DEPARTMENT OF MOLECULAR
AND BIOMEDICAL PHARMACOLOGY
COLLEGE OF MEDICINE
UNIVERSITY OF KENTUCKY

GRADUATE STUDENT INFORMATION HANDBOOK

(Updated June, 2008)

This handbook includes guidelines and general information on the graduate student program and departmental policies. The handbook is meant to assist students by providing general information, and a basic framework and timeline for their studies according to present procedures. However, it is not intended as a formal commitment or binding agreement. Policies, requirements and suggested timeframes can vary in any given year from those outlined here, in response to altered circumstances, and may be changed without notice. Specific policies are set by the Director of Graduate Studies and the faculty and must be approved by the Chair and be consistent with the broader regulations of the Graduate School.

I. Introduction

Welcome to New Graduate Students!

The Department of Molecular and Biomedical Pharmacology hopes to help you make your graduate student years cheerful ones, but also challenging and successful. This information is intended to make your transition as smooth and painless as possible. This handbook is intended to both provide practical information useful to pharmacology graduate students, and more importantly, to guide students through the important milestones of their graduate career.

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II. Integrated Biomedical Sciences Program (First Year of Graduate School)

Typically, first year graduate students enroll in the IBS program. The IBS program integrates most biomedical graduate students in the University of Kentucky College of Medicine. The seven participating departments and centers include Anatomy & Neurobiology; Microbiology, Immunology & Molecular Genetics; Molecular & Biomedical Pharmacology; Molecular & Cellular Biochemistry; Nutritional Sciences; Physiology; and Toxicology. The IBS program consists of both coursework and laboratory rotations. The 2007-2008 curriculum is described below. Detailed information about these courses can be obtained at www.mc.uky.edu/ibs/overview/curriculum.asp.

FALL Semester
IBS 601 Biomolecules and Metabolism (3 hours)
IBS 603 Cell Biology (3 hours)
IBS 605 Experimental Genetics (3 hours)
IBS 607 Seminar in Integrated Biomedical Sciences (0 hours)
IBS 609 Research in Integrated Biomedical Sciences (1 hour)

SPRING Semester
IBS 602 Biomolecules and Molecular Biology (3 hours)
IBS 604 Cell Signaling (3 hours)
IBS 606 Integrated Biomedical Sciences (4 hours)
IBS 607 Seminar in Integrated Biomedical Sciences (0 hours)
IBS 609 Research in Integrated Biomedical Sciences (1 hour)

SUMMER Session
TOX 600 Ethics in Scientific Research (1 hour)

All IBS students take four laboratory rotations (two per semester) among any of the participating programs. The purpose of the rotations is for the student to both gain experience in a working scientific lab, and to find a faculty member who will serve as a research advisor. Selection of a research advisor is a mutual decision of the student and faculty member and is made at the end of the spring semester.

Additional information about the IBS program can be obtained at the IBS web page (http://www.mc.uky.edu/ibs), or by directly contacting the IBS program by e-mail (ibs@lsv.uky.edu) or by phone at (859) 323-0004.

III. Pharmacology Graduate Program (2nd and Later Years of Graduate School)

A. The Pharmacology Curriculum

All Pharmacology students follow the curriculum described below. Students with extensive prior training in pharmacology may ask the Graduate Committee to evaluate whether the student may modify the curriculum. Also, students may take statistics in a different semester than suggested below. Note that graduate students must register for a total of 9 hours per semester until they pass their qualifying exam.

All Pharmacology students are expected to earn either an "A" or "B" grade in the required PHA courses. In order to ensure that all pharmacology graduates have demonstrated competency in the pharmacology discipline, students who receive a grade of "C" in PHA 621 or average less than a "B" in the four sections of PHA 622 may be asked to perform some level of remediation. The type of remediation will be decided on by the Pharmacology Graduate Committee in consultation with the student's advisory committee. The remediation could take the form of additional academic work, a re-examination, or repeating PHA 621 or appropriate sections of PHA 622. The lower the aggregate average for all sections of PHA 622 the more complete and extensive would be the remedial work.

<u>The Core Curriculum</u>

Fall, 2nd year

PHA 621 PRINCIPLES OF DRUG ACTION (3 hours) Dr. Swanson
This course covers the interaction of drugs with pharmacologic receptors, the coupling of these receptors to intracellular signaling cascades, and the techniques used to identify and differentiate receptor subtypes. The factors governing drug absorption, distribution, metabolism and excretion will also be discussed in detail.

STA 580 BIOSTATISTICS I (3 hours) Dr. Charnigo
Descriptive statistics, hypothesis testing, paired and unpaired tests, ANOVA, contingency tables, log rank test, and regression with biostatistics applications. STA 570 can be taken instead, if preferred.

PHA 750 RESEARCH IN PHARMACOLOGY (1-5 hours) Dr. Hadley
Students register for this course every semester until they have passed their qualifying examination, and should register for just enough credit hours to meet the required minimum number of hours per semester.

PHA 770 SEMINAR IN PHARMACOLOGY (1 hour) Dr. Hadley
Students register for this course every semester until they are ready to take their qualifying exam.

Spring, 2nd year

PHA 622 MOLECULAR DRUG TARGETS AND THERAPEUTICS (4 hours) Dr. Piascik
This advanced course provides state of the art information regarding drugs, drug action and targets for drug action. Four course sections are designed to function as independent one hour courses, emphasizing Cardiovascular Pharmacology (Section 001), Neuropharmacology (Section 002) , Chemotherapeutic Agents (Section 003), as well as Autocoids, Endocrine Pharmacology, and Toxicology (Section 004) .

PHA 750 RESEARCH IN PHARMACOLOGY (1-5 hours)

PHA 770 SEMINAR IN PHARMACOLOGY (1 hour)

Fall, 3rd year (and following terms)*

PHA 767 DISSERTATION RESEARCH* (2 hours) Dr. Hadley

* PHA 767 should be taken fall and spring semesters, as well as each 2nd summer session, beginning with the term the qualifying exam is taken (usually Fall, 3rd year).

Pharmacology Electives

Students should consult their major professor and advisory committee about any departmental or extra-departmental electives they wish to take.

PHA 616 BIOLOGY AND THERAPY OF CANCER (3 hours) Dr. Rangnekar

Cancer biology will be discussed at the molecular, cellular and organismic level. Emphasis will be placed on aspects of cellular signaling, apoptosis and the cell cycle which are unique to cancer cells. Same course as MED/MI 616. Taught in the Spring semester of alternate years.

PHA 617 PHYSIOLOGICAL GENOMICS (2 hours) Drs. McClintock & Chen

The study of function by global analysis of gene expression. Teaches the concepts, techniques, and functional significance of analyzing gene expression patterns. The technical emphasis is on the design and analysis of DNA microarray experiments. Same as PGY 617. Taught in the Fall semester.

PHA 710 AGING OF THE NERVOUS SYSTEM (3 hours) Dr. Gerhardt

This course will examine the alterations in the brain that occur with aging and in neurodegenerative disorders such as Alzheimer's disease. The course will examine aging at several levels, including molecular, cellular, organismic, and behavioral. Same course as ANA/GRN/PGY 710. Taught in the Fall semester in alternate years.

Registration for Courses

Registration is the student's responsibility, and must be done each semester after consultation with the major advisor. Registration is usually done using the myUK portal (https://myuk.uky.edu/irj/portal). Instructions are available at http://www.uky.edu/Registrar/docs/myUK.pdf. Initial registration typically occurs in March or April for the summer session and fall semester, and in November for the spring semester. Check the Registrar's web page for the exact dates. The department does not pay late fees for student registration. Any problems that appear while registering for classes using the myUK portal should be reported to Deborah Turner so that they can be corrected promptly for all students.

B. Formation and Responsibilities of the Advisory Committee

Graduate students select their major professor or research advisor at the end of their first year. The student's major professor will chair or co-chair the student's advisory committee. The committee is typically formed during the student's second year, a year before the qualifying examination.

The advisory committee must have four or more members. Three members must be Pharmacology faculty, and one member must be from outside the department. The four "core" faculty on the committee must be members of the UK Graduate Faculty, and three must be full (not associate) members. If the student's major professor is an associate Graduate Faculty member, a full member must chair the advisory committee with the major professor as co-chair. A list of Pharmacology Graduate Faculty can be obtained from the DGS. The Graduate School must approve the formation of the advisory committee.

The advisory committee oversees the progress of the student towards a doctoral degree. This includes guiding the student's coursework and dissertation research, as well as administrating and judging the qualifying and final examinations. Advisory committee decisions are made by majority vote.

C. Responsibilities of the Pharmacology Graduate Committee

The Graduate School requires each department to annually review whether a student is making good progress towards their degree. The Graduate Committee will discuss each student's progress with the student's major professor, and inform the student of the evaluation in writing. An example of the form used by the graduate committee is included on the last page of this handout

D. The Qualifying Examination

The objective of the qualifying examination is to evaluate the student's general scientific knowledge, ability to think critically, and competence in their research field, in order to determine whether the student is qualified to be a candidate for a doctoral degree. Student evaluation is the main purpose of the qualifying exam, so the exam should not be regarded as a formal dissertation proposal. A student's dissertation research is allowed to differ from the experiments described in the qualifying exam.

The qualifying examination consists of two components: 1) a written research proposal, which follows the same format as a NIH predoctoral fellowship application, and 2) an oral examination in which the research proposal is evaluated by the advisory committee. The qualifying exam is usually completed in the fall semester of the student's third year. The actual exam can be taken at any point during the term, as long as classes are in session. However, the date must be submitted to and approved by the Graduate School within the first six weeks of the semester.

Written Examination

Students should first submit an abstract of no longer than two pages to the advisory committee. This abstract should summarize the research proposal that the student wishes to write up for the written examination. The proposal is usually related to ongoing research in the major professor's laboratory, but can be on a different topic. The abstract should briefly describe: 1) the scientific background of the proposal, 2) the main hypothesis, and 3) the specific aims and methods that would be used to test that hypothesis. The members of the advisory committee should either approve or recommend revision of the abstract within one week.

The student has four weeks to submit a research proposal after approval of the abstract. In order to be fair to all students, it is essential that all creative work on the proposal (literature review, development of the hypothesis and research design, and all writing) be done by the student alone. The proposal may be related to ongoing laboratory work, but no part of the proposal should be adapted from a grant or manuscript written by someone else.

The student is encouraged to discuss drafts of the proposal with the major professor. The major professor should not edit the proposal, but instead advise the student on language and formatting, or point out elements of the proposal that the student should reconsider (e.g. "Do the specific aims really test your hypothesis?" "Have you considered the limitations of, or alternative approaches to this experiment?").

Required Format of the Research Proposal

The research proposal follows the format of the main body of a NIH predoctoral fellowship application, (http://grants.nih.gov/grants/funding/416/phs416.htm#forms) and should be divided into the following sections.

- Specific Aims. Describe the overall goal of the research proposal and the hypotheses that are to be tested.
- Background and Significance. Describe the scientific background of the proposal. Also explain the importance of the research proposal by describing how the specific aims relate to the long-term objectives.
- Preliminary Studies. Provide an account of any pertinent preliminary data.
- Research Design and Methods. 1) Outline the experimental design and review the experimental methods and statistical analysis that will be used. 2) Explain how the experimental design and methods address your hypothesis and specific aims. 3) Review the expected outcomes of the proposed experiments and discuss any limitations or alternative approaches that should be considered.

➢ Literature Cited. Citations must include author names, title, journal (or book), volume and page numbers, and publication year.

The total length of the research proposal, except for "Literature Cited", including all figures and figure legends, ***must not exceed ten pages single-spaced***. Additional formatting requirements include page margins of at least 0.5 inches, and a font of not less than 11 points (Arial 12 point is recommended).

The research proposal must be given to the advisory committee two weeks before the oral examination.

Oral Examination

Students are expected to present the outline of their research proposal at the beginning of their oral exam, which should include a discussion of the hypothesis and aims, background, preliminary data, methods, experimental design, and data analysis and interpretation. The advisory committee will ask questions aimed at evaluating the student's general scientific knowledge, familiarity with the relevant literature, and ability to critically think about the rationale and design of the research proposal.

If the student fails the qualifying examination, Graduate School regulations allow the student to take a second qualifying examination within 4-12 months, with the permission of the advisory committee.

E. Doctoral Candidacy

Students become doctoral candidates after passing the qualifying exam. Students have five years to earn their doctoral degree after the exam, unless the Graduate School is petitioned to allow additional time.

Doctoral candidates register for PHA 767 (Dissertation Research, 2 hours) every semester, as well as in the second summer sessions, even after all other class work is completed.

F. The Research Dissertation and Final Examination

Dissertation Guidelines

Students should first review the Graduate School's dissertation requirements in "Instructions for Preparing Printed/Electronic Dissertations and Doctor of Musical Arts Projects" (www.rgs.uky.edu/gs/thesdissprep.html).

The department permits the main body of the dissertation (called "text" on the dissertation format page in the above publication) to be written in one of two formats. The traditional format must include the following separate sections: Introduction or Background, Hypothesis, Materials & Methods, Results, and Discussion.

The alternative format allows the incorporation of manuscripts into the dissertation. The main body must include the following sections: Introduction or Background, Manuscripts (a separate chapter for each manuscript), and Discussion. The alternative format must include at least two manuscripts where the student is the first author. The manuscripts must already be published, in press, or submitted for publication. The Introduction and Discussion sections should be written so as to integrate the material covered in all of the included manuscripts. Note that journal reprints may not be directly included in the dissertation, and that the manuscripts must be retyped in a format that is acceptable to the Graduate School. References must be uniform in style throughout the dissertation, and conform to Graduate School requirements.

The dissertation must be submitted to the advisory committee three weeks before the final examination. The advisory committee will expect the dissertation to be proofread and corrected before submission.

Final Examination

The final examination is conducted by the advisory committee, including an outside examiner appointed by the Graduate School. The purpose of the examination is to evaluate the student's dissertation research, familiarity with relevant scientific literature, and general scientific background. The examination can be as

comprehensive as the committee desires. The dissertation research is expected to be an original and valuable contribution to the student's field of research, and the dissertation itself should be suitable for publication.

The student must schedule a dissertation research seminar to be presented immediately before the final examination. The student is also responsible for scheduling their final examination. This is a multi-step process and the student is urged to look carefully at the academic calendar in the current Graduate School Bulletin. Students must file an application for a degree with the Graduate School by thirty days after the beginning of the graduating semester, or fifteen days in the summer session. Students must also file a Notification of Intent to Schedule a Final Examination at least eight weeks prior to when the examination will occur. The final examination must occur at least eight days prior to the last day of classes in the semester or summer session. The Graduate School must also approve the scheduling of the examination at least two weeks beforehand.

G. Additional Responsibilities

Seminars

The department considers research seminars to be an essential feature of graduate education, so *students are expected to attend all official departmental seminars*. Students should notify the Director of Graduate Studies by e-mail if they were unable to attend. Students are also expected to register for PHA 770, Seminar in Pharmacology, until they have passed their qualifying exam. Students may be asked to assist seminar speakers in setting up their presentations, or in guiding visitors around campus. Advanced graduate students may be asked to present a seminar, so that the department can be informed of the student's research progress.

Journal Clubs

Pharmacology students meet to discuss a variety of research topics, including papers written by upcoming seminar speakers. The journal club typically meets at least monthly. The graduate student representatives are responsible for informing graduate students about journal club meetings.

Assisting Pharmacology Faculty in Teaching or Grading Exams

Students are expected to sign up at the start of the fall term to proctor at least two pharmacology exams. Students should see the graduate student representative to sign up for proctoring assignments. Proctoring assignments are very important to the department, and should only be missed for emergencies. If an emergency necessitates a student's absence, the student must inform the student representative in advance, and will be expected to make up the proctoring assignment. During the course of the year, the graduate student representative may be asked to assign students other duties as the need arises. An effort will be made to distribute duties fairly among graduate students.

Integrated Biomedical Sciences Program

Students are expected to assist the department in introducing new students to the IBS program. This may include attending lunches and question/answer sessions, or giving tours or demonstrations.

IV. M.D./Ph.D. Students

A. Transition from M.D. Training to Ph.D. Training

This usually takes place following the second year of medical school, after selecting a graduate program and major advisor. In order to make the transition as smooth as possible, students should be aware of the following points.

- Formal leave from medical school should be obtained from the Division of Student Affairs.
- Students must be admitted to the Graduate School (http://www.research.uky.edu/gs/gsapplication.html). Students should apply early, in order to allow time for receipt of transcripts, etc. Check with your advisor and the DGS about whether to apply for summer or fall admission.
- Have your major advisor contact Deborah Turner before May to set up employment as a research assistant.
- Health insurance coverage usually begins in August.

B. The Modified Graduate Curriculum

Entering M.D./Ph.D. students are regarded as second-year graduate students. They are expected to follow the second-year curriculum (page 3), but are excused from taking PHA 622. A typical timeline for the M.D./Ph.D. curriculum is as follows.

Fall, 1st year

PHA 621 PRINCIPLES OF DRUG ACTION	(3 hours)	Dr. Swanson
PHA 750 RESEARCH IN PHARMACOLOGY	(5 hours)	Dr. Hadley
PHA 770 SEMINAR IN PHARMACOLOGY	(1 hour)	Dr. Hadley

Spring, 1st year

STA 580 BIOSTATISTICS I	(3 hours)	Dr. Charnigo
PHA 750 RESEARCH IN PHARMACOLOGY	(5 hours)	Dr. Hadley
PHA 770 SEMINAR IN PHARMACOLOGY	(1 hour)	Dr. Hadley

Summer Session 1, 2nd year

TOX 600 ETHICS IN SCIENTIFIC RESEARCH (1 hour) Dr. Mellon

Fall, 2nd year (and following terms)*

PHA 767 DISSERTATION RESEARCH*	(2 hours)	Dr. Hadley

* PHA 767 should be taken fall and spring semesters, as well as each 2nd summer session, beginning with the term the qualifying exam is taken (usually Fall, 2nd year).

V. General Information

A. Financial Topics

Stipends

Graduate students in good standing receive a competitive stipend jointly set by the departments participating in the IBS program. Note that the University treats the stipends as wages paid to part time employees, and thus they are tax-liable. The stipends may be derived from a variety of sources, including departmental funds, research grants, scholarships or fellowships, and training grants.

In return for the stipend, students are expected to follow the course of study, conduct research, assist in teaching, and assist the department in other assorted duties. Some funding sources (e.g. training grants) may have additional requirements. Graduate school is regarded as a full-time endeavor, so the department discourages outside employment.

Tuition

Students awarded a research assistantship or fellowship receive payment of tuition, both in-state and out-of-state. Students should be aware that tuition fees paid for the student may be viewed as taxable income by federal and state governments.

Students are guaranteed payment of tuition related to their doctoral programs subject to the following conditions. (1) The coursework for which the student has registered has been approved by the IBS director during the IBS year, and by the chair of their advisory committee and the DGS of their program, once they have entered a doctoral program. (2) The student is in good academic standing. Effective fall 2007, students who have been notified by the Graduate School that they are officially on scholastic probation will be responsible for payment of in-state tuition charges while they remain on probation. During this time, out-of-state tuition will be paid by the PI/program for out-of-state students. Once they have raised their GPA to the required 3.0 to regain good academic standing, payment of any future tuition charges will be covered by their PI and/or program, subject to condition #1.

Student Health Insurance

The Graduate School provides student health insurance, and pays a fee allowing access to the Student Health Center for minor illnesses. Health insurance for dependents is offered through the University. Insurance coverage usually begins in August. Further information is available on the internet at http://www.research.uky.edu/gs/GradSchoolFAQs.html#Q22 and at http://www.rgs.uky.edu/gs/fellowship/healthcoverage.html, or by calling the Graduate School Insurance Coordinator, at (859) 257-3261.

B. Vacations and Holidays

New students should be aware that graduate school differs from undergraduate study in that graduate work is a full-time endeavor throughout the 12 months of the year. In general, students are expected to be in lab during the workweek when not in class or studying. The department has no specific guidelines governing holidays and vacations, so the research advisor should be consulted before planning time off. Students should also be aware that time-sensitive scientific research can often require work on holidays, weekends, and nights.

C. Personal Safety

Students should always consult with a faculty member before using new equipment, toxins, chemicals or infectious agents. Students should also be aware that the University requires specific safety training before

using various methods and equipment. The following is a partial list of University web pages where you can register for specific training classes or review appropriate safety manuals.

- Blood Borne Pathogens: http://ehs.uky.edu/classes.html
- Chemicals and Lab Safety: http://ehs.uky.edu/classes.html
- Hazardous Waste: http://ehs.uky.edu/classes.html
- Lab Animals: http://www.research.uky.edu/ori/univet/training/Web-Based_Training.htm
- Laser Safety: http://ehs.uky.edu/classes.html
- Radiation Safety: http://ehs.uky.edu/radiation/radsafe.html
- Additional safety information: http://ehs.uky.edu/ohs/welcome.html. Additional training classes that are available at this website include: Advanced Radiation Safety, Autoclaves, Biological Safety, Biological Safety Cabinets, Chemical Fume Hoods, Fire Extinguisher Training, Hazard Communication, and Select Agents.

D. Disciplinary Issues

Reasons for dismissing a student from the department's graduate program include the following.

- Failure to make adequate progress towards a doctoral degree.
- Failure to pass the qualifying exam.
- Plagiarism on class assignments or exams, or else on the qualifying exam or dissertation.
- Academic cheating, falsification of research data, or misuse of University equipment or grant funds.
- Violation of the Code of Student Conduct (http://www.uky.edu/StudentAffairs/Code/part1.html)
- Scholastic probation. When students have completed 12 or more semester hours of graduate course work with a cumulative GPA of less than 3.0, they will be placed on scholastic probation. Students will have one full-time semester or the equivalent (nine hours) to remove the scholastic probation by attaining a 3.0 cumulative GPA. If probation is not removed, students will be dismissed from the Graduate School.

E. Miscellaneous

Keys

Requests for lab or equipment room keys must be approved by your research advisor and departmental chair. Key forms are obtained from the departmental administrator.

Photocopier Privileges

Students may use the departmental photocopier for either research or academic, but not personal, use. An access code may be obtained from the departmental administrator.

Mailbox

Students have mailboxes at the end of the third floor MS corridor. Check for announcements regularly.

Molecular & Biomedical Pharmacology
Annual Assessment of Student Progress Towards the Ph.D. Degree

Student:_____ Date:_____

Overall, is the student making good progress towards their degree?
Yes: ☐ No: ☐

Expectations for Graduate Students in Molecular & Biomedical Pharmacology:
☐ Maintain an overall GPA > 3.0 and obtain a grade of "B" or better in all PHA courses.
☐ Attend and participate in departmental programs, including seminars.
☐ Maintain a professional attitude in interactions with faculty, staff and other students.
☐ Continual development as a researcher. This includes mastery of appropriate methodology, understanding of experimental design, and demonstrating diligence in carrying out experiments and maintaining records.
☐ Continual development as a scholar. This includes understanding the relevant scientific literature, and mastering skills for verbal and written scientific communication.

Comments or recommendations: _____

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Milestones for judging student progress toward their degree:
☐ Completion of Pharmacology curriculum.
☐ Successful completion of qualifying exam.
☐ Publication of the student's data as abstracts or manuscripts.
☐ Student presentation of their data at a departmental seminar.
☐ Dissertation defense.

Comments or recommendations: _____

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Chair/Co-Chair of Student Advisory Committee:

_____ _____

Pharmacology Graduate Committee:

_____ _____

_____ _____

_____ _____