

Department of Pathology & Laboratory Medicine

The Department of Pathology & Laboratory Medicine crosses the bridge between basic science and clinical practice and involves the study and diagnosis of disease. We emphasize innovative, service-oriented programs that encompass a full spectrum of medical practice. Our Mission is to provide excellent teaching, research, patient care and community service and to meet the health needs of Kansas and the community at large. Our Aim is to provide a supportive work environment so that each individual can excel and pursue avenues that lead to recognition within the medical community and benefit healthcare at large.

The Department provides vital patient services to the Hospital, Greater Kansas City Metropolitan Area and outlying medical facilities through our clinical laboratory (<https://www.kumc.edu/school-of-medicine/academics/departments/pathology/divisions/laboratory-medicine.html>) and anatomic (surgical) services (<http://www.kumc.edu/school-of-medicine/pathology/anatomicsurgical-services.html>). Faculty are board-accredited and the department provides a full spectrum of subspecialized expertise. The clinical laboratory processes over 3 million samples per year including the services of robotic automation and is accredited by the American Association of Blood Banks (AABB) (<http://www.aabb.org/Pages/Homepage.aspx>), College of American Pathologists (CAP) (<https://www.cap.org/>) and Foundation for the Accreditation of Cellular Therapy (FACT) (<https://factglobal.org/>). The core laboratory reviews over 38,000 surgical pathology specimens per year, reflecting 9% year over year case growth; cytopathologists review 13,000 accessions per year. 2,500 bone marrow accessions are reviewed per year. The Department provides material to the University of Kansas Cancer Center's Biospecimen Tissue Laboratory towards ongoing research and development of new and improved treatment modalities.

Basic Science research is conducted through our Division of Molecular Pathobiology (<https://www.kumc.edu/school-of-medicine/academics/departments/pathology/divisions/cancer-and-developmental-biology.html>) and includes cancer biology, developmental biology and cell differentiation, stem cell biology, and microbial and viral pathogenesis. Our laboratories are supported by external funding from sources including the NIH (<http://www.nih.gov/>) as well as private resources; faculty and laboratories reside on both sides of the state line at the KUMC (<http://www.kumc.edu/>), Children's Mercy Kansas City (<https://www.childrensmc.org/childrens-mercy-research-institute/>), and Stowers Institute (<http://www.stowers.org/>) campuses. Faculty numbers have increased dramatically since 2004, from 3 in 2004 to 29 in 2023.

The Department is committed to education (<http://www.kumc.edu/school-of-medicine/pathology/education-programs.html>) through its basic science research, medical, and continuing medical education programs. Basic Science education is sponsored through our Graduate (<http://www.kumc.edu/school-of-medicine/pathology/basic-science-graduate-program.html>) and Postdoctoral programs and has grown commensurate with division laboratory expansion; there are currently 16 graduate students and 8 postdoctoral fellows enrolled in basic science programs and labs.

Please refer to pages included in this catalog on both Master of Science and Doctor of Philosophy in Pathology for additional information regarding each program.

Courses

PATH 803. Stem Cell Biology. 2 Credits.

Current concepts in the study of stem cells and the clinical potential in modern disease treatment. Students will learn concepts of stem cells: origin, regulation of pluripotency, and differentiative potential; experimental isolation and manipulation; and clinical application of isolated stem cells. Current scientific literature will be used to highlight recent advances in stem cell biology. Special emphasis will be placed on the ethical and legal issues surrounding the use of stem cells of both adult and embryonic origin. Prerequisite: Course in cell biology or equivalent; consent of instructor.

PATH 804. Selected Topics in Signal Transduction. 1 Credits.

A survey of the basic principles and contemporary literature of signal transduction pathways involved in cancer development and developmental biology. Faculty lecture and student presentations will address selected topics in cellular signal transduction. Student seminars will focus on the scientific content of the publication with emphasis on appropriate presentation of background information, experimental methods, results and potential future directions. Critical discussion of papers will be provided by participating students and faculty. Prerequisite: Course in Molecular Biology or equivalent; consent of instructor.

PATH 805. Seminars in Pathology. 1 Credits.

Presentation of Pathology Department graduate student research-in-progress. Students will conduct a one-hour seminar in which updates of their current research project(s) in pathology will be reported. The seminars are interactive and students are encouraged to participate in discussion of the presented work. Prerequisite: Graduate standing in the Pathology program.

PATH 806. Epigenetics. 2 Credits.

Current concepts in epigenetic regulation of transcription, including its involvement in disease. Current scientific literature will be used to examine recent advances in the role of epigenetic regulation in transcription and its impact on cellular processes, including growth, differentiation, development, and disease. Students will learn the fundamental concepts of epigenetic regulation and the role of the epigenetic regulation in various gene expression systems. The role of epigenetics in long-range DNA interactions will also be studied, with an emphasis on enhancer, silencer, and locus control region function. Recent advances in the role of epigenetics in disease, including cancer will also be examined. The course will examine current experimental methods to study epigenetics and gene regulation. Prerequisite: Course in Molecular Biology; consent of instructor.

PATH 890. Research in Pathology. 1-10 Credits.

RSH. Replaces PATH 911 in prior catalogs. Enrollment for masters students and PhD students who have yet to successfully complete the oral comprehensive examination.

PATH 899. Master's Thesis. 1-7 Credits.

PATH 912. Advanced Topics. 1-3 Credits.

Offered by arrangement. Prerequisite: Approval of the instructor and completion of the IGPBS core curriculum or its equivalent.

PATH 913. Introduction to Grant Proposal Writing. 1 Credits.

This course will teach the fundamentals of writing a grant proposal with an emphasis on NIH proposals. This course is open to any graduate students interested in applying for pre-doctoral fellowships, and especially to graduate students in the Department of Pathology who will be conducting their comprehensive qualifying exams in the upcoming year. This course involves a combination of didactic lectures, student coursework and discussion. This course will include different principal investigators from the Pathology Department as guest speakers. Topics will include

different sources of funding, grant submission and post-submission review process. However, the core component of this course will involve teaching the basic framework and components of an NIH R01 application. This course is designed to give practical structural guidance in scientific writing at a professional level and does not give guidance on specific research projects. Prerequisite: Consent of instructor.

PATH 914. Bioinformatics Computing. 3 Credits.

The course is being introduced with the demand of current biological research, which relies on an extensive amount of data analyses, including single-cell RNA-seq and single-cell spatial transcriptomics, ATAC-seq, CLIP-Seq, etc. The course syllabus includes an advanced-level introduction to Linux operating system. It also includes two programming languages, Python and R.

PATH 990. Doctoral Research in Pathology. 1-10 Credits.

RSH for PhD candidates who have successfully completed the oral comprehensive examination. Prerequisite: PATH 890.

PATH 999. Doctoral Dissertation. 1-7 Credits.

Prerequisite: Consent of instructor.