OTHER ISSUES IN SCIENTIFIC PAPERS

PAPER

"WORKSHOP WRITING INTERNATIONAL JOURNAL"

Oleh

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WORKSHOP

"WRITING SCIENTIFIC PAPER FOR INTERNATIONAL JOURNAL"
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Other Issues in Scientific Paper

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STYLE

In all sections of the paper, present tense should be used to report background that is already established. For example, "The cell membrane is the barrier which separates the inside of the cell from the outside." Use future tense for work that you will do. For example, "We will test the hypothesis that some anti-microbial agents can permeate the cell membrane during division to inhibit growth." Always use past tense to describe results of a specific experiment, especially your own. For example, "Application of the antibiotic Chloramphenicol restricted growth of *E. coli*.". Number the pages of the body of the paper beginning with the Introduction as page 1. For a short paper a "Table of Contents" is generally not necessary.

CAPTIONING

Captioning is a method of separating the body of a paper into sections. Headings show organization and identify the topic for a section or a block of information. Capital letters, underlining, point size, and position on the page help to differentiate rank or level.

TITLE PAGE

Select an informative title as illustrated in the examples in your writing portfolio example package. Include the name(s) and address(es) of all authors, and date submitted. "Biology lab #1" would not be an informative title

The person reading, grading or judging a scientific paper can be most objective if the author remains anonymous while the paper is read. Your name, date, and title of the paper should be on a cover page, and not on any other part of the paper. See the "Rules for the Paper Competition" for additional information needed on the title page if you are entering the NMJAS Paper Competition. Your title should be specific in describing the experiment you performed. For example, "Effects of a Variety of Anti-microbial Agents on Four Bacterial Cultures" is much more interesting than just "Anti-microbial Agents".

ABSTRACT

The summary should be two hundred words or less.
An abstract is a concise single paragraph summary of completed work or work in progress. In a minute or less a reader can learn the rationale behind the study, general approach to the problem, pertinent results, and important conclusions or new questions

Abstract is a summary of the study, with the primary emphasis on results and conclusions. Very briefly present the question(s) asked, the experimental design, a summary of observations, and list conclusions. Be very succinct - the abstract should be a single paragraph, no more than one page. It should stand on its own; therefore, do not refer to any other part of the report, such as a figure or table. Avoid long sections of introductory or explanatory material. As a summary of work done, it is written in past tense. Start your introduction on new page.

"This study was done to look at the effect of a variety of antimicrobial agents on several microorganisms. This response is usually determined by the agent's mode of action and the structure of the microbe. The experiment involved applying antimicrobial disks onto agar inoculated with the test microbe. Zones of inhibition were measured after 18 hours to determine each reaction as sensitive, resistant, or intermediate. *Staph. Aureus*, a gram positive organism with a thick cell wall, was very sensitive to all agents except Nalidixic acid. *P. Aeruginosa* showed resistance to all but Streptomycin which had an intermediate effect. *E. coli* was resistant to all but Chloramphenicol and Nalidixic acid. These results were consistent with the fact that *E. coli* and *P. Aeruginosa* are gram negative organisms which exhibit a thin cell wall of peptidoglycan with an outer membrane acting as a barrier against some antibiotics. Further experiments should investigate the sensitivity or resistance of strains from different sources, such as hospitals and schools."

INTRODUCTION

Your introductions should not exceed two pages (double spaced, typed).
The purpose of an introduction is to aquaint the reader with the rationale behind the work, with the intention of defending it. It places your work in a theoretical context, and enables the reader to understand and appreciate your objectives.

Keep the introduction brief, but do indicate the purpose of the experiments performed as well as present appropriate background. Make sure that the reader knows enough to appreciate the relevance of the work and why it is appropriate to ask the question that you will address with your study. Always state the hypothesis and/or objectives in your introduction.

"This investigation involved exposing several microorganisms to a variety of anti-microbial agents to test whether the microbe was sensitive, resistant or intermediate to the particular agents. This kind of testing is very important in the medical field because physicians need to know what antibiotics to prescribe for certain microbial infections. Anti-microbial agents, because of their mode of action, inhibit the growth of only some microorganisms, and some work better than others. The Kirby-Bauer method employed in this study involves applying paper disks impregnated with different anti-microbial agents onto an agar surface inoculated with the test organism. The zones of inhibition which appear after incubation can be measured to determine the classification of sensitivity. It is hypothesized that two of the four organisms used, *P. aeruginosa* and *E. coli*, will show resistance to most of the anti-microbial agents due to their extra LPS (lipopolysaccharide) layer, characteristic of all gram negative organisms, which hinders growth inhibition."

METHODS

There is no specific page limit, but a key concept is to keep this section as concise as you possibly can. People will want to read this material selectively. The reader may only be interested in one formula or part of a procedure. Materials and methods may be reported under separate subheadings within this section or can be incorporated together.

You must document all methods performed in your study. Do not, under any circumstances, report methods word-for-word from any of the written sources you used. You need to summarize, in your own words, what you did. Also, do not give unneeded detail. For example, instead of "I took up 1 ml of bacterial broth from a 5 ml tube with a 2 ml plastic pipet and expelled it onto the surface of one agar plate", write "One agar plate was inoculated with 1 ml of bacterial broth". We can also see that in this latter sentence passive voice was used to report methods, a standard for most scientific publications. To give another example, one would write "Cells were grown at 37°C." instead of "We grew the cells at 37°C.".

While it is tempting to report methods in chronological order in a narrative form, it is usually more effective to present them under headings devoted to specific procedures or groups of procedures. Some examples of separate headings are "Sources of Materials," "Inoculation Procedures", "Analytical Procedures", "Measuring Zones of Inhibition," and "Statistical Methods."

Don't report information that would be irrelevant to an independent investigator. For example, not everyone uses the computer software you have in the lab. The programs you used to organize or plot data are not important. Most important, do not report any results of the experiment in the methods section. These, of course, go in the "Results" section.

RESULTS

The page length of this section is set by the amount and types of data to be reported. Continue to be concise, using figures and tables, if appropriate, to present results most effectively. The purpose of a results section is to present and illustrate your findings. Make this section a completely objective report of the results, and save all interpretation for the discussion

Raw data include all observations or data that you get from your experiment. Raw data are never included in your scientific paper unless they are needed to give evidence for specific conclusions which cannot be obtained by looking at an analysis, or summation, of the data. Analyze your data, then present them in the form of figures (graphs), tables, and/or descriptions of observations. Data in this form are called converted data. Figures are preferable to tables, and tables are preferable to straight text. By presenting converted data, you make your point succinctly and clearly.

To give your results continuity, describe the relationship of each section of converted data to the overall study. For example, rather than just putting a table in the paper and going on to the discussion section, write, "Table 2 shows the means and standard deviations for each interaction of anti-microbial agent and microbe. The results of those interactions with both 0 inhibitions and large positive inhibitions were questionable and were subsequently marked with a question mark (?)." The same goes for figures.

The table or figure should then be presented, complete with title. The title should explain what the table or figure is showing. For example, "Table 2. Means (M) and Standard Deviations (SD) of Inhibition Zone Diameters (mm)"

All converted data go into the body of the report, after the methods and before the discussion. Do not stick graphs or other data onto the back of the report just because you printed or prepared them separately. Place raw data at the back of the report as an appendix, if needed. The appendix is also appropriate for any sample calculations that are needed, such as hand-worked statistical analyses or raw calculations that show how you arrived at reported values. A published research report will seldom have such an appendix, but it may be appropriate in the case of a paper competition. Do not draw conclusions in the results section. Reserve data interpretation for the discussion.

DISCUSSION

Journal guidelines vary. Space is so valuable in the Journal of Biological Chemistry, that authors are asked to restrict discussions to four pages or less, double spaced, typed. That works out to one printed page. While you are learning to write effectively, the limit will be extended to five typed pages. If you practice economy of words, that should be plenty of space within which to say all that you need to say.

The objective here is to provide an interpretation of your results and support for all of your conclusions, using evidence from your experiment and generally accepted knowledge, if appropriate. The significance of findings should be clearly described.

Interpret your data in the discussion. Decide if each hypothesis is supported, rejected, or if you cannot make a decision with confidence. Do not simply dismiss a study or part of a study as "inconclusive". Make what conclusions you can, then suggest how the experiment must be modified in order to properly test the hypothesis(es).

Explain all of your observations as much as possible, focusing on mechanisms.

"*Proteus mirabilis* displayed an array of reactions to the antimicrobial agents. It was resistant to Bacitracin and Vancomycin, both involved in inhibiting peptidoglycan synthesis. The types of penicillins involved in inhibiting transpeptidization in the cell wall, Ampicillin and Methicillin, were more effective in inhibiting growth. The differences in these results may involve the different specific stages at which the antibiotics have their effect on protein synthesis."

When you refer to information, distinguish data generated by your own studies from published information or from information obtained from other students. Refer to work done by specific individuals (including yourself) in past tense. Refer to generally accepted facts and principles in present tense.

"John Doe (1964) found that Chloramphenicol prevents the formation of peptide bonds during protein synthesis while Erythromycin inhibits translocation."

Most studies will require a critique of the experiment. Determine if you asked the right question in the first place. Decide if the experimental design adequately addressed the hypothesis, and whether or not it was properly controlled. For example:

"There were a few problems with the data. A few of the interactions between antibiotic and microbe showed a great amount of inhibition along with absolutely no inhibition. Many of the antibiotic disks were out of date (some as long as 15 years) which may have caused some of the disks to lose their potency. A loss of potency would cause a decrease in inhibition. Although it could be assumed from this fact that the positive inhibition data is the more accurate, it cannot be said with certainty."

Finally, where do you go next? The best studies open up new avenues of research. What questions remain? Did the study lead you to any new questions? Try to think up a new hypothesis and briefly suggest new experiments to further address the main question. Be creative, and don't be afraid to speculate.

"Future experiments might include using cultures of microbes from different sources, such as hospitals, day care centers, and schools to look for signs of lowered resistance."

LITERATURE CITED

Please note that in the introductory laboratory course, you will not be required to properly document sources of all of your information. One reason is that your major source of information is this website, and websites are inappropriate as primary sources. Second, it is problematic to provide a hundred students with equal access to potential reference materials. You may nevertheless find outside sources, and you should cite any articles that the instructor provides or that you find for yourself.

List all literature cited in your paper, in alphabetical order, by first author. In a proper research paper, only primary literature is used (original research articles authored by the original investigators). Be cautious about using web sites as references - anyone can put just about anything on a web site, and you have no sure way of knowing if it is truth or fiction. If you are citing an on line journal, use the journal citation (name, volume, year, page numbers). Some of your papers may not require references, and if that is the case simply state that "no references were consulted."

Literature citations in the body of your paper should be in parentheses and contain only the author's last name and the date; for multiple authors include the last name of the first author, et al., and the date. If the author's name is used in the text then just the date in parentheses is sufficient. For example: (Monod, 1949) (Neidhardt et al., 1990) or Monod (1949) compared the reaction….. List all literature cited in your report in alphabetical order by the last name of the first author in a separate section. Use the proper form for citations. If the citation is to a specific page add the page number.

For scientific papers:

Monod, J. 1949. The growth of bacterial cultures. *Annu. Rev. Microbiol.* 3:371-394.

For a book:

Neidhardt, F.C, Ingraham, J.L. and. Schaechter, M. 1990. *Physiology of the Bacterial Cell.* Sinauer Associates, Sunderland, MA.

For a newspaper article:

McKay, D. 2000. Arsenic: how much is safe? *Albuquerque Journal.* July 30, 2000, p. A1.

For a web site:

National Research Council. 1999. Arsenic in drinking water. Subcommittee on Arsenic in Drinking Water. http://www4.nationalacademies.org/news.nsf/isbn/030906337?OpenDocument.

For a personal communication:

Sanchez, R. 1993. City of Socorro, Water Utilities Division, Socorro, NM. Personal communication.

Writing is easy. All you do is stare at a blank sheet of paper until drops of blood form on your forehead. --- Gene Fowler

KEMENTERIAN PENDIDIKAN NASIONAL
UNIVERSITAS JEMBER
LEMBAGA PENELITIAN

CERTIFICATE

Number : 912/H25.3.1/PL.2/2011

is granted to:

Ir. Sigit Soepardjono, M.S., Ph.D

as:

Presenter

"Writing Scientific Paper For International Journal
Year of 2011, University of Jember
from July 28th – 29th 2011"

Jember, July 29th 2011
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CERTIFICATE NO : QMS/173

"Writing Scientific Paper For International Journal Year of 2011 University of Jember from July 28th – 29th 2011"

Date	Duration	Contents	Tutor
Thursday, July 28th 2011	60 minutes	Writing Scientific Papers	Drs. Wisasongko, M.A
	60 minutes	Ethics Writing of Scientific Papers	Drs. Wisasongko, M.A
	60 minutes	Cause and Effect	Drs. Wisasongko, M.A
	60 minutes	Comparison and Contrast	Drs. Wisasongko, M.A
	60 minutes	Anatomy, Style and Method of Scientific Papers	Prof. Bambang Kuswandi,M.Sc.,Ph.D
	60 minutes	Tips and Tricks for International Papers	Prof. Bambang Kuswandi,M.Sc.,Ph.D
Friday, July 29th 2011	60 minutes	The Structure of An Essay	Drs. Syamsul Anam, MA
	60 minutes	Essay Outline	Drs. Syamsul Anam, MA
	60 minutes	Paragraph Development	Drs. Syamsul Anam, MA
	120 minutes	Other Issues in Scientific Papers	Ir. Sigit Soepardjono, M.S., PhD.
Total	**11 hours**		