Pathology


Programs of Study in Pathology

The Department of Pathology offers advanced courses in aspects of pathology. The department does not offer advanced degrees in pathology, but qualified graduate students who are admitted to department-based or interdepartmental graduate programs may elect to pursue their thesis requirements in the department's research laboratories. The discipline of pathology has served as a bridge between the preclinical and clinical sciences and is focused on the application of advances in the basic biological sciences, both to the diagnosis of human disease and the elucidation of the mechanisms of normal molecular, cellular, and organ structure and function that manifest themselves in clinical disease.

Accordingly, the department's research interests extend from fundamental molecular biology to clinical-pathological correlations, with an emphasis on experimental oncology.

Investigation in the department includes basic studies in areas using molecular biological, biochemical, and genetic cell biological techniques: DNA replication in yeast and cultured eukaryotic cells, cell cycle control in animal cells and yeast, identification and pathogenetic role of chromosomal aberrations in human malignancies and mechanisms of activation of oncogenes in human and animal cells, lymphocyte and neutrophil-interactions with endothelial cells, cell type specification and signal transduction pathways leading to specific gene expression or modulation of cytoskeletal behavior; cytoskeletal architecture, cell-matrix interaction, developmental biology of hematopoietic stem cells and thymus, regulation of the immune system, mechanisms of immune and other responses in the central nervous system, and neuro-degenerative diseases. Various studies focus on the development of novel diagnostic and immunotherapeutic treatment modalities and techniques for solid tumors, lymphomas, HIV, and genetic diseases. Research training in all of these areas is available for qualified medical and graduate students by individual arrangement with the appropriate faculty member. A summary of the research interests of the department faculty is available at Stanford's School of Medicine (http://pathology.stanford.edu) web site.

Emeriti: (Professor) Ellen Jo Baron, Susan Galel, Sharon Geaghan, Michael Hendrickson, Richard L. Kempson, Jon Kosek, Roger Warnke

Chair: Stephen J. Galli


Associate Professors: Jeffrey D. Axelrod, Matt Bogyo, Andrew Connolly, Tina Cowan, Christina Kong, Bingwei Lu, Jonathan R. Pollack, Arend Sidow, Robert West

Assistant Professors: Kimberly Allison, Niaz Banaei, Sean Bendall, Scott Boyd, Ann Folkins, Isabella Graef, Dita Gratzingher, F. Kim Hazard, Kristin Jensen, Jinah Kim, Jason Merker, Stephen Montgomery, Benjamin Pinsky, Ed Plowey, Eirich Schwartz, Uma Sundram, Marius Wernig, Monte Winslow, Ellen Yeh

Courtesy Professors: Euan Ashley, Donna Bouley, John Day, Bertil Glader, Daphne Koller, Lucy Tompkins

Courtesy Associate Professor: Atul Butte, Robert Shafer

Clinician Educators: Jennifer Andrews, Raffick Bowen, Susan Atwater, David Bingham, James Faix, Steven Long, Melanie Manning, Roberto Novoa, David Ou, Robert Ohgami, Tho Pham, Kerri Rieger, Darren Salmi, Neil Shah, Ran Shi, Carlos Suarez, Brent Tan

Instructors: Marissa Junjtilla, Franklin Mullins, Justin Odegard, Gerlinde Wernig, Kitchener Wilson

Adjunct Clinical Faculty: Robert Archibald, Jerome S. Burke, Glenn Cockerham, Seth Haber, Maie K. Herrick, Paul W. Herrmann, Michelle Jorden, Charles Lombard, Robert Luo, Gregory Moe, Joseph O’Hara, Girish Putcha, Matrina Schmidt, Thomas W. Rogers

Courses

PATH 101. Cancer Biology. 4 Units.
Experimental approaches to understanding the origins, diagnosis, and treatment of cancer. Focus on key experiments and discoveries with emphasis on genetics, molecular biology, and cell biology. Topics include carcinogens, tumor virology, oncogenes, tumor suppressor genes, cell cycle regulation, angiogenesis, invasion and metastasis, cancer genomics, cancer epidemiology, and cancer therapies. Discussion sections based on primary research articles that describe key experiments in the field. Satisfies Central Menu Areas 1 or 2 for Bio majors. Prerequisite: Biology or Human Biology core or equivalent, or consent of instructor.

Same as: CBIO 101

PATH 103Q. Lymphocyte Migration. 1 Unit.
Preference to sophomores. Lymphocytes migrate from blood vessels into tissues to participate in immune surveillance and the development of inflammation. The lymphocyte and blood vessel endothelia molecules that control lymphocyte migration, and are implicated in the development of human diseases such as asthma, type 1 diabetes, and multiple sclerosis are discussed.

PATH 199. Undergraduate Research. 1-18 Unit.
Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

PATH 204SL. Medical Etymology. 1 Unit.
A survey of medical eymology and terminology that parallels preclinical medical education. Topics focus on Greek and Latin roots and their appearances in the medical lexicon.

PATH 210. Stem Cells in Development and Disease. 1-2 Unit.
Molecular and cellular mechanisms underlying the basic self-renewal and differentiation properties of stem cells in multiple tissues and organisms. How abnormal stem cell behavior may contribute to diseases such as cancer. How to manipulate stem cell behavior in vitro or in vivo for therapeutic purposes. Classical papers and recent literatures in the field of stem cell biology. Open to graduate, medical, and advanced undergraduate students. Prerequisite: consent of instructor.

PATH 213. Gross Autopsy Pathology Laboratory. 2-3 Units.
Examine/discuss unfixed dissected organs from current autopsies and correlate morphologic findings with the clinical history. Students view postmortem examinations and may participate (in a small group) in one postmortem examination with the assistance of residents and staff, and present the case to the class. Class scheduling is flexible. Additional unit for participation in a postmortem examination. Class may not be repeated. Prerequisite: HHD220.
PATH 218. Computational Analysis of Biological Information: Introduction to Python for Biologists. 2 Units.
Computational tools for processing, interpretation, communication, and archiving of biological information. Emphasis is on sequence and digital microscopy/image analysis. Intended for biological and clinical trainees without substantial programming experience.
Same as: GENE 218, MI 218

PATH 233. The Biology of Small Modulatory RNAs. 2 Units.
Open to graduate and medical students. Explores recent progress and unsolved questions in the field of RNA interference and microRNA biology. Students are required to read assigned primary literature before each class and actively participate in guided discussions on related technical and conceptual issues during class meetings. Assignments include critiques of assigned papers and developing a novel research proposal.
Same as: GENE 233, MI 233

PATH 234. Fundamentals of RNA Biology. 2 Units.
For graduate or medical students and (if space allows) to active participants from other segments of the Stanford Community (e.g., TGR students); undergraduates by instructor consent. Fundamental issues of RNA biology, with the goal of setting a foundation for students to explore the expanding world of RNA-based regulation. Each week a topic is covered by a faculty lecture and journal club presentations by students.
Same as: GENE 234, MI 234

PATH 240. Clinical Studies in Pathology I. 3-9 Units.
A broad exposure to the practice of pathology in an academic medical center. Students are assigned a faculty mentor and work closely with pathology residents, fellows and faculty. Two months are spent in surgical pathology where students help examine surgical resection specimens and biopsies and participate in making a final diagnosis. One month is spent in autopsy pathology where students perform autopsy prosections and formulate final anatomic diagnoses under the supervision of faculty. This course must be combined with Clinical Studies in Pathology II, and two additional quarters of PATH 399, Directed Research, to fulfill a 12 month Post-Sophomore year Fellowship in Pathology. Prerequisite: MD candidate; instructor consent.

PATH 241. Clinical Studies in Pathology II. 3-9 Units.
An in-depth exposure to the practice of pathology for students who have completed Clinical Studies in Pathology I. Students are assigned a faculty mentor and work closely with pathology residents, fellows and faculty. Two months are spent in surgical pathology where students help examine surgical resection specimens and biopsies and participate in making a final diagnosis. One month is spent in sub-specialty areas of pathology that include dermatopathology, neuropathology, renal pathology, lymph node pathology or cytology. This course must be combined with Clinical Studies in Pathology I and two additional quarters of PATH 399, Directed Research, to fulfill a 12-month Post-Sophomore year Fellowship in Pathology. Prerequisite: consent of instructor and successful completion of Clinical Studies in Pathology I (PATH 240).

PATH 280. Early Clinical Experience in Pathology. 1-2 Unit.
Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

PATH 290. Pediatric Nonmalignant Hematology and Stem Cell Biology. 2 Units.
Pediatric hematologic disorders provide an important paradigm to study other developmental systems. Subjects covered include hematopoiesis, basic stem cell biology, endothelial cell development, alternative models to study nonmalignant hematolgy and stem cell biology (zebrafish and drosophila), defects in white cell function, basic research in stem cell transplantation, state of the art methods in nonmalignant hematolgy and stem cell biology (genomics, proteomics, and gene therapy), and bioinformatics. The course is also open to graduate students and junior and senior undergraduate students who are pre-med.

PATH 299. Directed Reading in Pathology. 1-18 Unit.
Prerequisite: consent of instructor.

PATH 370. Medical Scholars Research. 4-18 Units.
Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

PATH 399. Graduate Research. 1-18 Unit.
Students undertake investigations sponsored by individual faculty members. Opportunities at the molecular, cellular, and clinical-pathologic levels. Prerequisite: consent of instructor.