SCHOOL OF MEDICINE & DENTISTRY
UNIVERSITY of ROCHESTER MEDICAL CENTER

Guidelines for the Content of a Basic Science PhD Thesis

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1. Purpose of this document:

This document provides a summary of the expectations for the written content of a thesis; that is, it provides a guide for how a thesis should be structured for writing, and for the content that comprises a well written thesis.

This document is meant to be a supplement to the general guidelines of the University of Rochester for preparation of a thesis (THE PREPARATION OF DOCTORAL THESES: A MANUAL FOR GRADUATE STUDENTS), which can be found at the website: http://www.rochester.edu/Theses/ThesesManual.pdf, and which governs all theses at this university. Rather, the guidelines described here are meant to be a guide for the written content of the thesis.

2. Overview of thesis contents

A thesis is a description and interpretation of the research conducted by the candidate that qualifies him/her for the degree of PhD.

It is written for non-specialized scientists (not for the mentor!). Specifically, every member of the thesis examination committee, including faculty from other science departments, have to be able to read and understand everything that is included in the text without consulting secondary sources. Specialist terms need to be explained or avoided. Non-standard techniques have to be explained.

It is written in English with correct spelling and grammar. It is not the job of the committee to proof-read the text. Having the text of the thesis corrected and edited for clarity by a second person (mentor or otherwise) is acceptable and highly recommended. A committee member can refuse to accept a thesis with excessive grammatical or graphical errors.

There is no formal minimum or maximum length. The thesis has to give an in depth account of the background and scientific question addressed, as well as a detailed description of the conducted experiments, that is typically more specific than the published literature on the same work. Independent and original thought is welcome. An alliteration of published fact(oid)s with tangential relevance to the research topic (just to fill up pages) should be avoided.

3. Sections of the thesis

Title page

Abstract
-- Must be a maximum of 350 words.
-- Should contain no references, and no undefined non-standard abbreviations.

Acknowledgements
My boss rocks….. but I am glad to be out of here.. and I love my mother

Foreword
Although the thesis document can contain experimental data not generated by the candidate (for example those supplied by a collaborator or technician, if they are critical for the scientific argument), all such contributions must be specified in the foreword.

Glossary
A table explaining non-standard abbreviations and terms. For generally accepted abbreviations see the website at the Journal of Biological Chemistry (http://www.jbc.org/site/misc/abbrev.xhtml)

Biographical Sketch
Short academic history and list of papers published by the candidate. Date of birth and dates of earlier degrees are no longer included.

4. Organization of the Thesis

Introductory chapter

The introduction outlines the background of the field, and should set the stage for formulating the scientific question/problem addressed in the experimental part of the thesis. The introduction should tell a story with the candidate's own thoughts, to frame the question to be addressed in the thesis, and should not summarize all the papers that the candidate has read.

The last paragraphs of the introduction should explicitly state the questions to be addressed in the thesis, or the set of experimental aims, and the organization of the thesis.

Results chapters

Results chapters are most conveniently organized as papers or manuscripts, complete with abstract (250 word limit), introduction, materials and methods, results, figures and tables, discussion, and references. If there are several chapters with similar materials and methods the candidate is encouraged to organize all of the materials and methods into a single chapter. This eliminates unnecessary redundancy.

It is not necessary to include all of a published paper in a chapter, if for instance the candidate's contribution was a limited part. Additional data not included in the paper can also be added to a chapter.

One or more final chapters may include a collection of experiments that are not yet organized as manuscripts. These chapters should also have a title, an abstract, and a discussion that contains more in-depth interpretations and/or a general perspective on the overall set of results.

The paper format is encouraged as it is expected that every candidate will have one or more first author papers by the time of the thesis defense. However, the alternate format of having the thesis organized as separate chapters containing the Materials and Methods, Results, and Discussion is also acceptable.

Perspectives chapter

Each thesis should also include a final chapter (which could be entitled "Final Perspectives", "Perspectives", "Overall Conclusions", or some similar title) in which the candidate tries to tie up his thesis and add any overall perspectives. For example, the candidate might recapitulate the state of the field at the outset of the thesis, summarize the major results of the thesis, explain the status of the field as a result of the thesis work, explain current gaps in our knowledge of the field, raise questions that arise as a result of the thesis, or speculate on likely future directions of the field.

5. Description of the specific contents of each section of a chapter:

Title and Abstract: Each chapter should have its own title page, and an abstract page (abstract limited to 250 words)

Introduction: The introduction of each results chapter (manuscript, paper or results chapter) should outline the relevant background of the field without getting too expansive or detailed, and should frame the question(s) being addressed in the chapter in the context of the background. Often the last part of the introduction includes a very brief statement of the results and their significance.

Results sections:
Each experiment/group of experiments in the result section should include:

- a statement of the purpose of the experiment
- a description of the experiments and the results, with figures, tables, etc
- a brief explanation or interpretation of the results.

Discussion sections:

The discussion section of results chapters should include a BRIEF summary of the major findings and discoveries, without regurgitation of the results section. This section of the chapter might also address questions such as: What does it mean? Why is it relevant? How does it add to/extend existing knowledge? What general conclusions and principles (beyond the immediate field of study) may arise from this research? What were the experimental problems, ambiguities, alternative explanations? What next?

Materials and Methods

This is the most important, and most read part of the thesis for your colleagues and lab mates (and your future self). Use the opportunity to carefully document techniques that you have worked out during your PhD research in a way that others can use it as a protocol book. If the results chapters come from published papers, the materials and methods may be removed from those chapters and grouped into a single chapter. This is generally recommended as it makes the thesis easier to read and a better source for techniques.

Figures and Legends

Each figure should be clear and self-explanatory. It should be possible to gain at least a superficial understanding of the displayed experiments without reading the text or figure legends.

Each legend should have a title that conveys the conclusion of the presented experiments or data. If there are multiple panels (A, B, etc), each of these should also have a title. The body of each legend should explain all items included in the figure.

Figures can be placed on separate pages, or can be embedded in the text as text boxes.

References

All references in the thesis should be modeled on a journal (such as Cell) and should include a full set of authors (for ten or less authors), the complete title of the work, and the volume, and page numbers (and editor and publishers as necessary). If using reference management software, the references should be checked manually for completeness and accuracy.

Supplements, appendices

This part of the thesis is not a requirement, but can be highly useful for including data that does not easily fit within the main part of the thesis. Examples include movies, genomic data sets, PCR primer sets, and crystallographic coordinates or even supporting preliminary data.