lead from the big picture to your specific question. Try summarizing the topic of each step in a simple statement, e.g. “Evidence that c-myc is important for stem cell replenishment.” “Tactics the tobacco industry used to hide the impact of smoking on cancer.” “Arguments to support the use of flies as model systems to study behavior.”
3. Eventually, these shorthand statements will become **topic sentences** for the various sections/paragraphs of your introduction. E.g.
  - a. “Many studies have shown that c-myc is important for the replenishment of stem cells. For instance...”
  - b. “The tobacco industry has made many attempts to conceal the ill effects of smoking from the public as well as the scientific community. In some cases...”
  - c. “One of the reasons why flies are a promising model system to study addiction is that their responses to drugs resemble in many ways the responses of humans...”



### **Writing the Introduction using topic sentences and transitions:**

1. A topic sentence is like a flag or a title that announces to the reader what the paragraph is about. All sentences in a paragraph should be related to the topic announced by the topic sentence. In some cases they will be illustrations of the principle summarized in the topic sentence. In other cases, they will be steps in a reasoning that began with the topic sentence. Sometimes the paragraph does not start with a topic sentence: the topic sentence concludes the paragraph.
2. Even when they start with a topic sentence, some paragraphs might also need a “wrap up” statement, especially if they are long or contain complex information. The wrap up sentence gives the reader the take-home message of the paragraph. It can also serve as a nice springboard for the next paragraph.
  - a. “While these studies do not provide an exact mechanism for protein X’s function, they all suggest that X is indispensable for cell proliferation in mammalian cells.
  - b. On the other hand, none of these studies addressed the possibility that X also controls cell survival. Yet, X’s sequence shows similarities to yeast proteins involved in cell survival...”
3. Whenever possible, link paragraphs with transition words or transition sentences. See example in section 8.
4. Some principles for organizing information:
  - a. Known to unknown, familiar to surprising: good principles to set the stage for a question you wish to address.
  - b. Most important to least important, pros and cons: useful to organize arguments within a paragraph.