

## PREPARATION OF THE SENIOR THESIS

### Requirements

The senior thesis, in completed form on paper and as a pdf file, must be turned in to your Thesis Advisor by **Friday, May 7, 2010**. Print out the copy from the pdf for your adviser (as well as an outside mentor) on regular paper and upload the electronic pdf file onto the Blackboard site. You may also want to make another copy for yourself or you can purchase a bound copy. Fill out the Submission form.

### Format

When using a word processing program (Word, WordPerfect, etc.), set the font to 12-point in Times New Roman. Margins should be set at 1.25 inches on all sides. Double spacing must be used in the text of the thesis. Begin each chapter on a new page. Pagination begins with the first page after the Title page (Abstract) as page 1 and continues through References. The page number appears at the bottom center. All figures and images must be inserted as digital pictures (JPG, GIF or TIFF).

### Organization

Write a Title that describes the thesis work. The Abstract describing the thesis is placed after the title page; use the same one as you wrote for the abstract booklet. You should also write an Acknowledgement page to recognize the assistance you received from your mentor(s), laboratory personnel, family and friends.

For a *research thesis*, the first chapter is the Introduction, the second chapter is Materials and Methods, and the third and fourth chapters are either Results and Discussion or Results and Discussion followed by Summary. For much research work, it is more economical and more effective to include a discussion of results as the results are presented; the choice between these styles depends on the nature of the work and the results obtained, so discuss this issue with your advisor. After the last chapter, References (literature cited) and Illustrations (plates of micrographs, photographs etc.) should follow.

For a *teaching thesis*, there will be an Introduction, Chapters for Lesson Plans, a chapter to analyze the Scholarship of Teaching & Learning question, a chapter on Pedagogy and a reflection chapter. More details from your mentor will define this.

For a *thesis based on literature review and analysis*, the nature of the topic will dictate the subdivisions. Consult with your thesis mentor to determine the chapters and their order. In general, such a thesis will have chapters headed Introduction, titles of various subtopics, and Summary or Conclusion. After the last chapter, References (Literature Cited and Bibliography) and Illustrations (plates of figures, graphs, charts, etc.) should follow.

### Text and Citations

Write the text in your own words. Do not include lengthy quotations. Citations in the text bear the author's name and date of the paper; do not use superscripts for citations. Footnotes are not recommended in modern biological writing. The examples below demonstrate how to cite references within the text and for the style of the full citation in the reference section.

The genetic regulation of purine biosynthesis is best understood in prokaryotes. In *Escherichia coli*, expression of the biosynthetic genes is repressed by the PurR repressor (Rolfes and Zalkin, 1988a; Rolfes and Zalkin, 1988b), a member of the LacI family of repressor proteins. Repressor binding requires a coeffector, either hypoxanthine or guanine (Rolfes and Zalkin, 1990). In *Bacillus subtilis*, expression of the *pur* operon is regulated by both repression and attenuation (Ebbole and Zalkin, 1989). The repression mechanism bears no resemblance to the *E. coli* system and uses a repressor protein that is released from DNA when in a complex with PRPP (Weng *et al.*, 1995).

Make sure that you properly credit ideas that are not your own. All figures, schematics, models, data, etc. that you did not draw must be credited and permission obtained if the material is under copy-right protection.

## References

All citations in the text of your thesis should appear in the References. They should be listed by author, in alphabetical order, as follows: name or names of all authors, date, full title of paper, name of journal, volume number (which should be underlined and followed by a colon), first and last pages of article. In giving the title of the paper, you should capitalize only the first letter of the first word of the title and all other words should appear in small letters, except proper nouns and scientific names (the first letter of the genus is capitalized and the specific name is in lower case). Both generic and specific names are italicized or underlined, e.g., *Homo sapiens* or Homo sapiens.

In the case where several papers by the same author are listed, they should be arranged in chronological order (oldest to newest). If there are a number of papers involving one particular author (e.g., Jones), list in chronological order all the papers in which Jones is the sole author, and then list papers in which Jones is the first of multiple authors, alphabetizing by the second author's last name.

### References

- Ebbole, D. J., and H. Zalkin. 1989. *Bacillus subtilis pur* operon expression and regulation. J. Biol. Chem. 262:8274-8287.
- Rolfes, R. J., and H. Zalkin. 1988a. Regulation of *Escherichia coli purF*. Mutations that define the promoter, operator, and purine repressor gene. J. Biol. Chem. 263:19649-19652.
- Rolfes, R. J., and H. Zalkin. 1988b. *Escherichia coli* gene *purR* encoding a repressor protein for purine nucleotide synthesis. J. Biol. Chem. 263:19653-19661.
- Rolfes, R. J., and H. Zalkin. 1990. Purification of the *Escherichia coli* purine regulon repressor and identification of corepressors. J. Bacteriol. 172:5637-5642.
- Weng, M., P. L. Nagy, and H. Zalkin. 1995. Identification of the *Bacillus subtilis pur* operon repressor. Proc. Natl. Acad. Sci. 92:7455-7459.

The citation of a book includes the name of the author or of the editor, the publisher, and the place of publication. All words in the title of the book should be capitalized (except articles,

prepositions, etc.). Information for how to make a Web Site citation can be found on the Georgetown University Library homepage under Research Tools and Resources, then choosing Doing Research on the Internet (<http://www.library.georgetown.edu/internet/>). If you have any doubts, consult Committee on Form and Style, Council of Biology Editors Style Manual, 1978, Fourth edition, American Institute of Biological Sciences, Arlington, VA (on reserve in the Science Library).

## Figures and Illustrations

Relevant tables, figures and charts may be placed within the text or at the end of the thesis. If the figures are in the main chapters of the thesis, they should be placed on a page separate from the text with the figure legend on the same page (if there is room) or on the facing page (turn the page around). However, photographs and micrographs should appear in a separate section entitled Illustrations (see next paragraph) that follows the Reference section. Tables have a title and figures have a legend (or caption) that describes the details. You must properly give credit to any figures or tables that you did not make. All figures, tables and charts must be specifically referred to in the text.

- a) Figure 1 shows...
- b) Mitochondria containing transversely oriented cristae (Figure 1) are found in these cells.
- c) The mitochondria in Figure 1 contain...

Photographs and light or electron micrographs should appear in a separate section called Illustrations. Tables, figures and graphs may also be placed here or in the text, if more appropriate. The photograph should be placed on the right-hand page. On the left-hand, or facing page, you should place the figure number and explanation of the figure. If you have more than one figure on a page, this is called a plate, each figure should be listed separately. Use Roman numerals for plate numbers and Arabic numerals for figure numbers within the plate. Figure numbers in the Plates should follow the figure numbers of the text. Thus, if you have any figures in the text, e.g., charts, graphs, etc., the first figure of Plate I will not be Figure 1. In the case of photographs, be sure to include a magnification indicator, if appropriate. For example, a photograph of a small fish might well include a millimeter ruler. In the case of photomicrographs or electron micrographs, either the magnification should be denoted or a micron or micrometer mark placed on the figure.

**Plate I** (optional designation)

Figure 7. Bacteria, showing what appears to be internal structure, with a clear zone at each end of each cell. X160,000.

Figure 8. Bacterium with spherical shaped bacteriophage particle attached. X160,000.

## Final Format of Document

In preparing the thesis, the following format must be observed (see the example below):

First thesis page: Title page (this page is not numbered)

- Title (Center on one or more lines, so that it looks pleasing)
- Your full name (center with several lines separating it from the title)
- The following text is centered at bottom:

Submitted in fulfillment of the Senior Thesis requirement  
in the Department of Biology, Georgetown University  
Washington, D.C., May 2010

Second thesis page: Abstract (**start numbering with 1**) – this can be the same as in the abstract book or you may make changes. You can alter the margins from the abstract book requirements to the thesis requirements if you wish.

Third thesis page: Acknowledgements (**page 2**) – you should thank your thesis mentor, members of the laboratory, parents, and other people who helped and encouraged you.

Fourth thesis page: Table of Contents. List all chapters and subdivisions with page numbers.

Fifth thesis page: Chapter I. Introduction.

References: This section follows the Conclusion chapter; page numbering ends in this section.

Illustrations: Micrographs and photos go here; figures and charts may also be placed here if they are not found within the text.

Last thesis page: Following the last plate in Illustrations there should be a blank page.

(Example of First Thesis Page)

The Isolation of a Bacteriophage Active against  
a Strain of *Erwinia carotovora* which  
Causes a Soft Rot of the Onion

Chris B. Bright

Submitted in fulfillment of the Senior Thesis requirement  
in the Department of Biology, Georgetown University,  
Washington, DC, May 2008

(Example of Fourth Thesis Page)

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