



## Writing a research paper: A practical guide for students

April 30th 2019

A talk entitled “Writing a research paper: A practical guide for students” was presented by Professor Duncan R. Smith at the Institute of Molecular Biosciences on the 30th April 2019. This talk was an updated version of a presentation given on July 31st 2018. It was pointed out that research publications have particular importance for PhD students, as publication is one of the requirements for graduation. Over and above this, the ability to write a research paper is a critical career skill for those to pursue a research based career. The aim of the talk was to give practical suggestions.

It was emphasized that a paper should have a single, coherent and logical theme, and that paper should be clear in the message that they wish to convey. All parts of the manuscript should be prepared with this single "story" or message in mind. It was advised that manuscripts not be written in the order in which they are read (Title, abstract, Introduction, materials and methods, results, discussion and conclusions). Rather writing should start with the preparation of **Figures** (and figure legends) and **Tables**. This will allow the experiments to be put in a logical order. It was pointed out that there is no requirement to present experiments in the order in which they were undertaken, but rather should be arranged in a logical sequence that best supports the message of the manuscript. Once Figures and Tables have been prepared, the next section to be written should be **Materials and methods**. For students this is their strong point, as they undertook the experiments directly, and will have great familiarity with the methods. Next the Results section should be written and again this is one of the strongest points of the students as the data is their data. Preparation of the Discussion is the next logical step. It was strongly emphasized that the Discussion is not a simple replication of the results, but should critically discuss those results. A stylized 5 paragraph discussion format was presented as a working framework. Paragraph 1 is the big picture paragraph, paragraph 2 should present a critical analysis of major findings, paragraph 3 should discuss additional findings, paragraph 4 should highlight limitations of the study, paragraph 5 should discuss future directions and paragraph 6 should present the overall conclusions of the study.

The Introduction is the next section of the manuscript, which should be succinct and not stray into an extensive literature review. The concept of the “Inverted triangle” was introduced, where the Introduction starts at a global level (the importance of the research question) and focuses by successive paragraphs to the purpose and aim of the study. The Introduction ideally should consist of 4 to 6 paragraphs. The Abstract is a concise, word limited description of the study. It should encompass the background, methods, results and conclusions. The Title should be the last thing written, and a good title should be concise and informative. Avoid words such as “new” “novel” and “first”. Additional matters discussed in the presentation included Supplemental materials, authorship, affiliation, disclosures and acknowledgements (funding). Other material covered included examples of “Research highlights”, “Graphical abstracts” and the importance of a well prepared cover letter to accompany the submission to the manuscript.