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Every year Jessenius Faculty of Medicine in Martin admits several tens of graduates for post-graduate study in various branches of medicine and nursing. Within this study the students are immediately enrolled into scientific research programmes. The results of their research are to be reported to a broad community of other scientists. Usually the PhD students write a paper which they either deliver at a scientific conference or publish as an article in a scientific journal. Many beginning science writers have to write, for the first time, a standard paper, whose format, structure, content and style are completely different from a descriptive or narrative newspaper article. In our paper we want to instruct the young scientists how to manage the strategies of writing a scientific research article or a paper.

Why a Scientific Format?
● It enables an effective communication of scientific findings to a broad community of scientists in a uniform manner.
● It allows the papers to be read at several levels. For instance, many people skim titles to find out what is available on a subject. Others may read only titles and abstracts to get a rough idea what are the articles about. And only those who are deeper interested in research results may decide to read the whole text.

The Sections of the Paper
Most scientific research papers are subdivided into the following sections: Title, Author’s Name and Institutional Affiliation, Abstract, Introduction, Material and Methods, Results, Discussion, Acknowledgements, and References (Literature cited). Editorial board of each journal provides detailed Instructions to/for Authors specifying the required format, spacing, capitalization, centring, etc.

1. TITLE
A title should be concise but informative, containing the key words of the paper. It should succinctly describe the contents of the paper. If possible it should be short and unambiguous, yet be an adequate description of the work.

2. AUTOR’S NAME AND INSTITUTIONAL AFFILIATION
The person who did the research and wrote the paper is generally listed as the first author of a research paper. Other people who substantially contributed to the work are also listed as authors. They all should be informed about it. If you want to include your tutor among the authors, ask him for permission before including his/her name as co-author.

Affiliation concerns the institution, the authors represent in public.

Do not include professional titles or academic degrees.

3. ABSTRACT
An abstract summarizes, usually in one paragraph, the major aspects of the entire paper in the following prescribed sequence:
• the purpose or specific objectives of the study or investigation, (from Introduction)
• the basic methodology used, (from Material and Methods)
  (e.g. the number and type of patients involved, experimental animals, analytic methods, and key techniques used)
• the major findings including key results achieved (from Results)
• the principal conclusions (from Discussion), which should be stated clearly and briefly without lengthy discussion.

The length of an abstract may be anything from 100 – 250 words. To some extent, length depends on how extensive the topic of the paper is and how complicated or numerous are the results. However, check the Instructions to/for Authors for possible details about maximum length of the abstract.

The abstract should be a little less technical than the article itself in order not to dissuade the potential audience from reading the paper. But remember, it may be the only part that the readers can obtain via electronic literature searches or in published abstracts. Therefore, enough key information must be included to make the abstract useful to someone who may to reference your work.

Although it is the first section of the paper, the abstract must be written last since it will summarize the paper. Once you have completed the abstract, read it once more to make sure that all the information in the abstract completely agrees with what is written in the paper.

The abstract is only text. No figures, tables, charts or illustrations. Avoid lengthy background information, references to other literature. Write your abstract using concise, but complete sentences, and get to the point quickly.

4. INTRODUCTION

A good introduction is a clear statement of the problem or project and the reasons that you are studying it. This information should be contained in the first few sentences. Give a concise and appropriate background discussion of the problem and the significance, scope, and limits of your work. State the purpose of the work in the form of the hypothesis, question, or problem you investigated; and briefly explain your rationale and approach and, whenever possible, the possible outcomes your study can reveal. Outline what has been done before by citing truly pertinent literature, but do not include a general survey of semirelevant literature. State how your work differs from or is related to work previously published. Demonstrate the continuity from the previous work of yours. The introduction can be one or two paragraphs long. Often, the heading “Introduction” is not used because it is superfluous; opening paragraphs are usually introductory.

5. MATERIAL AND METHODS

In research reports, this section can also be called “Experimental Methods”, “Experimental Section”. For experimental work, give sufficient detail about your materials and methods so that other experienced workers can repeat your work and obtain comparable results. When using a standard method, cite the appropriate literature and give only the details needed.

Explain how you studied the problem. Depending on the kind of data, the section may contain subsections on experimental details, materials used, data collection/sources, analytical or statistical techniques employed, study area, etc.
Provide all background data, equations, and formulas necessary to the arguments, but lengthy derivation are best presented as Supporting Information. Include flowcharts, maps or tables if they aid clarity or brevity, but do not include results yet.

6. RESULTS

Explain your actual findings, using subheadings to divide the section into logical parts, with the text addressing the study aims. Link your writing to figures and tables as you present the results. The achieved results are often organized into a series of Tables and/or Figures to present your key finding in a logical order. Important negative results should be reported, too. Mention any uncertainty in measurement or calculation, and use an appropriate number of decimal places to reflect it. Make comments on the results as they are presented, but save broader generalizations and conclusions for later.

7. DISCUSSION

The purpose of the discussion is to interpret and compare the results. Be objective: point out the features and limitations of the work. Relate your results to current knowledge in the field and to your original purpose in undertaking the project. Briefly state the logical implications of your result. Suggest further study or applications if warranted.

Stand back from the details and synthesis what has (and has not) been learned about the problem, and what it all means. Say what you actually found, not what you hoped to find.

Do not repeat information given elsewhere in the manuscript.

Important Note: this section is often combined with either the Results section or the Conclusion section. Decide whether understanding and clarity are improved if you include some discussion as you cover the results, or if discussive material is better as part of the broader summing up.

8. CONCLUSIONS

The purpose of the Conclusion section is to restate the study aims and key questions and summarize the findings. Keep this section brief and to the point. Do not repeat discussion points or include irrelevant material. The conclusions should be based on the evidence presented.

9. ACKNOWLEDGEMENTS

This is an optional section. Thank people who directly contributed to the paper, by providing data, assisting with some part of the analysis, proofreading, typing etc. This paragraph is used to acknowledge people, organizations, and financing. As simply as possible, thank those persons, other than co-authors, who added substantially to the work, provided advice or technical assistance, or aided materially by providing equipment or supplies. If applicable, state grant numbers and sponsors here, as well as auspices under which the work was done, including permission to publish.

Follow the journal’s guidelines on what to include in the Acknowledgments section. Some journals permit financial aid to be mentioned in acknowledgments, but not meeting references. Some journals put financial aid and meeting references together, but not in the Acknowledgment section.

10. REFERENCES (LITERATURE CITED)

References to the research findings of others are an integral component of any research paper. The usual practice is to summarize the finding or other information in your own words and then cite the source. Within the text, cite references by author and year unless instructed oth-
erwise, for example Dzuganova (2009) stated that … or Several studies have found that… (Dzuganova, 2009; Dzugan, 2010). For two authors, list both names, and for three or more use the abbreviation et al. following the first name, for example Dzuganova and Dzugan (2007) or Dzuganova, et al. (2010).

As a rule, in research papers, direct quotation and footnoting are not practiced – simply restate the author’s ideas or findings in your own words and then provide a citation.

Attribute every idea that is not your own to avoid plagiarism. Plagiarism (use of others words, ideas, images, charts, etc. without citation) is not to be tolerated and can be easily avoided by adequately referencing any and all information you use from other sources. In the strictest sense, plagiarism is representation of the work of others as being your work.

In many journals, references are placed at the end of the article, in others, they are treated as footnotes. In any case, place your list of references at the end of the manuscript. The cited literature gives a complete list of references that you actually cited in the body of your paper. In the Reference section list citations in alphabetical order.

Overview

The format and structure presented here is a general one; the various scientific journals utilize slightly different formats and/or writing styles. Mastery of the format presented here will enable you to adapt easily to most journal-specific formats. While this guide is a necessary tool of learning the scientific writing style and format, it is not sufficient, by itself, to make you an accomplished writer. You must practice writing and thinking within this structure, and learn by example from the writings of others: learning the nuances of this style and format will be enhanced as you read the scientific literature – pay attention to how professional scientists write about their work. You will see improvement in your own scientific writing skills by repeatedly practicing reading, writing, and critiquing of other’s writing.

Getting Started

Order and organization: The first task to accomplish as you begin the process of writing is to order and organize the information you wish to present. As the paper will be divided into sections, you need to know what information will go into each.

Audience: Who will be reading your paper? Knowing your audience helps you to decide what information to include. Do not write your paper specifically for your tutor.

Style of Scientific Writing

Be clearly and concise. Write briefly and to the point. Make sure that every paragraph has a clear topic sentence and that the paragraph content supports the topic. The goal is to report your findings and conclusions clearly, and with as few words as necessary.

Your writing should be in complete sentence and easily understood. Do not use elliptical (i.e. ending with …) or incomplete sentences. Do not use contractions: for example, “don’t” must be “do not” and “isn’t” must be “is not” etc. The paper should conform to the conventions of standard written English (sentence form, grammar, spelling, etc.).

Your ideas will have little impact, no matter how good the research is, if they are not communicated well. Remember always that scientific terminology very often has precise meaning. Be certain you choose your words correctly and wisely. Do not try to impress people by using words most people have never heard of. A critical function of terminology is to say a lot with a few words, i.e., economy. This applies as well to appropriate abbreviations. If abbreviations have to save the space, and you want to use them, introduce the full term first, and only then use its abbreviation, e.g. the temporomandibular joint disorders (TMD).
Abbreviations are always used for **units of measure**. Always abbreviate these when using them with data (2 mm; 10 min.). Expect for temperature units (F, C, K) never abbreviate units of measure when using them in a non-data context (e.g., “we measured length in millimetres”; “time was recorded in minutes”; temperature was measured in F (or C”); 60 years have passed since Sir Fleming discovered penicillin.

**Use Past Tense:** Research papers reflect work that has been completed, therefore use the past tense throughout your paper (including the Introduction) when referring the **actual work** that you did, including statement about your expectations or hypotheses. Use the past tense, as well, when referring to the work of others that you may cite.

**First vs. Third Person:** The use of first vs. third person constructions varies widely. Some disciplines and their journals have moved away from a very strict adherence to the third person constructions, and permit limited use of the first person in published papers (i.e. “I/we undertook this study ...”). Other disciplines, especially the biomedical field, still prefer the third person constructions and passive voice, e.g. “High blood pressure was confirmed.”

**Use Active Voice:** It shortens the length of sentences considerably. Writing that overly uses passive verbs is deadly to read and almost results in more words than necessary to say the same thing, e.g. PASSIVE: “oxygen was consumed by the mouse at a higher rate ...” 

ACTIVE: “the mouse consumed oxygen at a higher rate ...”

Instead of: The rats were injected with the drug. Write: We injected the drug into the rat.

Instead of: The samples were analyzed. Write: We analyzed the samples.

**Be careful with commonly confused words:**

Temperature has an effect on the reaction. x Temperature affects the reaction.

**Use verbs instead of abstract nouns.**

Instead of: take into consideration  
Write: consider

**Use concise terms.**

Instead of:  
**prior to**
due to the fact that
in a considerable number of cases
the vast majority of
during the time that
in close proximity to
it has long been known that

Write: before  
because
often
most
when
near
we know that

**Use short words.**

“I would never use a long word where a short one would answer the purpose. I know there are professors in this country who “ligate” arteries. Other surgeons tie them, and it stops the bleeding just as well.”

Oliver Wendell Holmes, Sr.

**Use short sentences.**

A sentence made of more than 40 words should probably be rewritten as two sentences.

**Edit your paper !!!**

A major part of any writing assignment consists of re-writing. Scientific writing must be accurate. Check your grammar, spelling and punctuation. Do not use unnecessary commas. Proof-read carefully to see if you have not left out any words.
Use a spellchecker, but be aware that they do not catch all mistakes e.g. When we consider the animal as a *hole* vs. *whole* (ako celok)...Your spellchecker may not recognize scientific terms.

**Note at the end:** Most journals accept papers for publication only after peer review by a small group of scientists who work in the same field and who recommend the paper be published (usually with some revision).

**References**


**Internet sources:**


Comrie A. C. *Scientific Report Writing.*
Internet: <http://geog.arizona.edu/~comrie/geog230/report.htm>


*Instructions for Authors* that appear in each publication’s first issue of the year and on the World Wide Web at [http://pubs.acs.org](http://pubs.acs.org).

*Writing a Scientific Research Article. Format for the Paper.*
Internet: <http://www.columbia.edu/cu/biology/ug/research/paper.html>

Internet: <http://www.oup.com/us/samplechapters/0841234620/?view=usa>