Meharry Medical College
School of Graduate Studies and Research

Manual for the Preparation
of the
Ph.D. Dissertation or Thesis

Revised September 2013
PREFACE

This manual will discuss the formatting standards set forth by the School of Graduate Studies and Research (SOGSR) at Meharry Medical College. The manual explains in detail the formatting requirements and submission procedures to be followed by Ph.D. graduate students writing a dissertation or thesis at Meharry Medical College.
ACKNOWLEDGEMENT

The School of Graduate Studies and Research (SOGSR) would like to acknowledge that some of the text used in preparing this manual was adapted from the University of Tennessee's *Guide to the Preparation of Theses and Dissertations*. 
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INTRODUCTION

PURPOSE OF THE GUIDE

This guide is designed to be a basic source of information which will aid in the preparation of the Ph. D. dissertation or thesis. Its purpose is to outline the steps involved and establish the technical parameters of the thesis, such as the quality of paper, number of copies to be submitted, margins, and the sequence of pages within the document. Since most graduate students will publish during and after their graduate education, it is also logical to encourage the use of leading professional publications to help establish specific formatting conventions. Students are encouraged to use publications within their field journals and textbooks to help them in establishing heading format, bibliographic form, use of numbers, and other conventions that are discipline oriented. The application of this theory is not simple, however. It becomes necessary for students to understand the various elements of a manuscript and general publication formatting requirements in academic publishing. Although knowledge and use of publication formatting is essential, the regulations established by this Guide always takes precedence over any other style manuals for final submission of the thesis.

Style handbooks such as the MLA Handbook for writers of Research papers, Publication Manual of the American Psychological Association, A Manual for Writers, and/or The Chicago Manual of Style should also be used as resources for basic style and grammar. In contrast, previously accepted theses should never be used as the final guide to style. Examples taken from other theses may be out of context or may be incorrect. The existence of a particular style or usage in a previously thesis does not establish a precedent for its continuation.

Meharry Medical College, by accepting a thesis and awarding the degree, places its academic reputation on the line. While the technical quality and content of the thesis is evaluated by the student’s Committee on Instruction (COI), the Office of the SOGSR imposes format requirements to ensure an appropriate academic appearance of the manuscript.

STUDENT INTEGRITY

In part, and very importantly, conferral of a degree implies personal integrity and ability to perform within the framework of scholarly methods. There are four areas in which graduate students should be particularly cautious: [1] proper acknowledgment of cited works; [2] use of internet links; [3] use of copyrighted material; and [4] proper reporting of work subject to federal compliance regulations (e.g., use of human subjects, animal care, radiation, legend drugs, recombinant DNA, or the handling of hazardous materials).

1. Proper Acknowledgment of Cited Works

Students must take care not to plagiarize. “Plagiarism is using the intellectual property or product of someone else without giving proper credit.” Any material taken from another source must be fully acknowledged, and in no case should one present another person’s work as one’s own. Extreme caution should be exercised by students involved in collaborative research to avoid questions of plagiarism. If in doubt, students should
check with their major professor and the SOGSR about the project. Plagiarism will be investigated when suspected and appropriate action taken if necessary.

2. The Use of Internet Links (Embedding)

Students may use links in their document as long as they do not give the impression that the material linked to is their own. Students should ask permission to include a link to external material. If they do not receive permission, they may provide the address (URL) without providing the link. Students should use discretion in including links because the content of websites frequently changes, unlike published journal articles or books. Students should not link to material that is integral to their thesis/dissertation. They should instead seek permission to include that material in their thesis/dissertation.

3. The Use of Copyrighted Material

The law governing copyright infringement is based on a principle called “fair use.” If copyrighted material is used in a limited way, permission to quote usually need not be sought. Also, “no permission is needed to quote works in the public domain... such as publications of the United States Government” (Chicago Manual of Style, 2003, pg. 119). Unlike other material, a standardized test, figure, table or other graphical representation should not be reprinted in the thesis/dissertation unless permission has been granted. The source must be cited under the table/figure if permission is granted (APA, 2001, pg. 174). If extensive material from a copyrighted work is to be used, such that the rights of the copyright owner may be violated, permission from the owner must be obtained. Even when permission is not needed, make sure to cite the owner’s works fully. In determining the extent of a written work that may be quoted without permission, the student should consider the proportion of the material to be quoted in relation to the substance of the entire work. According to The Chicago Manual of Style (2003):

Use of any literary work in its entirety—a poem, an essay, a chapter of a book—is hardly ever acceptable. Use of less than the whole will be judged by whether the second author appears to be taking a free ride on the first author’s labor....Proportion is more important than the absolute length of a quotation; to quote five hundred words from an essay of five thousand is likely to be more serious than from a work of fifty thousand (pg. 136).

The publisher usually has the authority to grant permission to quote excerpts from the copyrighted work or can refer requests to the copyright owner or designated representative. The copyright owner may charge for permission to quote. Permissions should be credited on the acknowledgments page, and the source should appear in the list of references/bibliography section.

4. Reporting of Work Subject to Compliance Regulations

Compliance with federal regulations governing the use of human subjects, animal care, radiation, legend drugs, recombinant DNA, or the handling of hazardous materials in research is monitored by a number of federal agencies. Because of these regulations, research compliance is another area of importance to graduate students and to the conduct of their research. Every student is required to verify that he or she has complied with the appropriate approval procedures prior to initiation of the thesis related research, if approval is relevant to the research. The Institutional Review Board (IRB) at Meharry
Medical College grants this approval, and therefore, can assist with detailed information, materials and guidance in the completion of the appropriate forms.

The goal of the Office of the SOGSR, as well as the student’s dissertation or thesis committee, is to ensure that a document has been produced that will reflect well on, and properly represent, the student, the student’s committee, the graduate program, and the College.

ACADEMIC RESPONSIBILITY

Student's Responsibility
It is the student’s responsibility to follow the formatting guidelines set forth by the SOGSR relative to the dissertation/thesis. The student should also discuss content and proper format with their preceptor and Committee on Instruction (COI) for accuracy. In addition, it is the student’s responsibility to turn in all dissertation/thesis materials to the COI typed and in the proper formats. The student should also know and meet all deadlines relative to the dissertation/thesis process and graduation.

Preceptor and COI Responsibilities
The Preceptor and COI should aid the student in the preparation of the dissertation/thesis. They should also have a copy of the Manual for the Preparation of the Ph.D. Dissertation or Thesis. They should discuss content and proper format with the student for accuracy. The faculty will do their best to communicate with students in a timely manner. However, it is ultimately the graduate student’s responsibility to know, understand, and meet the requirements established by the SOGSR.

DISSERTATION/THESIS ELEMENTS AND STYLE

FORMATTING AND TECHNICAL POINTERS

Type Face or Font
Typeface affects the physical appearance of the thesis more than any other single element. Word processing software packages provide the opportunity to use different typefaces (i.e. Arial, Times New Roman, New York, Geneva, etc.), type sizes, and font attributes, such as bold or italics. The size of type is determined by point size. Text is most readable in 10, 11 or 12 point, so these sizes are highly recommended in the thesis. The SOGSR prefers Times New Roman -12 or Arial – 11.

The type face/font selected for text will be the base style or the "starting point" for all type/font selection and will establish the framework for the entire document. All of the following items must be in the same type/font selected as the "base" style:

- all preliminary pages, including approval sheet
- all text
- all tables, even those from other sources, provided they are called tables
• figure numbers and titles (the text within figures may be different
typeface)
• all page numbers, including appendix page numbers

**Type Quality**

Acceptable type quality for the final master copy is determined by the following two factors: clean, crisp type with no distracting marks and dark copy indicating sufficient
toner for reability.

**Margin Settings and Justification**

Thesis or dissertation margins must be strictly adhered to, and all margins are measured from the edges of the page. The left margin must be no less than 1 1/2 inches; the right,
top and bottom margins no less than 1 inch. All material included in the document, including text, tables, figures, page numbers, etc. must fit within these margins. All major headings in the preliminary pages and in the body must have a top margin of 2 inches. The approval sheet must have a top margin of 1 1/2 inches. These margins define the minimum white space to be maintained on all sides, because of the regulations set for binding. Although these margins are set to define white space, all
space that is given should be used.

**Note:**
1) Typing may extend no more than one single space below the bottom marginal
line, and only then to complete a footnote or the last line of a chapter,
subdivision, or figure caption.

2) It is not permissible to leave a single line of a paragraph or other subdivision at either the bottom or the top of a page. The last word on a page cannot be
hyphenated.

A type-written line, regardless of words in it that are exactly the same length as all other
lines, is called "justified" (*Chicago Manual of Style*, p.61). Either "justified" or "ragged-right" margins are acceptable. The use of justified or ragged-right margins must be
consistent throughout the document.

**Spacing**

Spacing has both aesthetic and utilitarian effects on the appearance of the document. Vertical spacing (or leading) determines the number of lines of text that will fit on a page
and can make the thesis appear either cluttered or uncluttered, depending on the
amount of space left between the lines. Horizontal spacing (or kerning) affects the
spacing between letters of text, and, like leading, makes the spacing of proportional
fonts appear disjointed or jointed.

Most technical decisions about both vertical and horizontal spacing are determined by
the word processing package. When a type face and size are selected, the default
values for horizontal (kerning) are automatically set. Most word processing packages
then allow the user to set the spacing for vertical measurement, using the predetermined 
line height as a basis. Single spacing leaves a small space between two lines of text, 
and doubling spacing leaves the equivalent of one line of text between two lines.

Standard double spacing is required for the document text. Most style manuals require 
single spacing to be used within long quotations, long tables, footnotes, multiple 
captions, and bibliographic entries. Double spacing should be used between footnotes 
and bibliographic entries.

In the event that extra space is needed (e.g., above headings, between numbering and 
title), an additional "enter" is added, doubling the white space. Paragraph indentions 
should be uniform throughout the thesis.

**Pagination/Numbering**

Table 1 shows the sequencing and pagination of the various parts of the 
thesis/dissertation. Small Roman numerals (i, ii, etc.), are used to number the 
preliminary pages (all pages preceding the body of the text). Although the preliminary 
paging begins with the title page, **no number** appears on this page. Therefore, the page 
following the title page should begin with the number ii. Beginning with the first page of 
the body of text, all pages should be numbered consecutively throughout the document, 
including the separation page, references, appendix, and vita, with arabic numerals (1, 
2, etc.) beginning with the number 1. Pagination using letter suffixes (i.e., 10a and 10b) 
is not allowed. **Numbers must be positioned 1 inch from the bottom of the page 
and centered within the margins.**

**Note:**

1) For paper copies, the page number orientation must always be portrait 
orientation, even on pages that contain material that is landscape orientation.

2) The approval sheet is not numbered.

**Consistency in Format**

Consistency in formatting means that the student establishes a series of conventions or 
protocols regarding spacing, heading sequencing, and other aspects of appearance to 
visually guide the reader through the document, thus enabling the reader to concentrate 
on the content.
Arrangement of Thesis Parts

Table 1 shows the sequencing of the various parts of the thesis. There are parts in the sequencing that are denoted as being optional and these pages can be left blank.

Table 1. Arrangement of Thesis Parts

<table>
<thead>
<tr>
<th>Thesis / Dissertation Parts</th>
<th>Page Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approval / Signature Sheet</td>
<td>No page number assigned</td>
</tr>
<tr>
<td>Preliminary Pages</td>
<td></td>
</tr>
<tr>
<td>Title page</td>
<td>Small Roman numeral “i” (assigned, not typed)</td>
</tr>
<tr>
<td>*Copyright page/Blank page</td>
<td></td>
</tr>
<tr>
<td>*Dedication page</td>
<td>Small Roman numeral Starting with number “ii” (Typed on page)</td>
</tr>
<tr>
<td>*Acknowledgments</td>
<td></td>
</tr>
<tr>
<td>Abstract</td>
<td></td>
</tr>
<tr>
<td>Table of Contents</td>
<td></td>
</tr>
<tr>
<td>List of Tables (if 5 or more)</td>
<td></td>
</tr>
<tr>
<td>List of Figures (if 5 or more)</td>
<td></td>
</tr>
<tr>
<td>List of Abbreviations and/or Symbols (if needed; may be included as an appendix)</td>
<td></td>
</tr>
<tr>
<td>Body of thesis (divided into chapters)</td>
<td>Arabic numerals, starting with 1</td>
</tr>
<tr>
<td>• Introduction (Review of Literature)</td>
<td></td>
</tr>
<tr>
<td>• Materials and Methods</td>
<td></td>
</tr>
<tr>
<td>• Results</td>
<td></td>
</tr>
<tr>
<td>• Discussion and Conclusions</td>
<td></td>
</tr>
<tr>
<td>Separation Sheet</td>
<td></td>
</tr>
<tr>
<td>Bibliography/ List of References</td>
<td></td>
</tr>
<tr>
<td>*Separation sheet (if an appendix or appendices follow)</td>
<td></td>
</tr>
<tr>
<td>*Appendix</td>
<td></td>
</tr>
<tr>
<td>Appendix</td>
<td></td>
</tr>
<tr>
<td>Vita</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Parts preceded by an asterisk are optional; all others are required.
Preliminary Pages:

Sometimes called the “front matter,” these pages serves as a guide to the content and nature of the thesis. Samples of these pages are shown in the Appendix.

I. Approval Page (Required)

The approval acceptance sheet, is part of the preliminary pages, confirm acceptance by the committee members acting for the department, and the Dean of the SOGSR acting for the college. Each copy of the thesis submitted to the SOGSR must have an approval page using the exact wording and format shown on the sample page. This sheet must be on the same brand and weight of cotton paper and be in the same base typeface as the remainder of the thesis. The name used on the approval page and title page must be that under which the student is registered at the institution. Each approval page must bear (all) original signatures of committee members. Black ink is required for the original signatures, preferably with the same pen. The number of signature lines must equal the number of committee members. The major and degree to be awarded must be exactly those to which the SOGSR admitted the student officially.

II. Title Page (Required)

This page is assigned Roman number “i,” although the number does not appear on the page. The date used is the month and year of commencement. The student’s name must appear as he/she is registered at the institution. The wording and format must be exactly as shown on the sample page.

III. Copyright Page (Optional)

Students may wish to copyright their theses. If so, a copyright page can be used in the document. Although this page is not mandatory, it is strongly recommended, because it informs the public that the work is protected by copyright. The thesis can be formally copyrighted by downloading a form from the U.S. Government's Official copyright website: http://lcweb.loc.gov/copyright/. This constitutes publication and makes the thesis available to the public. The Chicago Manual of Style offers an excellent discussion of copyright law and its implications. "Copyright law exists to protect the exclusive right of the copyright holder to copy the work . . . [although] the law has long been interpreted as allowing others to copy brief portions of the work for certain purposes." If copyrighted material is used in a limited way, permission to quote usually need not be sought. If, however, extensive material from a copyrighted work is to be used such that the rights of the copyright owner might be violated, permission of the owner must be obtained. In determining the extent of a written work that may be quoted without permission, the student should consider the proportion of the material to be quoted in relation to the substance of the entire work. According to The Chicago Manual of Style “A few lines from a sonnet, for instance, form a greater proportion of the work than do a few lines from a novel. Use of anything in its entirety is hardly ever acceptable”. In no case should a standardized test or similar material be copied and included in a thesis/dissertation without written permission. The publisher usually has the authority to grant permission to quote excerpts from the copyrighted work or can refer requests to the copyright owner or designated representative. The copyright owner may charge for permission to quote.
The following information must appear centered (vertically and horizontally) on the copyright page:

Copyright © _____________(name), 20__(year)
All rights Reserved

IV. Dedication Page (Optional)
If the student wishes to dedicate the thesis, the statement is included on this page. The dedication statement should be no more than five lines.

V. Acknowledgements (Optional)
This page is to thank those who have helped in the process of obtaining the graduate degree. Permissions to quote copyrighted material are listed here, as well as acknowledgments for grants and special funding. The acknowledgement should be no more than seven lines. If a student can not restrict their acknowledgements to seven lines, the additional acknowledgements can be place in the appendix.

VI. Abstract (Required)
The abstract of the masters' thesis should be a concise review of the work containing a brief summary of the problem and the results of the research. The following information is typically contained in the abstract:

(1) A short statement concerning the area of investigation
(2) A brief discussion of methods and procedures used in gathering the data
(3) A condensed summary of the findings and conclusions reached in the study
(4) Conclusions reached in the study

VII. Table of Contents (Required)
The Table of Contents may vary in style and amount of information included. Chapter or Section titles, the Bibliography or List of References, the Appendix, if any, and the Vita must be included. Chapter listings use Roman Numerals which should be aligned by the longest number at the left margin and the other numbers align with the longest number to the right. Page numbers given for the Bibliography and Appendix should be those assigned to the separation sheet preceding each of those items. Although it is not necessary to include all levels of headings, inclusion must be consistent. If a particular level is included at any point, all headings of that level must be included. No preliminary pages with Roman numerals are included in the Table of Contents; the Table of Contents entries start with page 1.

VIII. List of Tables (If necessary)
If there are five or more tables, a List of Tables must be included. Any tables appearing in the appendix are also included in the appropriate list. The title of each table must be different, and all titles must be entered in the list worded exactly as they appear in the tables. This includes information up to the first terminal punctuation.
A table consists of numbers, word, or both and presents information that is separated into columns. Tabular information allows the author to convey precise information to a reader in structured format.

**IX. List of Figures (If necessary)**

If there are five or more figures, a List of Figures must be included. Any figures appearing in the appendix are also included in the appropriate list. The title of each figure must be different, and all figures must be entered in the list worded exactly as they appear in the figures. This includes information up to the first terminal punctuation.

Any diagram, drawing, graph, chart, map photograph, or material that does not fit into the restricted format for table is a figure or plate. Figures generally show relationships or illustrate information rather than present precise data. Plates are a subgroup of figures and usually consist of groups of separate photographs or drawings presented together.

**X. List of Abbreviations (If necessary)**

The title of this material should reflect its content and may be included to define specialized terms or symbols. This information may also be placed in an appendix.

**Text:**

Text is used as a generic term to designate the main body of the thesis and to distinguish this element from the preliminary pages, references, tables, figures, and appendices.

*Note: A page ending must have at least two full lines of text. A paragraph ending at the top of a new page must have at least two full lines of text.*

**Chapters (Divisions)**

The document must be divided into a logical scheme that is followed consistently throughout the work. Examples of these formats are shown in Table 1. Each Chapter of the text must begin on a new page. A chapter entitled **INTRODUCTION** should be the first numbered chapter. Each subsequent chapter is a primary division of the entire document and are not part of the subdivision scheme and should begin on a new page centered in all caps.

I. Chapter 1: **INTRODUCTION**

- State the purpose of the study
- Brief background on how your study will contribute to the literature in your field of study
- Hypothesis and Specific Aims

II. Chapter 2: **LITERATURE REVIEW**

- Summarize research in your area of study
- State significance of previous research in relation to your study

(Note: I and II above can be written together in one chapter)
III. Chapter 3: MATERIALS AND METHODS
- Include significant materials used in study and where they were purchased
- Experimental design
- Protocols for data collection
- Statistical analysis

IV. Chapter 4: RESULTS
- Findings presented as figures and tables
- Include interpretation of the results, stating the statistical test and significance level of the test

V. Chapter 5: DISCUSSION
- Summarize findings and discuss how your finding contribute to the literature in your field of study
- Conclusions
- Provide recommendations for future directions

Subdivisions
Any logical system of subdivision within chapters is permissible, but the scheme must be consistent throughout the document. The appearance of the heading must vary for each level of subdivision unless a numbering system is used to indicate level. ALL titles are formatted in title case. The subdivisions within a chapter or section do not begin on a new page unless the preceding page is filled. If there is not room for the complete heading and at least two lines of text at the bottom of a page, the new subdivision should begin on the next page. First and second level subdivisions are always preceded by an extra space to indicate to the reader a major shift in subject.

References Within Text
References usually consist of information in parenthesis or square brackets within the text. The method for referencing is to use the author’s name and date of publication, as in (Smith, 1990), or to assign numbers to the bibliographical entries and insert the corresponding number for the authors as they are cited in the text, as in Smith (95). If the authors’ work is directly discussed in the text, then the citation should be as follows: “Smith et al. (1990) showed that….” The purpose of references is to guide the reader to the corresponding entry in the List of References or Bibliography, where complete information is available. Footnotes or reference notes collected at the end of each chapter or section (end notes) are not acceptable.

Tables and Figures

General Information

Titles. Each table or figure must have a unique title descriptive of its contents. Since tables and figures are separate entities, they must be numbered independently. This title appears at the top of the table and at the bottom of the figure (see Appendices XV,
Figures containing parts must be given a general title, after which the figure may be broken down into "A" and "B" parts. For multiple-part figures, the title may be integrated, with titles for each part as part of the general figure title, or composite, with no reference to the individual parts. No two figures may have exactly the same title. The formatting of the titles must be consistent for all tables and figures. ALL titles are formatted in title case.

**Numbering.** Tables and figures may be numbered in one of several ways. Three of the most common numbering schemes are (1) to number consecutively throughout the document, including the appendix, using either Roman or Arabic numerals; (2) to number consecutively within chapters/sections with a prefix designating the chapter/section (e.g., 3-1, 3-2, ... 4-1, 4-2). Appendix tables or figures would use a prefix of A for Appendix or a prefix designating the specific appendix (e.g., A-1, A-2 or A-1, B-1, B-2); or (3) to establish a consecutive numbering system for the body of the document and a different one for the appendix (e.g., 1, 2, 3 for text and A-1, A-2, A-3 for appendix). The style of numbering must be consistent.

**Placement within the body of the document (see Appendix XVI).** Each table or figure must immediately follow the page on which it is first mentioned (except as noted in the next paragraph) and all tables and figures must be referred to by number (Table 1, Figure 1), not by expressions such as "the following table/figure." When more than one table or figure is introduced on a page of text, each follows in the order mentioned. In degree of importance, table and figures are secondary to the text so that the text dictates where the tables or figures are placed. **All pages must be filled with text and in no case should a page be left significantly short because of the mention of a table or figure.** A table or figure less than one-half page in length (approximately 4 inches) may be incorporated within the text, provided the following criteria are met:

- Must be in numerical order.
- Is separated from the text by extra space (approximately 1/2 inch).
- Is not continued onto a following page.
- Follows its specific mention in the text.

Tables and figures integrated with text must be placed so that they appear either at the top or the bottom of a page. A mention on the upper half of a page of text would mean that the bottom half of the page would be reserved for the table or figure, and a mention in the bottom half of the page would place the table or figure at the top of the next page. There should always be a balance of no less than one-half page of text and no more than one-half page of table or figure. If multiple tables or figures are mentioned together on a page, they may be placed on a page together, provided there is approximately 1/2 inch between each.

**Horizontal Tables and Figures.** To accommodate large tables or figures, it is sometimes necessary to place them in horizontal orientation on the page. The margin at the binding edge must still be 1 1/2 inches, and all other margins at least 1 inch. The margin at the top of the page and the placement of the page number must be consistent with the rest of the thesis. The table or figure and its caption will be placed so that they can be read when the thesis is turned 90 degrees clockwise.
**Foldout Pages.** Large tables and figures should be reduced to fit an 8 1/2 x 11 inch page, if possible. If not, material on approved paper larger than 8 1/2 x 11 inches may be included in the thesis, provided the page itself is 11 inches vertically and is folded properly. The fold on the right side must be at least 1/2 inch from the edge of the paper. The second fold, on the left side, if needed, must be at least 1 1/2 inches from the binding edge of the paper. The finished page, folded, should measure 8 1/2 x 11 inches. If the page is to be bound into the thesis or dissertation, the paper submitted to the graduate school must be the same brand of 100% cotton as the rest of the document.

**Tables**
A table consists of numbers, words, or both, and presents information that is separated into columns (*at least 2*). Tabular information allows the author to convey precise information to a reader in a structured format. **TypeFace/Font.** The type face/font used for the document must be used for tables but may differ in size, depending on the "fit" of the information within the margins. However, the font size should not be any smaller than "10." Because of the type/font requirements for tables, it is seldom possible to use a table from another source "as is."

**Required Components.** Since tables consist of tabulated material or columns, the use of ruling or lines in tables helps the reader distinguish the various parts of the table. One of the characteristics that identifies tabulated material as a table is the presence of at least the following three lines:

1. The table opening line, which appears after the table title and before the columnar headings.
2. The columnar heading closing line, which closes off the headings from the main body of the table.
3. The table closing line, signaling that the data are complete. Anything appearing below the closing line is footnote material.

Vertical lines are accepted but not required.

**Continued Tables.** Tables may be continued on as many pages as necessary, provided the columnar headings within the columnar block remain the same. The columnar block is repeated for each page. The table title is not repeated, but continuation pages are indicated with the designation: **Table____ continued.** **Tables too large to fit within margins may be reduced.**

**Table Footnotes.** Footnotes to tables consist of four different categories: (1) source notes, (2) general notes, (3) notes to specific parts of the table indicated by superscripts, and (4) notes on level of probability. If the table or data within the table are taken from another source, the word **Source(s):** is used, followed by the full reference citation, regardless of the format for referencing used in the main body of the text. This ensures that if that specific page is copied in the future by an interested reader, all bibliographic information is contained within the page. All references must be included in the List of References or Bibliography.

General notes are introduced as **Note(s):** and may include remarks that refer to the table as a whole. Notes to specific parts of the table use superscripts (letters for tables consisting of numbers; numerals for tables consisting of words; symbols if letters or numbers might be mistaken for exponents) that are attached to the part of the table to which they apply. If a table contains values for which levels of probability are given,
asterisks are used by convention. A single asterisk is used for the lowest level of probability, two for the next higher, etc.

**Figures / Plates**
Any diagram, drawing, graph, chart, map, photograph, or material that does not fit into the restricted format for a table is a figure or plate. Figures generally show relationships or illustrate information rather than present precise data. Plates are a sub-grouping of figures and usually consist of groups of separate photographs or drawings presented together. If a figure has a long legend, the legend must be placed on a separate sheet preceding the figure, and both figure and legend are centered (vertically and horizontally) on the pages.

**Type Face/Font.** Since figures are considered illustrations, regardless of the nature of their content, any print that is part of the figure can be in any type face/font, provided it is neat and legible. The figure title and page number must be in the same base type face/font as the rest of the document because this material is considered to be part of the typeset body of the document.

**Legends.** Explanatory material for figures may be placed within the figure, below the title, or continued after the period following the title. If a figure has a long legend, which must be placed on a separate sheet because of the size of the figure, this page must be placed immediately before the figure. Text is centered vertically on the page. The page number assigned to the legend page is considered to be the first page of the figure, and therefore, this page number is printed in the “List of Figures” in the preliminary pages. The figure title would appear on the legend page in bold, together with the legend information. ALL titles are formatted in title case. Legend pages are used only as needed. The Legends’ left margin (1 1/2 inch) and right margin (1 inch) are just the opposite of the document.

**Continued Figures.** A figure containing several related parts too large to be included on a page may be continued onto other pages. The first page contains the figure number and complete title, and subsequent pages contain the remainder of the figure and the designation: Figure___ continued.

**Figure Footnotes.** Footnotes are placed below the figure title but are not separated by a dividing line. If the figure or information with the figure is taken from another source, the word Source(s): is used, followed by the full reference citation, regardless of the format for referencing used in the main body of the text. This ensures that if that specific page is copied in the future by an interested reader, all bibliographic information is contained within the page. If changes are made in a figure from another source, this is indicated by using the phrase “Adapted from . . . . .” General notes are introduced as Note(s): and may include remarks that refer to the figure as a whole. All references must be included in the Bibliography or List of References. (Note: It is best to “adapt” or “redraw” a figure from another source to avoid copyright infringements.)
**Photographs**

There are at least six methods for including photographs in a dissertation or thesis, each differing in quality and cost and requiring different handling.

1. With the high quality reproduction capability of the newer copiers, some of which have an automatic screening mode for photographs, it is often possible to mount an original on a tape-up sheet and have it copied onto 100% cotton paper without any charge other than the normal copying fee.

2. Individual photographic prints can be mounted in each copy using a permanent photo-mount spray adhesive. If this option is selected, the tape-up sheets should be prepared and one copy of the photographs trimmed approximately 1/8 inch smaller than the other prints. The trimmed photographs should be taped on all four sides onto the tape-up sheet and the page inserted into the master copy. Each time the master copy is copied, the photographs are also copied. Cost depends on the number of negatives and copies purchased. Quality depends on the quality of the original photograph.

3. Many students with darkroom access use full-page-size 8 1/2 x 11 inch photographic paper with an image area of 6 x 9 inches (standard margins). Double weight glossy paper is recommended for preservation and crisp image. If this option is selected, the title and other information are printed on a legend page, which precedes the actual photograph, and an address label is mounted on the back of the photograph, 1 inch down and 1 inch in from the right edge (with the photograph facing downward). The label is typed as follows:

<table>
<thead>
<tr>
<th>Figure #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page #</td>
</tr>
<tr>
<td>Last Name, Year</td>
</tr>
</tbody>
</table>

Both the legend page and the photographic page are given page numbers, and in the List of Figures the number shown is that of the legend page. There is not printing on the front of the photograph. The cost of this process depends on whether the darkroom work is done by the student or by a professional agency. The paper may have to be ordered in advance. Often 11 by 14 inch sheets are bought, then cut down to 8 1/2 x 11 inches. The detail quality is excellent.

4. Halftone prints are made of each photograph and mounted onto paste-up pages. The PMT (photo-mechanical transfer) process screens the halftone image and converts it into dots, which can then be copied. Generally a dot density of 85 lines per inch gives the best image on most copiers. The quality of reproduction is comparable to that of a newspaper and probably would not be satisfactory for scientific applications. The cost is relatively low, since as many photographs as will fit on a sheet of PMT material can be made in one shot.
5. Many students use scanners to reproduce photographs, making them part of the computer-contained document. Essentially, the scanner performs the same function as the PMT process and converts the photograph to dots, which are printed as graphics. Fine detail may be lost, but the overall image is attractive and copies well.

6. Offset printing is a final option. The process is done by full-service print shops and requires the processing of two negative—one for the printed copy and one for the halftone photograph. These are then combined; spots opaqued, burned onto a printing plate and printed on the offset press. Done well, this process produces excellent quality in a form that will last as long as the paper on which it is printed. The expense, however, may limit its use in thesis/dissertation production.

**List of References/Bibliography:**

A dissertation/thesis must include a list of citations used in the preparation of the document. This may consist only of references cited in the text (List of References) or it may include works consulted as well (Bibliography). A numbered page with the title -- List of References or Bibliography -- centered vertically and horizontally, precedes the list. The purpose of listing the citations is threefold:

(1) To serve as an acknowledgment of sources
(2) To give readers sufficient information to locate the volume
(3) In the case of personal interviews or correspondence, to save readers the trouble of attempting to locate material that is not available.

Reference software such as *Endnotes* or *Reference Manager* is available to make managing your references easier. The disk with *Endnotes* is available to students in the SOGSR.

**Appendix:**

An appendix (appendices or appendices) is generally a “catch all” for supplementary material to the thesis. In some cases, tables and or figures are placed in the appendix to avoid interrupting the text. If included, is preceded by a numbered page with the designation centered vertically and horizontally between the margins. Original data and supplementary materials are usually placed in the appendix.

**Vita:**

The vita is written in narrative or outline form and contains appropriate personal, academic and professional information about the author. Since copies of the manuscript will be available to the public, private information should not be included. It is the last item in the manuscript and appears with no preceding separation page and no page number.

As the final section of the thesis, the writer must prepare a biographical sketch of himself or herself in paragraph form, or in outline form. The vita should contain, but is not limited to, the following items:
(1) Full name, date of birth, and parents of the candidate, if desired
(2) High school and colleges attended with dates and dates of degrees
(3) Honors and major interests
(4) Military and work experience
(5) Career and objectives
(6) Teaching experience
(7) Publications
(8) Presentations
(9) Community Service

SPECIAL CONSIDERATIONS

Dissertations/Theses in the Form of Journal Articles
A dissertation or thesis may include articles submitted to professional peer reviewed journals. Some guidelines apply, however. The individual papers must be integrated into a unified presentation, which may be done through an introductory chapter, which might contain, among other things, detailed literature review of the type not presented in journal articles. Additionally, one or more connecting chapters might be used to expand upon the methodology or the theoretical implications of the findings presented in the individual articles. A uniform style of headings, reference citations, and bibliographical format—in compliance with this guide—must be adopted for the thesis/dissertation, even though the individual papers may have been prepared for submission to different journals. Each paper should be listed as an individual chapter within the thesis/dissertation. Bibliography or List of References, including all references from the various articles, should be presented at the end of the text. Finally, appendices may be added to present information not included in the chapters. Pages must be numbered consecutively throughout the document.

Two-Volume Dissertations/Theses
If a document is more than 2 1/2 inches in thickness (approximately 500 sheets of 20-pound 100% cotton paper), it must be divided as equally as possible into two volumes not exceeding 2 1/2 inches each. The division must come between major divisions, such as Bibliography or Appendices. The Table of Contents at the beginning of Volume 1 will list the contents for the entire document. Pagination is continuous throughout both volumes. A sheet with VOLUME 1 centered both horizontally and vertically between margins is inserted just prior to Chapter 1. Volume 2 opens with a title page followed by a sheet showing VOLUME 2. Neither volume separation sheet is assigned a number.

DISSERTATION/THESIS SUBMISSION

Submission
The student must submit an approved final draft of the dissertation or thesis by the COI to the SOGSR by April 15 for May graduation; May 15 for June graduation; August 15 for October graduation; and October 15 for December graduation. The SOGSR checks these copies for compliance with the Manual for the Preparation of the Ph.D.
Dissertation or Thesis, quality of reproduction, and other matters of format and style. The dissertation/thesis may be returned to the student if it does not comply with all requirements. The student should submit the approved final draft as early as possible and not wait until the final date of submission, to ensure a timely return of the draft, if corrections need to be made. The final date for submission of error free copies is the last Friday in April, May, August or October.

Submission of a dissertation/thesis to the SOGSR should not be interpreted as approval from the Graduate Dean. Approval comes only after the document is read and the format reviewed for consistency with the thesis guidelines. The final copy of the thesis must be acceptable to all members of the committee and to the Graduate Dean as witnessed by the signatures on the approval page.

The SOGSR will bind the copies and will distribute one to the major emphasis department, medical library, and Graduate Dean’s Office. All other copies of the thesis, including any required by the department are produced and bound through arrangements made personally by the student or with the Graduate School.

Copies
Five copies of the dissertation/thesis on required paper in an 8 1/2 x 11” box, with the required (original) signatures (black ink), must be submitted and accepted by the SOGSR by the published date. The five dissertation official copies will be hard-bound; one placed in the Library under arrangements made by the SOGSR, one placed in the student's division/program, one will be retained in the graduate dean's office, one will be given to the preceptor, and one will be given to the student. All other copies of the dissertation/thesis, including any required by the department/division and/or major professor, are bound through arrangements made personally by the student with the Graduate School. There is a fee of $35 for each additional bound copy beyond the required number.

Paper and Duplication
Five unbound copies of the dissertation/thesis must be produced using a laser printer or photocopier. Inkjet, dot matrix or bubblejet printers cannot be used to produce the final copies of the document. The final paper copies are one-sided copies printed on 100% cotton, at least 20-pound weight, white paper. Any brand of paper can be used, but the same brand must be used throughout all copies, including the approval sheets. Acceptability of these copies and the quality of reproduction is determined solely by the SOGSR. The reproduction of each page must be sharp and clear; each page must also be free from smudges and extraneous marks. Be sure to inspect each page of the five copies very carefully before accepting the five copies from a photocopying or reproduction company.
TIPS FOR WRITING

When you are about to begin, writing a dissertation/thesis seems a long, difficult task. One key to success is to adopt a systematic approach to achieve your goal.

I. PREPARE AN OUTLINE
   A. Create an outline
      1. Chapter headings
      2. Sub-headings
      3. Figure titles
      4. Notes and comments
   B. Discuss your outline with your preceptor.
   C. Give your preceptor a copy of your outline for reference.

II. BE ORGANIZED
   A. Have a computer filing system.
      1. Open a computer document for each chapter and one for the references.
      2. Make a back up of these files and do so daily
      3. Never underestimate the potential for fire or water damage.
      4. You should also have a rotating master back up.
         a. Use two disks or flash drives, back-up one of them every week.
         b. Email each updated version to yourself as an attachment.
   B. Have a physical filing system.
      1. A collection of folders with chapter numbers on them.
         a. This will make you feel good about getting started.
         b. It also helps keep you desk clean.
      2. Have a file for the plots of results and pages of calculations.
      3. Have a file for old notes, references, speculations, etc.,
      4. Put all of your folders in a box or a filing cabinet.
   C. Making Copies.
      If any of your data exist only on paper, copy them and keep the copy in a different location. Consider making a copy of your data book. Ethics may require you to keep original data for at least ten years, and a copy is more likely to be found if two copies exist.

III. CREATE A TIMETABLE
   A. Agree with the chairperson on a timetable for writing the manuscript.
      1. A list of dates for completing drafts of each chapter may be helpful.
      2. A list of dates for your chairperson to return with comments and corrections may be helpful.
      3. A date for completion is essential.
   B. Meet your deadline!
Whenever you sit down to write, it is very important to write something. So write something, no matter how rough. It is often easier to improve something that is already written than to produce text from nothing. So develop a draft then clean it up for your preceptor to read.

Your preceptor will expect to read each chapter in draft form (some prefer to see the whole document at once). It will be returned to you with suggestions and comments. Do not be upset if a chapter or the whole document --- especially the first one you write --- is returned covered in red ink. Your preceptor will want your work to be as good as possible, because their reputation as well as yours is affected. So take a positive attitude to all the scribbles with which your advisor decorates your text.

As you write your thesis, you will notice an enormous improvement in the initial drafts from the first to the last chapter written. Remember, only the final draft is assessed: the more comments your preceptor adds to the first or second draft, the better.

Before you submit a draft to your preceptor, run a grammar and a spell check. If you use a result, observation or generalization that is not your own, you must usually state where in the scientific literature that result is reported. The only exceptions are cases where everyone knows it: dynamics equations need not precede a citation of Newton. The importance of this practice in science is that it allows the reader to verify your starting position. Good referencing also tells the reader which parts of the thesis are descriptions of previous knowledge and which parts are your additions to that knowledge. In a thesis written for the general reader who has little familiarity with the literature of the field, this should be especially clear.
COMMON MISTAKES IN A DISSERTATION/THESIS

The following mistakes are seen over and over in a number of documents submitted to the Graduate School. Most of the mistakes listed can be avoided if you would FIRST READ AND FOLLOW THE GUIDELINES in this Manual for the Preparation of the Ph.D. Dissertation or Thesis.

Please read through the list and make sure you avoid making these mistakes.

1. Write in first person (I or we), when referring to your work.

2. Use the active voice and not the passive voice.

3. Write in the past tense because the research has been done, especially in the methods section. (You write in the future tense in your research proposal because you plan to do the work.)

4. Margins are incorrect (see appendices for proper margins).
   a. Page numbers are outside the 1 inch margin at the bottom of the page.
   b. Headings are 1 inch from the top instead of 2 inches.

5. The appearance of the subheadings must vary for each level of subdivision unless a numbering system is used to indicate level. ALL titles are formatted in title case. The subdivisions within a chapter or section do not begin on a new page unless the preceding page is filled (see 6a for the exception).

6. Too much white space on a page (especially at the bottom). This usually happened when:
   a. When you use a subtitle and it is close to the bottom of the page, there should be at least 2 sentences that come after it or else it will need to be moved to the next page.
   b. A figure is cited on one page of text then the figure must follow on the next page. The white space should be filled in with text on the page preceding the figure.

7. You must use the same font throughout the document.
   a. If you are using a different program for your pictures / figures, please note that any text used should be in the same font as your document.

8. Figures and figure legends are not centered on the page.

9. Figures should be large enough to read. Do not cut and paste "small sized figures" from your journal publication.

10. You cannot copy figures from another source and call it your own. This is copyright infringement. You must get permission to use the figure or you can
redraw it, which is not an infringement, and say “adapted from” or “redrawn from” and cite the reference.

11. Figure titles are placed below the figure unless they are placed with figure legend, which faces the figure.

12. Table titles are placed above the table. Do not include tables with no title or the title below the table.

13. Do not leave a split word or part of a number or open parentheses from a reference for example at the end of a line.

14. Use of abbreviations is not consistent throughout the document.
   a. The first time an abbreviation is used is after the word is first mentioned in the text, and parentheses are placed around the abbreviation. Going forward, the abbreviation is used throughout the rest of the document.
   b. Students will still spell the word in some places and use the abbreviations in other places throughout the document.

15. The references are cited differently throughout the document.
   a. Numbers in some places and names in others. This is usually due to cutting and pasting from different documents with different citation styles.
   b. If you use authors’ names as a reference in the text then you must put the date of the citation also.

16. Spell out the names of all authors in the List of References. Do not use et al. for authors’ names in the reference list.
   a. When using et al. in the text of the document, there is no period after "et" (which is not an abbreviation), there is one after "al."

17. Numerous typographical errors.
   a. Misspelled words. (Spell check on your computer does not pick up all the misspelled words, especially if they are spelled correctly and used out of context).

18. Sentences require punctuation. When sentences are 3 lines long, they probably require at least a comma. Reading a sentence aloud is one way to determine where the likely pausing points might be.
   a. Commas and semicolons are used to connect two sentences.
   b. There is always a comma after a transitional phrase but not before.
      i. If a sentence is started with a transition, then the transition should be followed by a comma (Examples: In addition to, In the next figure.)
   c. A transitional phrase will usually start a new sentence, but if you would like a smoother transition than that afforded by a full stop/period, you can use a semicolon before a transitional phrase to merge the new sentence with the previous one.
19. Punctuation usually comes inside quotation marks.

20. “Data” is a plural noun. Do not use it as a singular noun. The singular noun is “datum.”

21. Which word to use, "affect" or "effect"? Used as a noun "affect" means "emotion." Used as a verb "affect" means "to act upon." Used as a noun "effect" means "a result or consequence." Used as a verb "effect" means "to bring about or cause to happen." Examples: "What is the effect of this drug? Does it affect cognition? Does it alter affect? Could we use it to effect a change in one's personality?"
I. Sample Approval Sheet

To the School of Graduate Studies and Research:

I am submitting herewith a [dissertation/thesis] written by [name as it appears on title page] entitled "[complete title as it appears on title page]." I have examined the final copy of this [dissertation/thesis] for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of [Doctor of Philosophy or Master of Science in Public Health], in the [name of Graduate Program].

[Chairperson/Director]

We have read this [dissertation/thesis] and recommend its acceptance:

Preceptor

Accepted for the Graduate School:

Dean, School of Graduate Studies and Research
FULL TITLE OF THESIS/DISSERTATION

A Dissertation/Thesis
Presented for the
Doctor of Philosophy
Degree
Meharry Medical College

(Name as it appears on school records - No Initials)

(Month and year of commencement)
IV. Sample Dedication Page

DEDICATION

This dissertation is dedicated to my parents

friends and family

who have given me invaluable educational opportunities
V. Sample Acknowledgements

ACKNOWLEDGEMENTS

I would like to thank my major professor, Dr. Jack Watson, for his guidance and patience. I would also like to thank the other committee members, Dr. Joe Perona and Dr. Fred Weber for their comments and assistance over the past two years. I would like to express my thanks to my parents for encouragement and optimism. They encouraged me and reminded me of my goals. I would like to thank all the members of my family in Atlanta, Georgia.
VI. Sample Abstract

ABSTRACT

Butyrylcholinesterase is a serine hydrolase that is found in the brain, liver, lungs, and the G.I. smooth tract of humans. Butyrylcholinesterase (BChE) plays an important role in maintenance of the autonomic and central nervous systems by catalyzing the hydrolysis of the neurotransmitter acetylcholine, and also contributes to the hydrolytic breakdown of xenobiotics. Butyrylcholinesterase is 53% identical in sequence to acetylcholinesterase. Since butyrylcholinesterase has broader substrate specificity than acetylcholinesterase, it has been investigated to determine its use as a possible therapeutic treatment for various genetic and toxicological insults.
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VIII. Sample List of Tables

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<table>
<thead>
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<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>Acetylcholinesterase</td>
<td>AChE</td>
</tr>
<tr>
<td>Acetonitrile</td>
<td>MeCN</td>
</tr>
<tr>
<td>Alanine</td>
<td>Ala</td>
</tr>
<tr>
<td>Alanine</td>
<td>A</td>
</tr>
<tr>
<td>1-Butanol</td>
<td>1-But</td>
</tr>
<tr>
<td>Butyrylcholinesterase</td>
<td>BChE</td>
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</table>

*(NOTE: It is optional to underline the words and abbreviations)*
INTRODUCTION

Elucidating the Rate-limiting Step of the Butyrylcholinesterase Mechanism

Butyrylcholinesterase (BChE, EC 3.1.1.8) is a serine hydrolase that is synthesized in the liver and is a constituent in such areas as the nervous system, heart, serum, embryonic tissues, and certain tumors. Table 1.1 shows the distribution of BChE in humans (1). However, with such a substantial number of locations that contain BChE, its physiological function has yet to be completely elucidated due to the fact that butyrylcholine is not naturally occurring in vertebrates (2). In the central and peripheral nervous system BChE is believed to be a co-regulator of cholinergic activity (3). Recently though, BChE has been shown to maintain the cholinergic system in the absence of acetylcholinesterase (2). In the plasma, BChE is believed to aid in detoxification activities such as the hydrolytic removal of cocaine and heroin (4). Also in the plasma, BChE was found to be the primary enzyme that was involved in the hydrolytic breakdown of the muscle relaxant succinylcholine (5). BChE has been shown to have interactions with various plasma proteins; such as albumin,
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Table 1.1 Distribution of BChE

<table>
<thead>
<tr>
<th>Tissue/Tumor/Cell Line</th>
<th>Characterization/Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central nervous system</td>
<td>Marker for glial cells, cerebrospinal fluid. Embryonic: regulation of proliferation phase</td>
</tr>
<tr>
<td>Plasma</td>
<td>High content of activity, no mRNA; hydrolysis of cocaine</td>
</tr>
<tr>
<td>Liver</td>
<td>Most BChE mRNA; defense line/detoxification; source of blood plasma BChE</td>
</tr>
<tr>
<td>Lung</td>
<td>Defense line/detoxification; high mRNA level but no activity</td>
</tr>
<tr>
<td>Heart</td>
<td>mRNA</td>
</tr>
<tr>
<td>Skeletal muscle</td>
<td>mRNA</td>
</tr>
<tr>
<td>Pancreas</td>
<td>mRNA</td>
</tr>
<tr>
<td>Intestine</td>
<td>Villi, only globular forms</td>
</tr>
<tr>
<td>Kidney</td>
<td>Low Levels</td>
</tr>
<tr>
<td>Leukemia</td>
<td>Gene amplification</td>
</tr>
<tr>
<td>Ovarian carcinoma</td>
<td>Gene amplification</td>
</tr>
<tr>
<td>Neuroblastoma/glioblastoma</td>
<td>High frequency of gene mutation</td>
</tr>
<tr>
<td>Meningioma</td>
<td>High levels of mRNA</td>
</tr>
<tr>
<td>Breast and bladder carcinomas</td>
<td>Abnormal patterns of enzyme inhibition</td>
</tr>
<tr>
<td>Cell line T47D, Mamma carcinoma</td>
<td>-</td>
</tr>
<tr>
<td>Some SV40 transformed cell lines</td>
<td>-</td>
</tr>
</tbody>
</table>
Figure 1. Determination of the Absorptivity Constant of p-Nitrophenol
Figure 15: Initial Rate Profile for 2-propanol Activation of BChE-catalyzed Hydrolysis of PNPB. At each concentration rates were measured in duplicate. Results are similar to the ethanol studies, having an increase in initial rates as the 2-propanol concentrations increase. This is more identifiable at the higher PNPB concentrations. The entire experiment was conducted three times.
Serine hydrolases play an important role in maintenance of the autonomic and central nervous systems by catalyzing the hydrolysis of the neurotransmitter acetylcholine (acetylcholinesterase) or in the hydrolytic breakdown of xenobiotics (e.g. butyrylcholinesterases). Figure 2 shows the reaction (AChE) mechanism of a typical serine hydrolase.

The serine hydrolase mechanism is similar to that of serine proteases (10). The hydrolases use a catalytic triad to act as a nucleophile (Ser200 in AChE) and a general acid-base moiety (His440 and Glu327 in AChE) (11). The serine residue attacks the carbonyl carbon of the substrate to yield a tetrahedral carbonyl oxyanion, catalyzed by proton transfer from serine to histidine. The tetrahedral oxyanion is stabilized by hydrogen bonding to the peptide NH functions of Gly118, Gly119, and Ala201 (the oxyanion hole). The tetrahedral intermediate breaks down with release of the substrate.

Figure 2. Mechanism of Serine Hydrolase

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LIST OF REFERENCES


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VITA

Vernon K. Smith was born in Harvey, Missouri on April 18, 1952. He graduated from Thornton High School in June, 1970. After two years of military service, he entered Harvey Community College and later transferred to Rust College where he received his Bachelor of Science degree in 1972. He received the Master of Science in Education degree from Jackson State University in 1974. He then became a teacher of mathematics at Hernando High School, Hernando, Mississippi from 1974 to 1980. In 1980, he became a teacher of mathematics in the Jackson Public School System and later, in 1985, an instructor in mathematics at Hinds Community College. He was a John Hay Fellow at Williams College, Williamstown, Massachusetts, during the summer of 1972.

He has been awarded grants from the National Science Foundation in 1981 and 1982 for programs aimed at improving the performance of secondary school students in mathematics. In 1988, he served as a reader of proposals for the National Science Foundation. He is the author of several articles, which have appeared in the Mathematics Teacher.