



The Department of
Medical Pharmacology and Physiology
M.S. Student Handbook

University of Missouri-Columbia
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Department of Medical Pharmacology and Physiology University of Missouri

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University of Missouri School of Medicine
Department of Medical Pharmacology and Physiology

Statement of Philosophy:

The Department of Medical Pharmacology and Physiology at the University of Missouri, School of Medicine is committed to the development of research scientists. The Department has a strong tradition of preparing students for careers in academic research. However, the knowledge and expertise our trainees gain also can be applied to rewarding careers in teaching, industrial research, and government.

All students and mentors are encouraged to review the AAMC Compact between Biomedical Graduate Students and Their Research Advisors (www.aamc.org/gradcompact). In addition, students are highly encouraged to use the Individual Development Plan (IDP) during their training program (<https://myidp.sciencecareers.org/>).

Graduate students have the right to be informed of departmental, professional, and academic policies and procedures that affect them. Students should be informed of these policies during the initial term in which they enroll in a program. It is the responsibility of the student to be familiar with the University policies and procedure of the Graduate School, as described in the graduate catalog, and those of the department program. Students are expected to ask questions if any information is unclear, or not provided.

Important information, including, but not limited to, housing, health insurance/care, Graduate Student organizations, leave of absences, academic integrity, appeals, rights and responsibilities, can be found at the University of Missouri Graduate School <https://gradschool.missouri.edu>

MPP Diversity Statement:

The Department of Medical Pharmacology and Physiology strives to promote scientific excellence in our research, teaching, and service missions. At its core, scientific innovation flourishes from the fusion of different perspectives, which are inherently linked to the composition of the academic community. Therefore, we are committed to a scholarly community in which all participants feel equally welcome and encouraged to contribute. Full details about our commitments and expectations with respect to diversity and inclusion can be found at : <https://medicine.missouri.edu/departments/medical-pharmacology-and-physiology/diversity-statement>.

M.S.

The duration of the M.S. program is 2 years. M.S. students are required to serve as teaching assistants for each semester, beginning after their first semester. The first year consists of required course work, teaching assistantships, and laboratory experiences. By the end of the first semester, students are expected to have selected a laboratory and mentor, and to form their thesis advisory committee. The second year consists of a continuation of coursework, thesis research, and the defense of their thesis project.

Departmental Faculty:

For additional information, research interests and publications for individual faculty, please refer to the MPP website <https://medicine.missouri.edu/departments/medical-pharmacology-and-physiology>.

Full-time Faculty	Title	Email
Kerry McDonald, PhD	Chair of Medical Pharmacology and Physiology	mcdonaldks@missouri.edu
Erika Boerman, PhD	Assistant Professor; Co-director of Graduate Studies	boermane@health.missouri.edu
Michael J. Davis, PhD	Curators' Distinguished Professor	davismj@health.missouri.edu
Timothy L Domeier, PhD	Associate Professor-Margaret Proctor Mulligan Professor	domeiert@health.missouri.edu
William Durante, PhD	Professor	durantew@health.missouri.edu
Stephen Halenda, PhD	Associate Professor; Director of Preclerkship Curriculum	sph@missouri.edu
Olga Glinskii, MD	Assistant Research Professor	glinskiio@health.missouri.edu
Laurin Hanft, PhD	Assistant Teaching Professor	hanftl@health.missouri.edu
Maike Krenz, MD	Associate Professor; Diversity Ambassador	krenzm@umsystem.edu
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Luis Martinez-Lemus, DVM-PhD	Professor James O. Davis Distinguished Professorship in Cardiovascular Research	martinezlemusl@missouri.edu
Charles E. Norton III, PhD	Research Assistant Professor	nortonce@health.missouri.edu
Alan Parrish, PhD	Associate Professor; Co-Director of Graduate Studies Vice Chair for Education	parrishar@health.missouri.edu
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Shivendra D. Shukla, PhD	Professor; Margaret Proctor Mulligan Professorship in Medical Research	shuklasd@health.missouri.edu
Gregorz Sowa, PhD	Associate Professor	sowag@health.missouri.edu
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Joint and Adjunct Faculty	Title	Email
Frank W. Booth, PhD	Professor	BoothF@missouri.edu
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Kevin Gillis, DSc	Professor	GillisK@missouri.edu
Christopher Hardin, PhD	Professor	hardinc@missouri.edu
Eileen Hasser, PhD	Professor	HasserE@missouri.edu
Jamal Ibdah, MD, PhD	Professor of Medicine; Raymond E. and Vaona H. Peck Chair in Cancer Research	ibdahj@health.missouri.edu
Kattesh V Katti, PhD, MScEd	Director of Institute of Green Nanotechnology; Director of University of Missouri Cancer Nanotechnology Platform; Distinguished Curators' Professor	kattik@health.missouri.edu
Zhenguo Liu, MD	Division Director of Cardiovascular Medicine; Professor of Medicine;	liuzheng@health.missouri.edu

	Margaret Proctor Mulligan Professor	
Chris Baines, PhD	Adjunct Professor Biomedical Sciences & Dalton Cardiovascular Research Center Investigator	BainesC@missouri.edu
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Robert Lim, PhD	Associate Professor	LimR@health.missouri.edu
James Sowers, MD	Professor of Medicine	sowersj@health.missouri.edu
Anandi Upendran, PhD	Director of Biomedical Innovation	upendrana@health.missouri.edu

Graduate Advisory Committee

Selection of a Thesis Advisor (Major Professor):

Students must identify and select a Thesis Advisor from the departmental faculty. The thesis advisor guides course selection, thesis committee formation, research, and thesis/dissertation preparation. The thesis advisor is the official liaison between the student and the Graduate Education Committee.

As soon as students are accepted into the program, they should begin contacting faculty members to explore areas of mutual research interests. A thesis advisor must be selected by the end of the first semester. M.S. students are encouraged, but not required to do rotations. Rotations are designed to allow students to get a feel for the laboratory and the viewpoints of the advisor. Rotations can begin the summer before beginning of classes but no later than the first part of the fall semester. Faculty members and students should discuss rotation expectations. The **Student/Mentor Expectations** document should be completed by the faculty member and student *before* the start of the rotation. Faculty members should indicate in advance whether they have room and/or funding for a new student.

Every effort will be made to place the student in the laboratory of his/her choice, provided the faculty member is agreeable and space and sufficient extramural grant support are available to support the student's research.

The student is expected to devote a considerable amount of time to research at the bench and in the library even when coursework and teaching is in progress. A key part of developing into a biomedical scientist is for the student to learn how to partition his/her time so that progress can be made in research while other responsibilities are met.

M.S. Thesis Committee:

A thesis advisory committee is composed of three members of the MU faculty: a major advisor from the department, and two graduate faculty members. The major advisor approves the Plan of Study for the Master's Degree (M1) form, while the thesis committee approves the Request for Thesis Committee (M2) and Report of Master's Examining Committee form (M3). Each of these forms is available on the Graduate School website (<https://gradschool.missouri.edu/current-students/forms-cs/>).

Coursework

M.S. Curriculum:

The Master of Science degree requires 30 hours graduate credit. A minimum of 15 of the 30 hours must be 8000/9000 level courses and no more than 40% of the 30 hour credit requirement can be satisfied by research, readings and problems courses. The approved curriculum is:

Year 1: Fall Semester

MPP 7422 Medical Physiology (4)
MPP 9422 Journal Club (1)

MPP 8200 Medical Pharmacology I (3)
MPP 8412 Seminar (1)

Year 1: Spring Semester

MPP 8250 Medical Pharmacology II (3)
MPP 8412 Seminar (1)

MPP 9422 Journal Club (1)
MPP 9090 Research (4)

Summer Semester

MPP 8090 Research

Year 2: Fall Semester

MPP 8560 Data Design & Analysis I (3)
MPP 9422 Journal Club (1)
MPP 8090 Research (4)

MPP 8550 Skills I (1)
MPP 8412 Seminar (1)

Year 2: Spring Semester

MPP 8550 Skills II (1)
MPP 8412 Seminar (1)

MPP 9422 Journal Club (1)
MPP 8090 (7)

Registration:

Registration for course work each term is the responsibility of the student. Course registration should conform to the student's plan of study. Course information may be obtained through the University myZou (see <https://registrar.missouri.edu/registration-classes/registration/myzou-first-time/>). Course consent may be required for some courses in order to enroll. These are obtained from the professor teaching the course.

Student Responsibilities

Teaching Assistant (TA) Responsibilities:

Medical Pharmacology and Physiology graduate students will be TAs in the Physiology 3202; M.S. students serve as TAs in each semester in the program beginning in their second semester. TAs are responsible for preparing the laboratory, assisting students in the laboratory, and cleaning up after lab.

Seminar Program

Departmental seminar is the one occasion in which all faculty, postdoctoral researchers and graduate students meet weekly and discuss research findings and new developments in disciplines of Pharmacology and Physiology. It is an important component of a training program and provides the opportunity for the graduate students to learn cutting-edge research in many fields, to begin to develop a career, and to see how data is presented and interpreted. Enrollment/participation in MPP 8412 (Seminar) is required of all students each semester that they are in the graduate program.

Journal Club Participation

MPP Journal Club (MPP 9422) enrollment/participation is required of all students each semester that they are in the graduate program. This course enhances the students' understanding of pharmacology and physiology and teaches them experimental design, including the techniques in the fields, data analysis and presentation. This course is critical for the development of critical thinking necessary for graduate students.

Research Presentations

All MS students are required to present their research at the annual MPP Trainee Research Forum, typically held in August prior to the start of Fall courses. Students will have additional opportunities to present research on campus at the annual Cardiovascular Day, Health Science Research Day and Life Sciences Week.

M.S. Thesis:

Students must write and defend the thesis to their committee. The thesis should include a literature review, hypothesis to be tested, methodology, results and discussion. The thesis needs to be formatted in accordance with MU Graduate School guidelines (<https://gradschool.missouri.edu/current-students/thesis-dissertation/thesis-dissertation-guidelines/>). Upon completion of a successfully defended thesis the student will submit an electronic version to the Graduate School and paper copies to the Department for binding. The Department pays the costs of binding a copy for the student, one for the Department library and one for each of the dissertation advisory committee members who wants one.

Student Progress and Retention

Reasonable Term of Study:

The target time required to complete the M.S. program is 22 months. Both the graduate student and the thesis committee should strive to keep the reasonable term of study from being unduly exceeded.

Maintaining Records of Progress towards a Degree:

Degree Program Forms: There are 3 forms for the M.S. degree (M-forms) that need to be completed and returned to the Graduate School to aid in assessing your progress towards degree completion. A copy of these forms can be obtained from the Graduate School website (<https://gradschool.missouri.edu/current-students/forms-cs/>). Each form is submitted to the Graduate School. These forms include:

- M-1 Form:** Lists the course work to be included in the student's degree program.
- M-2 Form:** Request for thesis committee. Due by the end of the second semester.
- M-3 Form:** Reports the results of master's thesis defense. Due 2 weeks prior to graduation.

Preparing for Graduation:

The Graduate School must be notified of the semester that you plan to graduate. During the semester, the Graduate School send necessary information to all graduating students. Check with the Graduate School early in the semester to find the deadlines for defending and turning in the final copy of your thesis. You also should note the deadline for ordering your graduation regalia. The graduation regalia (gown, cap, and tassel) can be rented from the University Bookstore. More information about graduation deadlines can be found at: <https://gradschool.missouri.edu/current-students/graduation-commencement/graduation-checklist/>

Grounds for Dismissal:

Annual review of students will be performed, with input from the student, thesis advisor and faculty who supervise the teaching assistants.

Maintaining good standing in graduate school is based on grade point average (GPA). This is achieved by a cumulative GPA of 3.0 or above. Students who do not maintain this GPA are placed on probation at the end of the semester in which this occurs. If at the end of the following semester the cumulative GPA is 3.0 or better, the probationary status is removed. A student on probation who fails to achieve a 3.0 cumulative GPA, on the recommendation of the department may be allowed a second and final probationary semester. A student is subject to dismissal upon failure to achieve a 3.0 or greater by the end of the second probationary semester or when the cumulative GPA falls below 2.0. To graduate, a student must have a GPA of 3.0 or above in all graduate courses taken at MU. Graduate school and /or departmental probation may result in loss of stipend support.

A student may be dismissed for failure to meet academic (grade), teaching assistantship, or research requirements. Additionally, departments and graduate-degree-granting area programs have the right to place on probation any graduate student who is deemed to be making insufficient academic progress or whose work is not of the quality required. Reasonable

progress is judged on research progress, seminar and Journal Club attendance and overall intellectual involvement in academics. After a minimum of 30 days probation, dismissal from the program is possible. The faculty advisor or departmental chair must inform the Graduate School as soon as the student is notified and the probationary period begins. The dismissal may occur at any time during study for a graduate degree. Details of the dismissal policy and appeals process can be found at

<http://gradstudies.missouri.edu/academics/progress/requests-for-extensions-appeals.php>

Grounds for Withdrawing Financial Support:

Graduate school and /or Departmental probation may result in loss of stipend support. Dismissal from the Department will result in the loss of stipend support.

General Information

Tuition and Expenses:

Along with the stipend, the Department of Medical Pharmacology and Physiology provides a tuition waiver for **approved courses** for all graduate students. All courses that are relevant and applicable to a student's degree program and approved by the student's advisor will be covered by the waiver. If a student takes a course that is not approved by the department or advisor, the student will be responsible for the total cost of that course.

A student on academic probation is not eligible for the Tuition Waiver Program. While the student may still hold an assistantship, students will not be eligible for a tuition waiver until they are off academic probation. If a student earns probationary status, the department, and subsequently the student's advisor, shall be informed of the student's status. The department may request a grace period by petitioning the Graduate School dean.

Each semester there are various fees that are not waived and not paid from grants and for which students are responsible. For more information, contact the Cashiers office at (573)882-3097, or visit the website at <http://cashiers.missouri.edu/>.

Outside Employment:

A stipend is provided to MS students in exchange for full-time work in the laboratory and as a TA. Thus, outside employment is strongly discouraged. If special circumstances require such employment, students should discuss it with their major professors to ensure that it will not conflict with their research activities. During the first year, the Director of Graduate Education is to be contacted regarding outside employment.

Holidays, Sick Days, and Vacation:

At the start of each semester, the graduate students should establish working hours with their major professor. For the graduate student, flexible work hours are both a necessity and a privilege, and should not be abused. The term full-time graduate assistantship designates a minimum of a 40-hour work week. A reality of graduate studies is that at times, all students work more than the minimum time. They also work at night, on holidays, and on weekends to effectively conduct a research project. Personnel management policies include the granting of time for graduate student recreational and personal activities, provided this does not interfere with the student's academic and/or research responsibilities. Graduate students should schedule any absences with their major professor to ensure that their absence will not conflict with their research activities. Holidays are established and annually published by the administration. The Department is committed to accommodating all major religious and cultural holidays for our students once absences are arranged with the major advisor, course director and/or other relevant parties.

Laboratory Safety

All employees and students of the University of Missouri-Columbia must be protected from exposure to hazardous chemicals, radiation, etc. through a combination of safety training and safe practices in the work place. All persons in the workplace must be trained regarding all hazardous chemicals, radiation safety, and animal handling prior to assignment, and at least annually thereafter. The thesis advisor will assist the student in enrolling in necessary safety training courses through Environmental Health and Safety (<https://ehs.missouri.edu>) and other regulatory offices as needed based on each student's specific research. Commonly-required training is summarized below, but each student must consult with their advisor to ensure all lab-specific requirements are met.

Environmental Health and Safety Training:

<https://ehs.missouri.edu/train/bio>

required courses:

- EHS 120: Intro to Lab Safety
- EHS 201-202: Biosafety Training
- EHS 220: Bloodborne Pathogens
- EHS 301-305: Chemical Safety for Laboratory Workers

Occupational Health and Safety Program:

<https://research.missouri.edu/animal-research/occupational-health-safety-program-ohsp#:~:text=How%20to%20enroll,the%20required%20online%20OHSP%20training.>

1. OHSP Hazard Evaluation Form (HEF)
 - Individuals need only one HEF for ALL animal work, update it to reflect ALL job duties.
 - If at any time your job duties, animal exposures or medical status changes, you are responsible for updating your information in eCompliance.
2. OHSP Confidential Health Questionnaire (CHQ)
 - This form is HIPAA-protected and can only be viewed by the enrollee, the OHSP Nurse Practitioner and/or Physician.
3. Occupational Health & Safety Training
 - Choose "Lab" Category

****All animal-related training below is only required if working with laboratory animals****

Basic Training for Animal Care and Use

<https://ars.research.missouri.edu/training.php>

Log in to the Office of Research with your email and password:

Mouse and Rat Handling Workshops (Optional)

Pre-register now to be notified of the next workshop.

Note: Ensure you have completed the online Basic Training for Animal Care and Use at MU.

- Workshops are held monthly unless anticipated participant demand is low.
- Workshop openings are filled on a first-come, first-served basis; you may be on a waitlist

Graduate Student Organizations

Graduate Association for Pharmacology and Physiology Graduate Students (GAPPS):

The GAPPS is an organization that was formed to provide an opportunity for graduate students to share information with each other and faculty. The organization is intended to improve the graduate student experience by facilitating communication between graduate students and the faculty, professionally and socially. The GAPPS was formed in 1999 and its membership is restricted to pharmacology and physiology graduate students. There are two elected officers, a president and vice-president, that each serves for one year. The president of GAPPS attends MPP faculty meetings and serves as a voice for the graduate students. The vice-president acts as representative for MPP graduate students to the Graduate Professional Council (<https://gpc.missouri.edu>).