



Department of Pharmacology and Physiology Graduate Student Handbook

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Preface

This handbook summarizes the policies of the graduate program in the Department of Pharmacology and Physiology. The general policies for graduate study at the University of Rochester are contained in the Official Bulletin of Graduate Studies, <https://www.rochester.edu/GradBulletin/>, and in the Student Handbook of the School of Medicine and Dentistry, <http://www.urmc.rochester.edu/education/graduate/trainee-handbook>. Since policies continually evolve to respond to changing needs of the graduate program and our students, it is imperative that students and faculty advisors verify important decisions with the Program Director.

Program Objective

The objective of the graduate programs in pharmacology and physiology at the University of Rochester is to provide a state-of-the-art learning environment in which students explore the molecular and cellular mechanisms that enable organisms to detect and respond to signaling molecules and pharmacologic agents. We aim to train scientists in molecular and integrative pharmacology and physiology and prepare them for successful careers in independent research and teaching. Each student will acquire the range of technical, analytical, and critical skills required to successfully pursue a research career in academia or in the biotechnology/pharmaceutical industry. The program offers Ph.D. degrees in both pharmacology and physiology and includes courses in basic and advanced biomedical sciences, pharmacology, and physiology; original laboratory research; and the preparation and defense of a doctoral thesis. The Ph.D. degree is awarded upon completion of scholarly work and research described in a publishable dissertation. Our department and program websites are listed below.

<http://www.urmc.rochester.edu/pharmacology-physiology/index.cfm>

<http://www.urmc.rochester.edu/education/graduate/phd/pharmacology-and-physiology/>

Program Administration

The graduate program in pharmacology and physiology is administered by the Program Director, the Graduate Studies Committee, and the faculty of the Department of Pharmacology and Physiology. The review and acceptance of applicants into the program and the review of students enrolled in the program is the responsibility of the Graduate Studies Committee. The Pharmacology and Physiology faculty will participate in major policy decisions concerning the graduate program.

The Graduate Committee of the Department of Pharmacology and Physiology consists of the Program Director and typically four to five other faculty members who hold either primary or secondary appointments in the Department of Pharmacology and Physiology. This committee is responsible for administering the Ph.D. programs, setting program

requirements and policies, and monitoring student progress. The Graduate Committee reviews and approves students' thesis advisory committees. The committee also considers petitions for graduate course transfers, graduate course selection, and exemptions to requirements and policies.

Doctoral Programs in Pharmacology and Physiology

- A. **Year 1:** Students are admitted into the CMPP program on a provisional basis for the first year. After successful completion of the first year of study- which includes required coursework, laboratory rotations (including written and oral reports), and selection of a thesis advisor, students formally enter the graduate studies program of the Department of Pharmacology and Physiology. During the first year, students will be advised directly by the CMPP Program Director.
- a. **Coursework:** Students must complete at least 32 credit hours of coursework. This total includes 25 credit hours of required courses and at least 7 credit hours of electives. The following courses, or acceptable equivalents as determined by the Graduate Studies Committee, are required of all Ph.D. candidates:
- i. Required courses*:
 - IND 431 Foundations in Modern Biology I (5 credit hours, fall course)
 - IND 432 Foundations in Modern Biology II (5 credit hours, spring course)
 - PHP 403 Human Cell Physiology (4 credit hours, fall course)
 - PHP 404 Principles of Pharmacology (4 credit hours, spring course)
 - PHP 405 Effective Scientific Communication (2 credit hours, spring course)
 - IND 420 Mastering Scientific Information (0 credit hours, fall course)
 - IND 501 Ethics in Research (1 credit hour, fall course)
 - PHP 502 Seminar (1 credit hour/semester, fall/spring course, total of 4 credits required)
 - ii. Recommended Elective courses (7 credit hours, total):
 - IND 447/PHP 447 Signal Transduction (4 credit hours, spring course)
 - IND 426 Science Communication for Diverse Audiences (2 credit hours, fall course)
 - PHP 550 Ion Channels and Disease (2 credit hours, spring course)
 - MBI 473 Immunology (3 credit hours, fall course)
 - NSC 525 Biology of Neurological Diseases (3 credit hours, spring course)
 - BST 463 Introduction to Biostatistics (4 credit hours, fall course)
 - PTH 507 Cancer Biology (3 credit hours, spring course)

PTH 509 Pathways to Human Disease I (4 credit hours, fall course)
PTH 510 Pathways to Human Disease II (4 credit hours, spring course)
PTH 571 Molecular Basis of Disease (3 credit hours, fall course)
CVS 401 Cardiovascular Biology and Disease (3 credit hours, fall course)

*All required courses, except PHP 405, are typically taken in the first year; requests to take these courses after the first year require approval of the Graduate Studies Committee.

Attendance at all Department of Pharmacology and Physiology seminars and lectures is required until the requirements for the Ph.D. are completed. Each student is also required to formally enroll in PHP 502 each semester through their years of graduate study; however, a total of 4 credits are required. ***Each student must present a seminar in this series at least 4 times prior to graduation.*** Seminar topics may consist of research areas in pharmacology and physiology, and dissertation progress reports. Topics will be chosen by the course director or by the student with approval of the course director. Students are encouraged to attend research seminars of local and visiting scientists hosted by other departments. In addition, students are strongly encouraged to join one of several journal clubs run by faculty within the department.

Selection of appropriate elective courses that complement the student's research area should be done in conjunction with the student's thesis advisor in consultation with their thesis committee. Elective courses can be taken at any time during the student's period of study, though most students prefer to complete all course requirements within the first two years. *Students may request to take elective courses that are not on the recommended list, however this requires approval of the Graduate Studies Committee.* Requests for approval should be made prior to the semester in which the course is held.

- iii. Assessment: All required courses, with the exception of PHP 405 and 502, and IND 501, must be taken on the A/E system; Rotations, PHP 405, 502 and IND 501 are taken on the S/E system. Minimum passing grades for courses and research carrying credit are C or S. Students who receive a grade of C in any two courses will be terminated from the program. Those students with a GPA less than 3.0 at the end of the academic year or those who have received a grade of 'C' in any course will be put on academic probation and may be dropped from the program. Alternatively, the student may be permitted to undergo a first-year examination (discussed in detail below).

A/E SYSTEM		S/E SYSTEM	
A	Excellent	S	Satisfactory
A-		E	Failure
B+		I	Incomplete
B	Good	IE	Incomplete and Failure
B-		W	Withdrawn
C	Poor	N	No report
E	Failure		
I	Incomplete		
IE	Incomplete and Failure		
W	Withdrawn		
N	No report		

- b. **Laboratory Rotations:** All first-year students must successfully complete at least three laboratory rotations before formally entering the program in Pharmacology or Physiology. Under most cases, these rotations will have been completed during the student's first year of study. These laboratory rotations provide an opportunity to gain a broader perspective of the sciences of pharmacology and physiology and at the same time, allow the student to become familiar with the diverse investigative activities being pursued within the University of Rochester Medical Center. Typically, faculty who are interested in having students rotate in their laboratory present brief overviews of their research projects at the beginning of the fall semester to highlight ongoing studies. However, students must contact faculty directly to determine whether the faculty member is accepting students. The duration of each rotation is 11 weeks, and students are expected to spend at least 10-12 hours per week in the lab.
- i. **Rotation Assessment:** The Program Director will meet with students at the beginning of their first academic year to discuss faculty expectations of student performance during the rotation period. To obtain a satisfactory grade for a rotation, a student must participate in the activities of the lab (such as journal clubs and lab meetings), complete experimental activities agreed upon, and be able to demonstrate proper documentation, analysis, and presentation of acquired data. Rotations will be assessed through a combination of evaluations and written and oral reports.
1. At the end of each rotation, *both the student and mentor will each complete a written evaluation*. Forms for these evaluations can be found here:
<http://www.urmc.rochester.edu/education/graduate/home/forms.cf>

m The mentor is expected to discuss their written evaluation with the student and submit following the instructions on the bottom of the form. Student evaluations of their rotation mentors are kept confidential. Both student and mentor evaluations are assigned due dates by the Graduate Education office (GEPA). Failure to submit these evaluations on time may result in a grade of 'incomplete'. Though the faculty evaluation is submitted by the rotation advisor, it is the responsibility of the student to ensure that the program and graduate education office receive the evaluation on time.

2. In addition, *the student must complete three written reports on their rotation experiences*. These reports should be at least two pages, single spaced, with ≤ 1 inch margins. The reports should describe the research problem encountered during the rotation, and include the following subsections: background, significance/rationale, approach, future directions, and references. Figures should be included as appropriate; however, figures and references are not included in page requirement. The two-page reports should be completed with the input of the rotation advisor, and *each report submitted to the CMPP Program Director and Year 1 Program Coordinator within 1 week of the end of the rotation*. The overall evaluation of these three writing exercises will be considered one part of each student's end of first year evaluation.
3. First-year students will also *present a 30-minute talk on a selected rotation* at the end of the spring semester as part of the student colloquium.

- c. **Faculty Review of Student Performance:** At the conclusion of the academic year, the Graduate Studies Committee meets to discuss the academic performance of first-year students. Coursework grades, laboratory rotation evaluations, and written reports are used to assess student performance. Students are expected to have an overall GPA of at least 3.0, and rotation evaluations of "meets expectations" or "exceeds expectations" (scale = Exceeds Expectations/ Meets Expectations/Needs Improvement/Unacceptable) for lab rotation performance. Those students with a GPA less than 3.0, those who receive an "unacceptable" on their rotation evaluation, and/or those who have received a grade of 'C' in any course may be dropped from the program. Alternatively, the student may be permitted to undergo a first-year examination (discussed in detail below). Students must receive a grade of "Pass" on this exam to remain in the program. At the conclusion of the first academic year, a summary of student performance and recommendations of the Graduate Studies Committee are presented to the Department Faculty by the Program Director.

Students who have successfully completed their first year of studies receive a letter from the Program Director indicating admittance into the Doctoral Program in Pharmacology and Physiology. The Program Director meets individually with those students who did not meet the performance criteria in order to convey performance deficiencies and concerns of the faculty and discuss remediation.

- d. **First-year Examination:** The purpose of the exam is to evaluate a student's critical thinking skills in both written and oral formats, in order to identify those students who appear capable of completing all requirements for the doctoral program.

The subject of the first-year exam is a recent article from the literature. The Program Director will select three faculty members from the Department of Pharmacology and Physiology to serve on the exam committee. These faculty will then submit recent articles that align with the background and interests of the student to the Program Director, who will pass the list on to the student. The student will then have 3 days to select one paper on which to execute the exam. After selecting a paper, the student will be given 14 days to prepare a report. Reports are to be no more than 15 double spaced pages, 12 pt font (or an alternative legible format of equivalent length), with 1 inch margins. Figures and legends should be embedded within the text. The report should begin with an executive summary. The report must include a critical evaluation of the paper. The critical analysis should address: 1) the significance of the study in the context of human health, 2) the findings of previous studies that address similar questions, 3) the quality of the work, data, and/or model(s), and 4) the strength of the conclusions. Note that a student does not need find things 'wrong' with the paper. Students will have at least three days after turning in the report before the oral exam. The student should prepare an approximately 20 minute oral presentation on the paper and their report. The paper is used as a starting point for questioning, but the student's understanding of fundamental pharmacology/physiology principles and biology will be tested during the oral portion of the exam. The student will meet with the Program Director prior to the oral exam to explain the expectations for passing the exam to the student. Students are not allowed to retake this exam. Failure results in termination from the program. Students who pass the examination receive verbal feedback on their performance immediately after the exam.

- B. **Year 2:** Students formally enter the graduate studies program of the Department of Pharmacology and Physiology following completion of their first-year of study in one of the first-year program areas. Students must designate a thesis advisor and Ph.D. track (Pharmacology or Physiology). The selection of a thesis advisor requires approval by the

Program Director and the Graduate Studies Committee. A faculty member may not be able to accept a student for some of the following reasons: (1) insufficient laboratory space or facilities; (2) lack of funds to support research; (3) commitments that prevent the faculty member from devoting sufficient time to the student's training and education; and (4) plans for a sabbatical leave. Students wishing to make a change in their selection of thesis advisor must petition the Program Director and provide the Graduate Studies Committee with the rationale for electing a different advisor.

- a. **Thesis Advisor:** Full-time, tenure-track faculty members at the University holding primary or secondary appointments in Pharmacology and Physiology, as well as full-time, tenure-track faculty members of the Aab Cardiovascular Research Institute may serve as a Ph.D. thesis advisor to graduate students in the Pharmacology and Physiology programs. With few exceptions, a thesis advisor should be selected by June 1 of the first academic year. Selection of the Thesis Advisor requires approval by the Program Director in Pharmacology and Physiology. Students should meet with their thesis advisor to discuss and sign the Roles and Responsibilities of Advisors and Students Form within 2 weeks of joining the lab.
- b. **Thesis Advisory Committee:** The thesis advisory committee performs several functions during the student's time at the University. It serves as the basis for the qualifying examination committee, reviews the student's progress on an annual basis, provides advice during the development and progression of the research project, and serves (along with an appointed Chair) as the examination committee for the thesis defense. The Thesis Advisory Committee should be consulted during conception of the thesis problem, execution of the thesis research, and the writing of the thesis. A faculty member does not need to be performing similar scientific research to be a valuable committee member. Often, those with peripheral knowledge of the student's research area can see important avenues of study because of their different perspectives.

At latest, students are expected to assemble their thesis advisory committee during the Spring semester of their second academic year. Students, after consultation with their faculty advisor, should submit the list of prospective committee members to the Program Director in Pharmacology and Physiology for approval. Please note that *students must meet with their thesis advisory committee during their second academic year.*

The Department of Pharmacology and Physiology requires that the thesis advisory committee be composed of at least three tenure-track faculty members in addition to the student's thesis advisor, for a total of at least four committee members. The

University requires that the final thesis committee be composed of at least three faculty members (including the student's advisor) - two faculty members with primary appointments in Pharmacology and Physiology and one faculty member with a primary appointment in another department. Therefore, to satisfy both requirements...

... if the student's thesis advisor holds a primary appointment in Pharmacology or Physiology, the student should choose one more primary faculty for the committee to satisfy the requirements of the Dean's office. The third member should hold a primary appointment in another department. The fourth committee member can hold a primary appointment in any department.

...if the student's thesis advisor does not have a primary appointment in Pharmacology and Physiology, the student should select two committee members with primary appointments in this department. The fourth committee member should have a primary appointment in another department (advisor does not count for outside member).

At any time, the student and his/her thesis advisor may petition the Program Director and the Graduate Studies Committee to alter the composition of the Thesis Advisory Committee in order to reflect changing needs of the student's research project.

- c. **Seminar:** Second-year students will present two seminars during the year – one in the fall and one in the spring. In the fall semester, second-year students will present a literature review of their choice. During the spring semester, students will present a research/literature seminar designed to incorporate some of their preliminary laboratory research in conjunction with relevant recent literature.
- d. **Teaching (TA) Requirement:** Students are required to act as a teaching assistant in one or more courses prior to completion of their degree. Typically, this requirement is fulfilled during the second year, but can be fulfilled at any time. Our program requires students complete *a minimum of 8 student contact hours* to fulfill this requirement. In addition, all students in year 3 and beyond are expected to serve as a discussion facilitator for a 2-hour small group session in PHP 100, the Pharmacology course for 1st year medical students, which currently takes place during the last half of March.

To fulfill the requirement for 8 student contact hours, students may TA more than one course, or more than one semester. Students are strongly recommended to

contact the course director for the course that they wish to TA far in advance of the semester the course will be offered. Upon completion of a teaching assistantship, the student must submit a TA Requirement Certification form, signed by the course director, to the Graduate Program Coordinator.

Below is a list of approved courses in which there are opportunities to TA. Students who wish to TA courses not on this list will require prior approval from the Graduate Committee.

FALL

PHP 403 Human Cell Physiology
BST 463 Introduction to Biostatistics
CVS 401 Cardiovascular Biology and Disease
IND 431 Foundations of Modern Biology I
MBI 473 Immunology
PTH 509 Cell Biology of Human Disease I
PTH 571 Molecular Basis of Disease

SPRING

PHP 404 Principles of Pharmacology
PHP 447/IND 447 Signal Transduction
PHP 550 Ion Channels and Disease
PHP/BME 468 Intro to Structure and Analysis of Biomolecules
IND 432 Foundations of Modern Biology II
NSC 525 Biology of Neurological Diseases
PTH 510 Cell Biology of Human Disease II

- e. **Qualifying Examination Preparation:** The Program Director meets with second-year students to provide students with the rules and expectations of the qualifying examination. A written summary of rules and expectations will be provided at the meeting. Students must meet with their thesis advisory committee during their second academic year. It is strongly recommended that this meeting occur following the student's research seminar in the Spring semester. During this meeting, the student and committee members should discuss the student's emerging research proposal. The Qualifying Examination may be scheduled as early as the spring of the second year of study, but must be completed no later than October 1st of the third academic year.
- C. **Year 3:** The third year of study is marked by the completion of the Qualifying Examination in the fall. Students must also maintain a 3.0 GPA throughout their years of study, attend departmental seminars, and continue full-time research. Ph.D. students who successfully pass their qualifying examination and have completed their coursework will be awarded a Master's Degree.
- a. **The Qualifying Examination:** Exams may be scheduled as early as the spring of the second year of study, but must be completed no later than October 1st of the third

academic year. An examination grade of “Fail” is recorded for those students who have not taken the exam by the deadline. Whether the student is permitted to take the exam at a later date is left to the discretion of the Graduate Studies Committee. A second failing grade results in termination from the program.

The Qualifying Examination is administered by members of the student’s Thesis Advisory Committee, plus two ad hoc faculty members appointed by the Program Director. *Students must schedule the exam at least one month prior to the actual date of the exam and inform both the Program Director and the Program Coordinator of the date, time, and location of the exam.* Once the exam is scheduled, ad hoc members will be appointed. The appointed faculty members serve for the Qualifying Examination only, and are not permanent members of the student’s Thesis Advisory Committee. *The full exam committee roster, as well as a title page and abstract of the proposal, must be submitted to GEPA at least 15 work days (~3 weeks) prior to the examination.*

The student will submit the required paperwork and research proposal (ten-page maximum) in the NIH grant-proposal format to all members of the Qualifying Examination committee at least two weeks prior to the examination. Failure to distribute the written document by the deadline, without prior approval from the Graduate Studies Committee, will result in cancellation of both the examination and seminar, and the exam will be recorded as ‘Fail’. The student will be given an opportunity to retake the exam once. Details of the format of the written portion of the exam are listed below. Failure to follow the formatting guidelines will result in the proposal being returned to the student and may result in a recorded grade of “Fail” for the exam.

The exam consists of the written proposal, and the oral exam, which is comprised of a public seminar and closed exam session. The closed portion of the exam typically lasts between two and three hours. The thesis advisor is not present during the closed examination.

- i. **Written Exam Specifications:** Students are expected to propose a logical series of experiments designed to test a stated hypothesis and to defend their proposed ideas and approaches. The examination is not intended to be an abridged thesis defense, and therefore, limited preliminary data is required.
 1. Students must use the current NIH-style format for their proposal. References, title page, and abstract are not included in the 10-page

limit. All print (including figure axes and legends) must be clear and legible.

2. Font: Use an Arial or Helvetica typeface and a font size of 11 points or larger. A symbol font may be used to insert Greek letters or special characters; the font size requirement still applies. Type density, including characters and spaces must be no more than 15 characters per inch. Type may be no more than 6 lines per inch.
 3. Page Size and Margins: Use standard size (8 ½" x 11") sheets of paper. Use one-half inch margins (top, bottom, left, and right) for all pages. Use single column format. The proposal must be single-sided and single-spaced.
 4. Number pages consecutively. Do not use suffixes (e.g. 5a, 5b, etc.). Do not include unnumbered pages.
- ii. Oral Examination: The aim of the research proposal/qualifying examination is to assess the student's general knowledge of the broad aspects of pharmacology and physiology and to test the student's ability to apply this knowledge to the solution of research problems. *Students must deliver a 60 minute (50-minute presentation, 10 minutes for questions) open proposal seminar prior to the closed examination.* If the presentation is significantly shorter than the allotted time, this may be taken into account by the committee when determining whether the student has completed the requirements of the exam. During this seminar, students should clearly state the hypothesis to be tested by the specific aims of the proposed project, provide justification for the research through consideration of published literature and/or preliminary data, and clearly outline the proposed line of experiments and anticipated results. Students should make every attempt to schedule their open seminar during the Student Colloquium Series (PHP 502). However, in some instances scheduling constraints may require the open seminar and exam to be scheduled at an alternate time.
- iii. Evaluation: During the closed examination, students will be evaluated by their ability to satisfactorily answer questions raised by committee members that focus primarily on the following issues:
1. Does the proposed research project address a valid and important scientific question?
 2. Has a central hypothesis been clearly stated? Is the hypothesis supported by published literature and/or preliminary data?
 3. Does the student have a broad and firmly based knowledge of the literature related to the area of research?

4. Do the proposed methods appropriately address the hypothesis? Are the questions likely to be answered by the proposed approach?
5. Are the proposed methods feasible? Does the student understand the limitations of the proposed techniques and possible technical obstacles? Does the student have alternate approaches in mind?
6. Can the student clearly describe the predicted results and competently interpret the multiple possible outcomes of the experiments?
7. Is it likely that the project could be completed within the requisite time frame?
8. Is the scientific significance/importance of the question clearly stated? Is the relevance of this information to human health/disease clearly expressed?

iv. **Re-Taking the Exam:** If a student fails the examination, they may be given an opportunity to retake the exam once. According to the U of R Regulations and University Policies Concerning Graduate Studies, "A second qualifying examination after failure, if permitted, may be taken after a period of five calendar months." Given scheduling constraints, students should allow plenty of time to arrange with their Qualifying Examination Committee the date, time, and location of the Qualifying Examination. In addition, the student must submit two forms (available from the graduate program coordinator) along with an Abstract and Title Page to the Senior Associate Dean for Graduate studies requesting that the examination be scheduled. This form must be sent no later than 15 work days before the scheduled examination.

b. **Seminar:** During the third year of graduate work, a seminar is delivered in conjunction with the Qualifying Examination and is the only seminar required for the year.

D. **The Remaining Years:** The remaining years of graduate study are spent on full-time research developing the research project that will be described in the Ph.D. thesis. The research advisor and thesis advisory committee play key roles during these years.

a. **Annual Assessment:** Following successful completion of the Qualifying Examination, *students must meet with their thesis advisory committee at least once yearly.* During these meetings, the committee will discuss the student's progress and clarify research problems. *A written report of the student's progress must be approved by the committee and then submitted to the Program Director and Senior Associate*

Dean for Graduate Studies, by June 1 of each academic year. If the annual progress report is not submitted by this deadline, stipend funding may be terminated. The form for this report can be found on the Graduate forms website: <http://www.urmc.rochester.edu/education/graduate/home/forms.cfm> (Evaluation-Annual).

The annual committee meeting is typically done in conjunction with the student's required seminar. Prior to the committee meeting, students will work with their research advisor(s) to fill out the annual progress report and then distribute the report to committee members. Students who receive an overall performance evaluation of 'good', 'fair', or 'poor' (scale = poor/fair/good/very good/excellent/outstanding) will be asked to schedule bi-annual committee meetings to provide more feedback to the student. The Program Director will meet with students who receive a grade of 'fair' or 'poor' and their advisor to discuss potential ways to improve performance. The completed annual progress report (signed by all committee members) should be submitted after this meeting.

- b. **Additional Requirements:** Students are encouraged to work closely with their thesis advisor to submit a predoctoral grant application in year 3 or 4. *Students are expected to submit at least one first author peer-reviewed manuscript for publication before their doctoral defense.*
- E. **Dissertation Preparation and Defense:** The dissertation (thesis) is written after the student's Thesis Advisory Committee and advisor have approved the completion of the thesis research. The expectation of the CMPP program is that each dissertation shall be a report on independent research, consist of a body of work of suitable scope and depth, and be formulated in a manner worthy of publication. All collaborations and other contributors to the student's thesis should be clearly indicated and defined in the written document and public presentation.

When the student is ready to write the thesis, the appropriate form should be signed and delivered to the graduate program coordinator. The student should go to the following website to print out a copy of the booklet "Preparing your Thesis, A Manual for Graduate Students"- <http://www.rochester.edu/theses>. This booklet outlines the University's requirements for format, documentation, and the physical form of the thesis. *The student must prepare the thesis to meet the requirements set forth in this booklet.* Students should also consult the "Regulations and University Policies Concerning Graduate Studies" for additional instructions. The student should reach an agreement about the format and content of the thesis with their advisor prior to writing the thesis. The advisor has the ultimate responsibility and authority to determine the content of the student's thesis.

a. **Overview of Thesis Defense Process and Registration of Defense:**

Important Due Dates

- i. At least **6 months prior** to proposed date of defense – meet with your advisory committee to request approval to begin writing thesis.
 - ii. At least **4 months prior** to proposed date of defense – notify your graduate program coordinator of the three faculty members to nominate to serve as Chair for your defense.
 - iii. At least **2 months prior** to the date of defense – arrange date, time, and location of defense with committee and poll your defense chair and advisory committee to determine their preference for thesis format (hard copy/pdf). Notify the Registrar and graduate program coordinator of defense date. Your graduate program coordinator will start your defense record in an online SharePoint, PhD Completion Site. You will work with your graduate program coordinator to provide other documents to complete the online defense record. Check with your graduate program coordinator to determine when these documents must be submitted.
 - iv. At least **25 work days prior** to the date of defense – provide thesis to your graduate program coordinator to upload to the online system and make hard copies as needed.
 - v. At least **15 work days prior** to the date of defense – graduate program coordinator will confirm thesis and all paperwork is uploaded to online system and approve. This generates an email to your advisor, advisory committee and program director to request online approval of the thesis submitted for defense.
 - vi. At least **10 full work days prior** to the date of defense – advisor, advisory committee and program director have approved your thesis for defense. The thesis and defense record is reviewed and approved by SMD Senior Associate Dean for Graduate Studies.
 - vii. At least **5 full work days prior** to the date of defense – registration of thesis for defense. The University Dean for Graduate Studies reviews and approves the thesis and defense record. This generates an email to your defense chair, advisor and advisory committee announcing the date, time, and location of defense. The defense chair receives instructions for the defense, forms and for reporting the exam outcome.
- b. **Nomination of Defense Chair:** A Chair is appointed for each Ph.D. oral defense exam to monitor and promote fairness and rigor in the conduct of the defense. The Chair's status as a nonmember of the advisor's and student's working group, program, or

department enables distance from previously established judgments on the candidate's work. The outsider status also limits the Chair's and member's' ability to use department administrative influence in the defense process. The candidate and advisor will nominate three individuals to serve as Chair using the Request for PhD Chairperson form prepared by the graduate program coordinator and submitted to the Senior Associate Dean for Graduate Studies. You will be notified of the Chair selection and the selected chair and will be included in the planning for specific defense dates.

- c. **Registration for Defense:** At least 15 full work days prior to the date of defense, the final thesis and required forms must be uploaded to the online system. Work with the Registrar and graduate program coordinator to ensure completion of forms.
- d. **Final Oral Examination:** The Final Oral Examination will be taken after completion of all other requirements for the degree, but not earlier than six months after passing the cumulative and oral qualifying examinations. The examination consists of two parts: the first part is a public seminar that describes the work presented in the dissertation. The second part of the examination takes place immediately after the seminar and after all questions have been satisfactorily answered. The student will then meet privately with the Dissertation Advisory Committee to defend the dissertation.
- e. **After your Defense:** After a successful defense, the student must make the corrections requested by the advisory committee as well as corrections from the University Dean for Graduate Studies. The University Graduate Studies (UGS) office may also notate required corrections to the format of your thesis. This annotated copy, along with the original thesis, will be stored in the PhD Completion Site for you to reference after your defense. Log into <https://phdprocess.ur.rochester.edu> to access this document; in most cases your graduate program coordinator will download and provide it for you. If required, a final signed form from the student's advisor indicating that all changes have been made will be submitted to the UGS.
 - i. Once all corrections/revisions are completed, all PhD students must attach a pdf of their final abstract (350 words or less) and attach a pdf of their final dissertation to the UR ProQuest site (<http://www.etdadmin.com/rochester>). You will receive instructions for the ProQuest publishing process from the University Graduate Studies (UGS) office. In addition, you will receive instructions from UGS for other forms to complete that are required for the completion of the degree.

- ii. After your final thesis is submitted to ProQuest, provide a PDF version to your graduate program coordinator who will have hard cover bound copies made - one for the student, one for your advisor, and one for the department library. This is a courtesy paid for by the Department of Pharmacology and Physiology. You can have additional copies bound, at your expense. Do not request bound copies through ProQuest.

Note: Please be sure that the graduate program coordinator receives a copy of any correspondence between your advisor and the Senior Associate Dean for Graduate Studies Office that concerns your qualifying examinations and thesis registration. It is important that accurate records be kept within the department on the status of each student.

F. General Policies

- a. **Advisor's Responsibilities:** Advisors are expected to meet regularly with trainees to assess their academic and research progress. The advisor should set reasonable expectations for performance in the laboratory, should assist the student in gaining access to needed equipment and facilities, and should discuss potential or actual problems with the Departmental Graduate Studies Committee. The Cellular and Molecular Pharmacology and Physiology Program requires advisors to acknowledge their responsibilities and attest that they have discussed laboratory policies with their students by signing the 'Roles and Responsibilities of Advisors and Students' form.
- b. **Student's Responsibilities:** Students are expected to comply with departmental and graduate school regulations concerning deadlines and the convening of dissertation advisory committee meetings, to meet the academic performance expectations of the University, to attend all departmental seminars, and to pursue their thesis research vigorously. All research laboratories require that students maintain up-to-date records of their experimental work. The research notebooks are the property of the student's advisor. The Cellular and Molecular Pharmacology and Physiology Program requires students to acknowledge their responsibilities and attest that they have discussed laboratory policies with their advisor by signing the 'Roles and Responsibilities of Advisors and Students' form.
- c. **Regulations:** In addition, the document, "Regulations and University Policies Concerning Graduate Studies", contains more detailed information than is provided in this handbook, and students are expected to be thoroughly familiar with these regulations. This Bulletin is available from the graduate program coordinator and is

also available on the Graduate Education website.

(<http://www.cc.rochester.edu/GradBulletin/PDFbulletin/Regulations10-12.pdf>)

- d. **Right of Petition:** Students have the right to petition the Departmental Graduate Studies Committee to make changes in their program or to deviate from the guidelines contained in this handbook.
- e. **Vacations/Holidays:** Graduate students are expected to engage in full-time study and research. NIH guidelines and official University of Rochester policy provides graduate students with 2 weeks (10 business days) of vacation per year, as well as fixed University holidays. *Students are not permitted to take more than two weeks of vacation at any one time. Any student requesting an exception to this policy must submit a written request to both the Program Director and the Senior Associate Dean for Graduate Studies.* In all cases, the student's advisor or the Program Director (for students whose advisor is unavailable) should be consulted about planned vacations. Students are also entitled to official University holidays and a reasonable amount of sick days.
- f. **Supplies and Photocopying:** In general, students will use research supplies available in the advisor's laboratory. All purchases must be approved by the research advisor. Photocopying is charged to the laboratory's copy card. If the student does not have access to a card or if the student is required to copy course material, a copy card is available in the Pharmacology and Physiology Department Office.
- g. **Telephones:** The University does not allow personal long-distance phone calls to be made from the office or the laboratory. There is no mechanism for an individual to be charged for the calls or to reimburse accounts.

Program for Master's Degree in Pharmacology or Physiology

The Cellular and Molecular Pharmacology and Physiology program also accepts students seeking a Master's Degree in Pharmacology or Physiology. Master's students can complete either a Plan A (research focus) or Plan B (academic/literature focus) master's program. Plan A students may, at their discretion, identify a Master's thesis advisor prior to entry into the program, or complete 2-3 research rotations prior to selecting a laboratory in which to complete their thesis. However, a thesis advisor must be identified and approved prior to the second year of study. Once a thesis advisor is selected, Plan A students will work in the laboratory to complete their thesis project. Depending on whether rotations are performed, total time to completion of degree for Plan A is expected to be 2 ½ -3 years. Plan B students must, at the end of their first year of study, identify an advisor for their Master's Essay, typically a faculty member with expertise in the field. Students typically take at least one semester to write their Master's Essay. Total time to completion of degree for Plan B is expected to be 2 years.

- A. **General Requirements:** Both Plan A and Plan B students must complete the following:
 - i. All "required courses" as outlined for the Ph.D. program in Section A, including four credits of seminar (PHP 502).
 - ii. Complete 5 additional credit hours of elective course credit from the list outlined for the Ph.D. program in Section A.
 - iii. A minimum of 30 hours of graduate credit.

- B. **In addition, Plan A students must:**
 - iv. Prepare a dissertation based in part on original material that displays thorough acquaintance with a limited subject. This dissertation will be similar in format to a Ph.D. dissertation, but more limited in scope.
 - v. Successfully complete a final oral examination that focuses on the thesis defense, but may include examination of general competency in pharmacology or physiology. Students preparing for this examination should review the description of the qualifying examination for Ph.D. candidates, as their exam will be similar in format, if not in scope.

- C. **In addition, Plan B students must:**
 - vi. Complete a Master's Essay that presents a critical review of a topic of current pharmacologic or physiologic relevance. Minimum length of 10 pages, excluding references. Format: single-spaced, 12pt font, ≤ 1 inch margin, figures included as appropriate. The Master's Essay should be similar in scope and organization to a review article published in any

peer-reviewed journal, including in-depth analysis and critical evaluation of the current literature in the field.

- vii. Successfully complete a comprehensive oral examination in pharmacology and physiology. The Program Director will appoint an examination committee who will oversee the exam. This committee will consist of 2-3 department faculty plus the student's advisor. The student is responsible for scheduling the oral exam at least 30 days in advance of the exam date. In addition, the student must provide the committee members with their completed Master's Essay at least two weeks prior to the exam. The exam will consist of an approximately 20 minute presentation by the student of their critical review, followed by questioning by the committee.

M.D./Ph.D. Combined Degree Program

During their second year of study, M.D./Ph.D. students should discuss entry into the Ph.D. program with the Program Director of the Department of Pharmacology and Physiology. The Ph.D. portion of their combined degree program will begin after successful completion of the first two years of the Double-Helix Curriculum. M.D./Ph.D. students should expect to successfully complete 2-3 laboratory research rotations, at least one with a primary faculty member in the Department of Pharmacology and Physiology, during the first two years of the Double-Helix Curriculum.

- A. **Course Requirements:** The Ph.D. portion of the M.D./Ph.D. program will build on previous background acquired in the Medical School curriculum. Because of this, certain course requirements of the traditional Ph. D. track outlined above will be waived and advanced courses may be substituted to provide depth in an area of specialization. M.D. / Ph.D. students are granted 30 credits toward the 96 credit requirement for the Ph.D. on the basis of their basic science courses in the medical curriculum.
- a. Each M.D./Ph.D. student must complete at least one of the following two courses:
 - i. IND 431 Foundations in Modern Biology I (5 CR)
 - ii. IND 432 Foundations in Modern Biology II (5 CR)
 - b. M.D. / Ph.D. students must also complete each of the following additional courses:
 - i. IND/PHP 447 Signal Transduction (4 CR)
 - ii. PHP 502 Seminar (4 semesters) (1 CR)
 - iii. IND 501 Ethics and Professional Integrity (1 CR)
 - c. Finally, M.D./Ph.D. students must complete an additional 4 CR of upper-level A/E credit selected from the recommended courses listed in Section A above.
- B. **Qualifying Examination:** M.D. / Ph.D. students must successfully complete the Departmental Qualifying Examination by October 1 of their 4th year of study in the M.D./Ph.D. program (as described in Section C above).
- C. **Annual Evaluations:** M.D. / Ph.D. students must meet with their thesis advisory committee at least once per academic year. During these meetings, the committee will discuss the student's progress, clarify research problems, and outline priorities

of future research directions. Thesis preparation and defense requirements are the same as those listed in Section E above.

- D. **Teaching Requirement:** M.D./Ph.D. students are currently exempt from the TA requirement, as per MSTP policy.

Ph.D. Degree Program for Post-M.D. Students in the Training Anesthesiologists as Physician Scientists Program (TAPS)

It is possible to obtain Ph.D. training after obtaining the M.D. degree. The Department of Anesthesiology coordinates and supports a graduate research training program that leads to a Ph.D. degree in a basic science, and the Department of Pharmacology and Physiology participates in this program. Anesthesiology residents or fellows in the TAPS program can use credits obtained during medical school towards the course requirements of the Ph.D. degree as defined above. The program for training is individualized for the student depending on their background and previous experience. Thus, the specific course requirements are defined during the application process. Once accepted, students usually rotate through 3 laboratories before selecting an advisor. Participants will be allowed to complete the requirements for residency or fellowship while working on the Ph.D. degree and would also be permitted to work one day per week clinically once they have finished their clinical training.

Timeline of Study and Important Due Dates

Timeline	Event	Dates	Important Due Dates
Year 1	1 st lab rotation	October 1 to December 15 (optional July 1-August 31, evaluation due September 15)	Program director must approve rotation lab <u>prior</u> to start of rotation
			December 20: Student and Faculty ^s Evaluations due
			December 22: Written rotation report due
	2 nd lab rotation	January 1 to March 15	Program director must approve rotation lab <u>prior</u> to start of rotation
			April 1 : Student and Faculty ^s Evaluations due
			March 22: Written rotation report due
	3 rd lab rotation	March 16 to May 31	Program director must approve rotation lab <u>prior</u> to start of rotation
			June 15: Student and Faculty ^s Evaluations due
			June 7: Written rotation report due
	Fall Registration	See Academic Calendar* (August)	
Spring Registration	See Academic Calendar* (November)	Elective courses not on the approved list require approval by the Graduate Studies Committee prior to registration	
Rotation Presentation	15-20 min presentation on one rotation topic.	See Seminar course director for scheduling (typically in May/June)	
Select Advisor	Student must join a lab no later than 12 months after starting the program	June 1: Approval form signed by program director	
		June 15: Signed Roles and Responsibilities document submitted ^s	

Year 2	Select Thesis Committee	Recommended ASAP, no later than March	Thesis Committee approval must be granted at least 1 week prior to first committee meeting
	Fall Seminar	Literature Review	See Seminar course director for scheduling
	Spring Seminar	Research Seminar	See Seminar course director for scheduling
	Fall Registration	See Academic Calendar* (July)	Elective courses not on the approved list require approval by the Graduate Studies Committee prior to registration
	Spring Registration	See Academic Calendar (November)	Elective courses not on the approved list require approval by the Graduate Studies Committee prior to registration
	TA Requirement	Course director must sign TA Requirement Certification form	Signed TA Certification form must be submitted to program coordinator at conclusion of the course
	Committee meeting	Committee must meet once during academic year 2 and annual evaluation form† completed	July 1: Meeting complete and Annual Evaluation Form submitted by advisor ^s with thesis committee approval
Year 3	Qualifying exam	Prior to Oct. 1	Exam date scheduled no later than 30 days in advance
			Work with graduate coordinator to complete required paperwork 15 business days (3 weeks) prior to the exam. Research proposal should be submitted to committee no later than 2 weeks prior to the exam.
Years 4-5	Committee Meeting	Committee must meet once during each academic year and an annual evaluation form† completed	Advisor ^s should submit the annual evaluation form (with committee approval) to the program coordinator and graduate office by July 1 of each academic year.
	Seminar	Yearly research update	See Seminar course director for scheduling

ACADEMIC CALENDAR

*<https://www.urmc.rochester.edu/education/graduate/current-students/academic-calendar.aspx>

IMPORTANT FORMS

†<https://www.urmc.rochester.edu/education/graduate/current-students/forms.aspx>

[§]Though these forms are submitted to the graduate education office, the committee, and the program director by the advisor/mentor, it is the student's responsibility to inform the graduate coordinator that an evaluation is in progress, and ensure they are completed and submitted on time.



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