Pathology and Anatomical Sciences

School of Medicine
M263 Medical Sciences Building
(573) 882-1201
https://medicine.missouri.edu/departments/pathology-and-anatomical-sciences/

About Pathology and Anatomical Sciences

The Department of Pathology and Anatomical Sciences in the School of Medicine, along with the department of Veterinary Pathobiology in the College of Veterinary Medicine, offers a PhD degree through the Pathobiology Area Program. Faculty also participate in other doctoral programs such as the Integrative Neuroscience Program, Genetics Area Program, and Molecular Pharmacology and Physiology. The MS degree is designed primarily to prepare students for supervisory roles in basic-science and clinical laboratories, and to offer greater in-depth study in pathology and anatomical sciences concurrent with studies leading to the PhD and/or MD degree.

Faculty

Professor G. E. Davis, W. J. Krause**, J. H. Miles, G. Y. Sun, C. V. Ward**
Associate Professor E. H. Adelstein*, A. A. Diaz-Arias*, E. A. Ingram, R. Mitra*
Assistant Professor K. J. Aldridge*, G. L. Arthur*, V. V. Glinskii**, Z. Gu**, C. M. Holliday**, K. H. Taylor**
Lecturer D. L. Dufeau, R. H. Dunn, S. D. Maddux*
Clinical Instructor J. Jones, D. V. Shin
Clinical Professor D. C. Miller*, M. Petrides*
Associate Clinical Professor A. D. Havey*
Assistant Clinical Professor M. Esebua, S. R. Frazier, C. C. Stacy*, M. X. Wang*
Associate Research Professor R. R. Little
Assistant Research Professor J. Cui
Adjunct Professor M. J. Ravosa**, M. S. Stack**
Associate Professor Emeritus L. E. Spollen

* Graduate Faculty Member - membership is required to teach graduate-level courses, chair master's thesis committees, and serve on doctoral examination and dissertation committees.
** Doctoral Faculty Member - membership is required to chair doctoral examination or dissertation committees. Graduate faculty membership is a prerequisite for Doctoral faculty membership.

Undergraduate

While MU does not offer undergraduate degrees specifically in pathology and anatomical sciences, the University does offer baccalaureate opportunities in a number of related areas in the other Schools and Colleges that make up the University. The catalog provides a complete list of these degree options (https://catalog.missouri.edu/degreesanddegreeprograms/).

Graduate

- MS in Pathology and Anatomical Sciences (https://catalog.missouri.edu/schoolofmedicine/pathologyanatomicalsciences/ms-pathology-anatomical-sciences/)

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Financial Aid from the Program

Some programs require an extra form or statement from those who wish to be considered for internal assistantships, fellowships or other funding packages. Check the program website or ask the program contact for details.

PTH_AS 2201: Human Anatomy Lecture
A systems-based survey of human gross anatomy including structure, function and history. Internet access required: lectures and assignments will be online. Graded on A-F basis only.

Credit Hours: 3
Recommended: Minimum cumulative MU GPA of 2.5 required

PTH_AS 2203: Human Anatomy Laboratory
A systems-based survey of human gross anatomy. Internet access required: most materials will be online. One on-campus laboratory meeting per week. Graded A-F only. Recommend: Minimum cumulative MU GPA of 2.5 and completed or currently enrolled in PTH_AS 2201.

Credit Hours: 2

PTH_AS 2203H: Human Anatomy Laboratory - Honors
A systems-based survey of human gross anatomy. Internet access required: most materials will be online. One on-campus laboratory meeting per week. Graded A-F only. Recommend: Minimum cumulative MU GPA of 2.5 and completed or currently enrolled in PTH_AS 2201.

Credit Hours: 2
Prerequisites: Honors eligibility required

PTH_AS 3460: Research and Instructional Techniques
Involves library and laboratory research. Includes development of oral and written communications skills.

Credit Hours: 3

PTH_AS 4210: Seminar in Pathology and Anatomical Sciences
Presentation and discussion of original investigations and current literature.

Credit Hour: 1

PTH_AS 4220: Forensic Pathology and Death Investigation
(cross-leveled with PTH_AS 7020). Forensic Pathology and Death Investigation.

Credit Hours: 2

PTH_AS 4220H: Forensic Pathology and Death Investigation - Honors
(cross-leveled with PTH_AS 7020). Forensic Pathology and Death Investigation.

Credit Hours: 2
Prerequisites: Honors eligibility required

PTH_AS 4220HW: Forensic Pathology and Death Investigation - Honors/Writing Intensive
(cross-leveled with PTH_AS 7020). Forensic Pathology and Death Investigation.

Credit Hours: 2
Prerequisites: Honors eligibility required

PTH_AS 4220W: Forensic Pathology and Death Investigation - Writing Intensive
(cross-leveled with PTH_AS 7020). Forensic Pathology and Death Investigation.

Credit Hours: 2

PTH_AS 4222: Gross Human Anatomy (The Health Professions)
(cross-leveled with PTH_AS 7222). Gross structure and neuroanatomy of the human body; dissection of extremities, back, head, neck abdomen and thorax.

Credit Hours: 7
Prerequisites: instructor's consent

PTH_AS 4222H: Gross Human Anatomy (The Health Professions) - Honors
(cross-leveled with PTH_AS 7222). Gross structure and neuroanatomy of the human body; dissection of extremities, back, head, neck abdomen and thorax.

Credit Hours: 7
Prerequisites: instructor's consent; Honors eligibility required

PTH_AS 6033: SCC ABS Surgical Anatomy
The 4th year anatomy student will work independently or as a team to dissect and explore regions of cadavers particular to their interests. We generally offer the following regions (Lower Limb, Upper Limb, Pelvis, Thorax, Abdomen, Head & Neck). Students will improve their anatomical knowledge and learn using hands-on experiences and a variety of evidence-based resources while exploring the human body. Requirements: A) Complete a dissection relevant to your interests of the following regions: brain, head and neck, thorax, abdomen, pelvis, upper limb (one side), lower limb (one side). B) Give a 15-minute presentation to Occupational Therapy or Physician Assistant class about the anatomy of your region behind clinical practice. Schedule this presentation with the course coordinator and/or the course director within two months of the scheduled block. However, presentation slides must be given to the course faculty leader by the end of the block. C) Prepare 5 PowerPoint slides for use in Occupational Therapy or Physician Assistant courses on clinically-relevant anatomy for the audience by the end of the block. After review by course faculty the slides will also be sent to Columbia for consideration of use in M1 classes. D) Complete an exit interview with a faculty member to discuss the student's experience during the course.

Credit Hours: 5
Prerequisites: Successful completion of the first 2 years of medical school and 5 of the 7 core clerkships

PTH_AS 6331: ABS Advanced Medical Neurosciences
ABS Advanced Medical Neurosciences

Credit Hour: 5-10

PTH_AS 6333: ABS Pathology/Anatomical Science Research
ABS Pathology/Anatomical Science Research

Credit Hours: 5

PTH_AS 6341: ABS Science Anatomical Science Teaching
ABS Science Anatomical Science Teaching

Credit Hours: 5

PTH_AS 6343: ABS Surgical Anatomy
ABS Surgical Anatomy

Credit Hours: 5

PTH_AS 6345: ABS Surgical Anatomy of the Head and Neck
ABS Surgical Anatomy of the Head and Neck

Credit Hours: 5

PTH_AS 6347: ABS Surgical Anatomy of the Back and Limbs
ABS Surgical Anatomy of the Back and Limbs

Credit Hours: 5

PTH_AS 6600: Anatomic Pathology
Anatomic Pathology

Credit Hours: 5

PTH_AS 6601: Springfield Anatomic Clinical Pathology Elective 4 WK
M4 students may observe the gross dissection of surgical specimens and follow them through to final microscopic diagnosis. During final check out of surgical specimens between the attending pathologists, the student may participate actively in the study or discussion of slides via a multi-headed microscope. This rotation encourages substantial independent study by the student as well as attendance at and participation in available teaching and/or case discussions each week. Students seeking experience in a particular organ system(s) will be encouraged to review the relevant present study sets and to help select additional cases to add to the appropriate set(s).

Credit Hours: 5

PTH_AS 6602: Clinical Pathology
Clinical Pathology

Credit Hours: 5

PTH_AS 6604: Forensic Pathology
Forensic Pathology

Credit Hours: 5

PTH_AS 6606: Anatomic/Clinical Pathology
Anatomic/Clinical Pathology

Credit Hours: 5

PTH_AS 6608: Anatomy Elective
Anatomy Elective

Credit Hours: 5

PTH_AS 6900: Springfield Anatomic Clinical Pathology 2 WK
Students participating in a two-week anatomic clinical pathology elective rotation will be exposed to surgical pathology and/or cytopathology. All students in this rotation will also have some observation in surgical pathology. All students will observe gross dissection and description of surgical specimens, intraoperative consultations ("frozen sections"), and will observe microscopic examinations and sign-out of such specimens. The surgical pathology exposures may include exposure to the subspecialties of hematopathology, neuropathology, and gastrointestinal/liver pathology, as well as to general surgical pathology. Those with an interest in cytopathology will be able to observe the preparative steps for cytopathology specimens and to observe microscopic examinations and sign-out of those specimens. Students are expected to attend available case discussions and or educational presentations. Student instruction may be from attending pathologists and senior technologists as appropriate to the service and the daily work flow of that service. Students have access to the Medical Library and to online educational and reference resources. This rotation encourages substantial independent study by the student. There are many excellent microscopic slide study slide sets available for personal study.

Credit Hours: 2

PTH_AS 6916: Anatomic Pathology Two-Week
This is a two week rotation. Students will learn how to integrate information and apply previously acquired knowledge and concepts to the assessment and interpretation of surgical pathology, cytopathology, and/or autopsy cases. Students will learn about the procedures necessary to arrive at anatomic pathology diagnoses and the work that goes into specimen processing and examination so as to produce diagnoses.

Credit Hours: 2
Prerequisites: Successful completion of the first two years of medical school

PTH_AS 7020: Forensic Pathology and Death Investigation
(cross-leveled with PTH_AS 4220). Summary of Forensic Death Investigation from beginning to end. Will include some of the current laboratory techniques seen on "CSI" Team taught by experts in the fields including medical examiners, death investigators, forensic anthropologists, police CSI teams, lawyers and others.

Credit Hours: 2
Prerequisites: Basic Biology

PTH_AS 7222: Gross Human Anatomy (The Health Professions)
(cross-leveled with PTH_AS 4222). Gross/human structure through dissection. Graded on A-F basis only.

Credit Hours: 7
Prerequisites: Acceptance into Physical Therapy Programs or instructor's consent

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PTH_AS 7400: Seminars in Translational Medicine
Students participate in regular seminars and discussion groups with other students interested in clinical and translational sciences. Students, working together with faculty in biomedical sciences and those working in clinical and translational fields, identify seminar topics. Learning objectives and written assignments are arranged on an individual basis. The course is open to all graduate level students and students enrolled in professional schools, for 0-5 credit hours, with instructor's approval. Graded on S/U basis only.

Credit Hour: 0-5

PTH_AS 7450: Precision Medicine Informatics
(same as INFOINST 8450). This course will introduce students with the theoretical and practical aspects of precision medicine informatics. Topics include: complex diseases, computational genomics/proteomics, informatics of molecular interactions and biological pathways, somatic mutations, signal transduction and cancer, biomarker discovery, machine learning and data mining for PMI, networks methods for PMI, knowledge representation and reasoning for PMI. The course will consist of a set of didactic lectures, computational assignments, in-class demonstrations of PMI methods and discussions of recent publications. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: INFOINST 8005 with C or better or INFOINST 7010 with C or better or instructor's consent

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PTH_AS 8010: Current Issues in Anatomical Sciences
Survey of the recent literature in integrative anatomy, including functional, evolutionary, developmental and translational anatomy, conducted through readings and discussion. Grade determined by participation and presentation of weekly readings. May be repeated for a maximum of 10 hours. Graded on S/U basis only.

Credit Hour: 1
Prerequisites: instructor's consent

PTH_AS 8090: Advanced Pathology
Open only to properly qualified graduate students, with counsel of faculty. Focus of MS-related research in evolutionary morphology, genomics, neuroscience, pathobiology or laboratory sciences. Graded on S/U basis only.

Credit Hour: 1-99

PTH_AS 8100: Fundamentals of Evolutionary Biology
Principles of modern evolutionary biology. Topics include: phylogeny, palebiology, developmental processes, genetic and phenotypic variation, form and function, speculation, macroevolution, and molecular mechanisms.

Credit Hours: 3
Prerequisites: instructor's consent

PTH_AS 8150: Fundamentals of Evolutionary Morphology
This course is a survey of the fundamentals of modern evolutionary morphology. Topics will include: patterns of vertebrate evolution, comparative methods, development and ontogeny, constraint, functional morphology, evolutionary innovations, and experimental methods. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: instructor's consent required

PTH_AS 8201: Human Anatomy: Back and Upper Limb
Developmental, gross, and clinical anatomy of the human back and upper limb, including skeletal, muscular, nervous, and vascular tissues. Graded on A-F basis only.

Credit Hours: 2
Prerequisites: instructor's consent required

PTH_AS 8202: Human Anatomy: Thorax and Abdomen
Developmental, gross, and clinical anatomy of the human thorax and abdomen. Graded on an A-F basis only.

Credit Hours: 2
Prerequisites: instructor's consent required

PTH_AS 8203: Human Anatomy: Head, Neck and Neuroanatomy
Developmental, gross and clinical anatomy of the human head, neck and neuoranatomy. Graded on A-F basis only.

Credit Hours: 2
Prerequisites: instructor's consent required

PTH_AS 8204: Human Anatomy: Pelvis and Lower Limb
Developmental, gross and clinical anatomy of the human pelvis and lower limb. Graded A-F basis only.

Credit Hours: 2
Prerequisites: instructor's consent required

PTH_AS 8285: Problems in Pathology and Anatomical Sciences
Regions or systems which may include developmental, microscopic, and gross anatomy.

Credit Hour: 1-99
Prerequisites: instructor's consent

PTH_AS 8290: Research in Pathology and Anatomical Sciences
Research unrelated to thesis work in evolutionary morphology, genomics, neuroscience, pathobiology or laboratory sciences.

Credit Hour: 1-99
Prerequisites: instructor's consent

PTH_AS 8450: Human Anatomy Teaching Practicum
Provides practical experience teaching clinically oriented human anatomy in lecture and laboratory settings. For students pursuing doctoral degrees in Pathobiology. Enrollement is limited to students who have completed PTH_AS 8201, PTH_AS 8202, PTH_AS 8203, and PTH_AS 8204. Graded on S/U basis only. May be repeated for credit.

Credit Hour: 1
Prerequisites: instructor's consent

PTH_AS 8500: Seminar in Translational Neuroscience
Students participate in seminars and discussion groups. Masters students identify seminar topics and present existing data with findings. PhD students identify seminar topics, conduct research and present findings. Learning objective and written assignments are arranged individuality. May be repeated for credit. Graded on S/U basis only.

Credit Hour: 1-5

PTH_AS 8640: Quantitative Methods in Life Sciences
(same as BIO_SC 8640). Quantitative Methods in Life Sciences is a graduate-level course in statistical analysis designed for the specific needs of students in life sciences, focusing on statistical literacy: performing, interpreting, and writing about biological data analysis. As such, the course assumes a basic understanding of some topics and little understanding of other topics. The course will cover most topics broadly and occasionally in great depth, highlighting the perils and pitfalls of different methods, while providing guidelines for a wide array of statistical approaches to data analysis. The course seeks to find the balance between really understanding all the math involved and learning to be a competent practitioner and consumer of analysis, emphasizing the practical over the theoretical, with additional focus on the communication of data (plotting, graphs, figures) and of results. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: Consent of instructor

PTH_AS 8642: Quantitative Methods in Life Sciences II
(same as BIO_SC 8642). A graduate-level course in statistical analysis designed for the specific needs of students in life sciences, focusing on advanced statistical methods: nonlinear statistics, multivariate statistics, structural equation modelling, correlation structures (phylogenetic and kinship methods), experimental design, mixed models, Bayesian statistics, permutation and distribution free methods, mathematical modelling. This course assumes a background knowledge of statistics and analysis in R. This course is modular and can be taken for variable credit. Students select 1-3 5-week module(s) of interest. Graded on A-F basis only. May be repeated for credit.

Credit Hour: 1-3
Prerequisites: BIO_SC 8640/PTH_AS 8640 or consent of instructor

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PTH_AS 9090: Research in Pathology and Anatomical Sciences
Open only to properly qualified graduate students, with counsel of faculty. Focus of PhD-related research in evolutionary morphology, genomics, neuroscience or pathobiology. Graded on S/U basis only.

Credit Hour: 1-99

PTH_AS 9290: Research in Pathology and Anatomical Sciences
Open only with instructor's consent. Courses with specialized lectures in various topics such as evolutionary morphology, genomics, neuroscience and pathobiology, depending on faculty expertise and student demand. Graded on S/U basis only.

Credit Hour: 1-99
