

Molecular Pathology

OFFICE: 1012 Basic Science Building,
School of Medicine

Professors

Stephen Baird, M.D., *Pathology (Academic Senate Distinguished Teaching Award)*

Roland C. Blantz, M.D., *Medicine*

Kenneth R. Chien, M.D., *Medicine*

Lynette B. Corbeil, D.V.M., Ph.D., *Pathology*

Jack Dixon, Ph.D., *Medicine/Pharmacology*

Daniel J. Donoghue, Ph.D., *Chemistry and Biochemistry*

Marilyn G. Farquhar, M.D., *Cellular and Molecular Medicine (Chair)*

James Feramisco, Ph.D., *Medicine/Pharmacology*

Joshua Fierer, M.D., *Medicine/Pathology (In-Residence)*

Xiang-Dong Fu, Ph.D., *Cellular and Molecular Medicine*

Frances D. Gillin, Ph.D., *Pathology (In-Residence)*

Christopher Glass, M.D., Ph.D., *C.M.M. Medicine*

Paul Insel, M.D., *Pharmacology*

Martin F. Kagnoff, M.D., *Medicine*

Michael Karin, Ph.D., *Pharmacology*

Michael J. Kelner, M.D., *Pathology*

Dzung Le, Ph.D., *Pathology*

Eliezer Masliah, M.D., *Neurosciences/Pathology*

Andrew Mizisin, Ph.D., *Pathology*

Henry C. Powell, M.D., *Pathology (Acting Chair)*

C. Ann Rearden, M.D., *Pathology*

Sharon Reed, M.D., *Pathology*

Douglas Richman, M.D., *Pathology/Medicine (In-Residence)*

Michael G. Rosenfeld, Ph.D., *Medicine*

Deborah H. Spector, Ph.D., *Biological Sciences*

Ajit P. Varki, M.D., *Medicine*

Gernot Walter, Ph.D., *Pathology*

Tony Yaksh, Ph.D., *Anesthesiology/Pharmacology*

Associate Professors

Nigel Calcutt, Ph.D., *Pathology*

Richard Gallo, M.D., Ph.D., *Medicine*

John Guatelli, M.D., *Medicine*

Mark P. Kamps, Ph.D., *Pathology (Director)*

Fred Levine, M.D., Ph.D., *Pediatrics*

Victor Nizet, M.D., *Pediatrics*

Joe Vinetz, Ph.D., *Medicine*

Assistant Professors

Ju Chen, Ph.D., *Medicine*

Steffan Ho, Ph.D., *Pathology*

Paul Martin, Ph.D., *Neurosciences*

Bing Ren, Ph.D., *Cellular and Molecular Medicine*

Adjunct Professors

Kathryn Ely, Ph.D., *Pathology*

Eva Engvall, Ph.D., *Pathology*

Hudson Freeze, Ph.D., *Pathology*

Minoru Fukuda, Ph.D., *Pathology*

Martin Haas, Ph.D., *Biology*

Mike Kalichman, Ph.D., *Pathology*

Stuart Lipton, M.D., *Neurosciences*

Rich Maki, Ph.D., *Pathology*

Mark Mercola, Ph.D., *Pathology*

Robert Oshima, Ph.D., *Pathology*

Elena Pasquale, Ph.D., *Pathology*

Manuel Perucho, Ph.D., *Medicine/Pathology*

James Quigley, Ph.D., *Pathology*

John Reed, M.D., Ph.D., *Pathology*

Diane Shelton, D.V.M., *Pathology*

Ian Wilson, Ph.D., *Pathology*

Associate Adjunct Professors

Jacques Corbeil, Ph.D., *Medicine*

Sylvia Evans, Ph.D., *Medicine*

Gen-Sheng Feng, Ph.D., *Pathology*

Steven Frisch, Ph.D., *Pathology*

Roberta Gottlieb, M.D., *Pathology*

David W. Rose, Ph.D., *Medicine*

Guy Salvesen, Ph.D., *Pathology*

Associate Clinical Professor

H. Elizabeth Broome, M.D., *Pathology*

The Graduate Program

The goal of the molecular pathology Ph.D. program is to provide research training in the molecular mechanisms of human disease for students pursuing biomedical careers in academia or the biotechnology industry. The program is interdepartmental in nature. It is centered in the Department of Pathology, but faculty members are also drawn from other departments and institutions. The program provides a comprehensive knowledge of normal and abnormal biological processes, with particular emphasis on the molecular mechanisms of human diseases.

Course Work

The goal of the Molecular Pathology Program is to produce outstanding researchers focused on the molecular basis of disease who also

understand disease at levels of histology, pathology, and treatment. The basic science curriculum includes classes in Molecular Biology of the Cell, Methods in Cellular and Molecular Pathology, the Molecular Pathology of Cancer, and Neurologic and Muscle Disease. Electives are offered in Microbial Pathogenesis and Mouse Models for Human Disease. Learning is focused on reading and evaluating current scientific literature, with special attention to identifying the major open questions within a field and determining the correct experimental plan to answer these questions. Two electives are required, and may also be selected from graduate level courses offered by other medical school programs or undergraduate departments (biology, chemistry and biochemistry, bioengineering). This option allows students the opportunity to acquire advanced training in areas they have selected for graduate research. Popular classes are graduate level immunology, genetics, neurobiology, molecular modeling, microbial pathogenesis, and mouse models of human disease. An education in histology and pathology is acquired by taking the School of Medicine course in histology and an overview course in human pathology developed by Department of Pathology faculty for molecular pathology and pharmacy students. All students must take five of seven core courses offered by faculty members from the Department of Pathology. Students may elect to take in-depth pathology training in their particular disease(s) of interest by attending a set of comprehensive lectures (eight to twelve) taught as part of the comprehensive medical school pathology curriculum. Concurrent with their thesis research, third-year students can acquire a practical consideration of the clinical treatment of disease by attending pathology conferences, including Breast Pathology Conference, Tumor Board, Pediatric Autopsy, and Neuropathology "Brian-cutting" conference. In such conferences, students learn how disease presents and progresses, how physicians currently treat disease, what the practical obstacles are in disease treatment, and where the opportunities are for development of molecular therapeutics.

Examinations

First Qualifying Examination (Minor Proposition)

The purpose of this examination is to test the student's ability to choose a research problem in

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molecular pathology and to propose an experimental approach to its solution. The problem should be unrelated to the student's thesis project. The student is expected to demonstrate knowledge in molecular biology and basic pathology. The first qualifying examination will be taken by the end of the fall quarter of the second year.

Second Qualifying Examination (Major Proposition)

The second qualifying examination, a university requirement, consists of an oral report by the student about research accomplished and the goals to be achieved for completion of the thesis. Upon successful completion of the examination, the student will advance to candidacy. The second qualifying examination should be completed by the end of the third year, and must be completed by the end of the fourth year.

Departmental Ph.D. Time Limit Policies

Students must be advanced to candidacy by the end of four years. Total university support cannot exceed six years. Total registered time at UCSD cannot exceed seven years.

PATH 208G. Human Disease (8)

An integrated consideration of the general principles of pathology and microbiology, epidemiology, and medical therapeutics of the important diseases. An example of their application to a specific organ system will be included.

PATH 220. Molecular Pathology of Disease (4)

This course will explore the molecular pathology associated with various diseases other than cancer. Emphasis will be placed on understanding the aberrant cellular processes, caused by mutation or environmental factors, that are associated with the disease state. Cardiovascular, neurological, immunological, and other diseases will be investigated.

PATH 221. Molecular Pathology of Cancer (4)

The purpose of this course is to present exciting new developments in molecular carcinogenesis, with particular emphasis on oncogene expression and functions of oncogenic proteins. The relevance of molecular mechanisms for understanding human cancer will be discussed.

PATH 222. Microbial Pathogenesis (3)

Topics covered in this course include molecular and cellular mechanisms of viral, bacterial, and protozoan pathogenesis. Host response and microbial mechanisms of host defense will also be discussed. Sessions will consist of faculty and student presentations of current literature.

PATH 225. Molecular Pathology Research Seminar (2)

Group and individual discussion of current literature and ongoing research activities. The format of SOM 225 will encourage student participation. Students are to present on their rotation work or current research project.

PATH 230G. Molecular Biology of the Cell (6)

An integrated consideration of the general principles of molecular pathology. This course will provide the basic foundation of the molecular biology of the cell for graduate students as a prerequisite for Pathology 208G. This course is for graduate students only.

PATH 231. Modern Methods in Cellular and Molecular Pathology (4)

This course presents key concepts and methodologies used in cellular and molecular pathology research. Topics will include cell membrane transport, protein purification, recombinant DNA techniques, DNA sequencing, and PCR technology. The relevance of these methods for investigating human disease will be discussed.

PATH 232. Statistical Methods and Experimental Design

This course will emphasize the relationships between experimental design, statistical methods, and biomedical research. The content of the course will include basic issues in experimental design and commonly used statistical methods. The assumptions behind the statistical tests, their appropriate use, and examples of misuse will be discussed.

PATH 296. Directed Reading (1-4)

Reading and laboratory study of special topics under the direction of a faculty member. Exact subject matter to be arranged in individual cases.

PATH 299. Independent Study or Research (1-12)

Independent study or research.

SOM 213. Histology (2)

This course teaches the structural basis of normal and abnormal function at the cellular and tissue levels. Emphasis is based on microscopic study conducted in small laboratory groups under close faculty supervision.