
DEPARTMENT OF PHARMACOLOGY AND PHYSIOLOGY

The Department of Pharmacology and Physiology is nationally and internationally known for its excellence in research and plays a major role in the graduate and medical teaching missions of the Medical School. Faculty in the department use a broad range of molecular, cellular, genetic, and whole animal approaches in their research. Faculty research interests cover a broad area of pharmacology and integrative physiology, with particular emphasis on molecular and cellular pharmacology, ion channel function, signal transduction mechanisms, and cell injury and death. More information can be obtained on the Departmental Web site: www.urmc.rochester.edu/phph/.

The vision of the Department is to gain prominence in the national and international scientific communities for its research and teaching, excel in teaching medical and graduate students and in preparing them for productive professional careers, and promote the career and professional development of faculty, trainees, and staff.

The Department is dedicated to excellence in teaching and has a leadership role in the medical curriculum, participating extensively in several teaching blocks. The Department also offers coursework leading to the M.S. and Ph.D. degrees in both pharmacology and in physiology. For more information, see the *Official Bulletin: Graduate Studies*. Students from several graduate clusters, the M.D./Ph.D. program, and programs on the River Campus undertake their dissertation research in laboratories in the Department. In addition, faculty mentor numerous undergraduates, postdoctoral clinical fellows, and visiting faculty who are engaged in research in the Department.

Courses Offered by the Department of Pharmacology and Physiology

407. Introduction to Physiology

Credit—four hours

Associate Professor Blair and staff

This course is designed to introduce the basic principles of mammalian physiology to graduate students in the biomedical sciences. Topics include: cellular physiology of nerve and muscle, epithelial transport, cardiovascular, respiratory, renal, and gastrointestinal physiology, endocrinology, and thermoregulation. Fall.

440. Topics in Vascular Biology

Credit—four hours

Prerequisites: graduate physiology recommended and permission of instructor

Professor Sarelius and staff

This course provides in-depth coverage of selected topics in vascular biology. Major topics and concepts are introduced in the context of current literature. These include vascular functional anatomy, angiogenesis, hemodynamics, vascular control mechanisms, vessel-blood interactions, signaling, mechanotransduction, leukocyte-endothelial cell interactions, vascular disease, and gene therapies. Spring, odd-numbered years.

491. M.S. Reading

Credit—to be arranged

Staff

495. M.S. Research

Credit—to be arranged

Staff

502. Seminar

Credit—one hour each term

Staff

General topics presented by students and staff members. Organized surveys of selected fields may be presented upon request.

550. Ion Channels and Disease

Credit—two hours

Professor Begenisich and staff

Advances in molecular biology, cellular physiology, and structural biology, coupled with the recent progress in sequencing of the human genome, have revealed an increasing number of human and animal diseases that arise from defects in ion channel function. Many of these diseases are caused by mutations in genes encoding ion channel proteins and are now referred to as channelopathies. This course focuses on the function of ion channels in normal physiological processes in the brain, skeletal, and cardiac muscle and how these functions are altered in certain channelopathies. These advances are examined through readings of the original literature, integrated with didactic material where useful. Topics include the biophysical basis of excitation in nerve and muscle, excitation-contraction coupling, synaptic plasticity, and other topical subjects. Special emphasis is placed on the molecular basis of important ion channel diseases and other pathologies involving ion channels including genetic defects that lead to cardiac arrhythmias, skeletal muscle myotonias and paralyses, and epilepsy. Spring.

552. Readings in Integrative Physiology

Credit—three hours

Professor Sarelius and staff

This readings course includes detailed critical discussion of original scientific publications. Readings are chosen to illustrate current topics in cell and molecular physiology as they relate to the integrated function of organ systems in health and disease.

553. Molecular Pharmacology

Credit—four hours

Professor Bidlack and staff

This course focuses on the principles and mechanisms for drug action and the use of drugs in treating disease. Basic pharmacological principles from the molecular to the cellular levels are covered, as well as therapeutic approaches to treating diseases. This multi-topic course is beneficial for students interested in understanding drug action or considering future careers in the pharmaceutical industry. Spring.

555. Computational Pharmacology

Credit—one hour

Staff

The objective of this course is to familiarize the student with the use of the computer as a tool in basic pharmacological research. The emphasis is on hands-on experience. Topics include the use of Internet-based 3-D structure and sequence databases, analysis of protein sequences, basic molecular modeling, protein engineering, and analysis of structure-function relationships in small molecules. Spring.

593. Special Topics in Pharmacology and Physiology

Credit—to be arranged

Staff

Directed studies in the field of pharmacology and/or physiology supervised by a faculty member and organized to meet the needs of individual or small groups of graduate students. May involve supervised readings, laboratory exercises, or organized discussions.

595. Ph.D. Research

Credit—to be arranged

Staff

Research in the Department is focused on integrative studies in molecular pharmacology and physiology. Active research areas include cell signaling and regulation, neuropharmacology, drug metabolism and bioactivation, ion channel biology, cell injury and death, cardiovascular pharmacology and physiology.

596. Laboratory Rotations

Credit—to be arranged; minimum of four hours

Prerequisite: permission of the instructor

Staff

These rotations are designed to introduce students to modern research problems and techniques, and reflect the research interests of the participating faculty.

INTERDEPARTMENTAL COURSES

IND 409. Cell Biology

Credit—four hours

Prerequisite: biochemistry (concurrent or prior) or permission of instructor

Professor Hinkle and staff

The course covers membrane structure and function; cytoskeleton; protein synthesis, modification, and targeting; organelles; vesicular traffic; nuclear import/export; cell:cell communication; signal transduction; cell cycle control; apoptosis; growth control; and cancer. Selected topics are covered in depth with emphasis on experimental approaches. Papers from the recent literature are discussed in depth. Fall.

IND 447. Signal Transduction

Credit—four hours

Prerequisite: BCH 401 or equivalent

Associate Professor Smrcka and staff

The goal of this course is to teach modern concepts in signal transduction. The lectures cover a range of topics from basic principles and mechanisms of signal transduction to contemporary techniques for performing research in this area. Spring.

Faculty of the Department of Pharmacology and Physiology

A. William Tank . . . *Paul Stark Professor of Pharmacology, Professor of Pharmacology and Physiology, and Chair*. B.S. Lehigh, 1972; Ph.D. Purdue, 1976. Instructor of Pharmacology, University of Colorado Health Sciences Center, 1980–82; Assistant Professor of Pharmacology, 1982–86; Assistant Professor of Pharmacology, University of Rochester Medical Center, 1986–92; Associate Professor of Pharmacology and Physiology, 1992–2001; Professor of Pharmacology and Physiology, and Chair, 2001–.

Patricia M. Hinkle . . . *Professor of Pharmacology and Physiology, and Associate Chair, and Oncology*. B.A. Mount Holyoke, 1965; Ph.D. University of California (Berkeley) 1970.

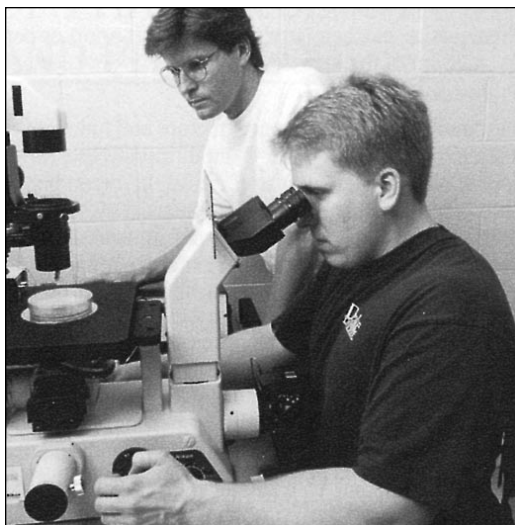
Professors

M. W. Anders, Emeritus. D.V.M. Iowa State, 1960; Ph.D. Minnesota, 1964.

Ted Begenisich. B.S. University of California (Davis), 1968; M.A. University of California (Irvine), 1971; Ph.D. Maryland, 1974.

Bradford C. Berk, and *Medicine*. B.A. Amherst, 1975; M.D. Rochester, 1981; Ph.D. 1981.

Jean M. Bidlack. B.A. Skidmore, 1975; M.S. Rochester, 1977; Ph.D. 1979.



David A. Bushinsky, and *Medicine*. B.S. Lehigh, 1971; M.D. Tufts, 1975.

Thomas W. Clarkson, and *Environmental Medicine*, and *Biochemistry and Biophysics*. B.Sc. University of Manchester (England), 1953; Ph.D. 1956.

Albert B. Craig, Jr., Emeritus. M.D. Cornell, 1948.

Paul L. LaCelle. A.B. Houghton, 1951; M.D. Rochester, 1959.

Camillo Peracchia. M.D. University of Milan (Italy), 1962.

Leonor Rivera-Calimlim, Emeritus. A.A. Arellano University (Philippines), 1948; M.D. University of Santo Tomas (Philippines), 1953; M.S. Indiana, 1965.

Ingrid H. Sarelius. B.S. Massey, 1968; M.Sc. 1973; Ph.D. Auckland, 1978.

Shey-Shing Sheu. B.S. National Taiwan University, 1972; Ph.D. University of Chicago, 1979.

Ira Shoulson, and *Neurology*, and *Medicine*. B.A. University of Pennsylvania, 1967; M.D. Rochester, 1975.

Peter G. Shrager, and *Biochemistry and Biophysics*, and *Neurobiology and Anatomy*. B.S. Columbia, 1963; Ph.D. University of California (Berkeley), 1969.

Trevor J. Shuttleworth. B.Sc. London University, 1968; Ph.D. Otago (New Zealand), 1972.

J. Newell Stannard, and *Biochemistry and Biophysics*, Emeritus. B.A. Oberlin, 1931; M.A. Harvard, 1934; Ph.D. 1935.

Richard E. Waugh, and *Biomedical Engineering*, *Biochemistry and Biophysics*, and *Mechanical Engineering*. B.S. Notre Dame, 1973; Ph.D. Duke, 1977.

Stephen L. Welle, and *Medicine*. B.S. Illinois, 1974; Ph.D. Northern Illinois, 1978.

Hermes H. Yeh, in the Center for Aging and Developmental Biology. B.A. DePauw, 1976; Ph.D. Texas (Dallas), 1981.

Adjunct Professor

Stephen H. Curry. Ph.D. University of London, 1965; D.Sc. (Med) 1990.

Associate Professors

Nasr H. Anaizi, part-time, and *Pharmacist, Strong Memorial Hospital*. B.S. Perugia (Italy), 1972; M.S. Rochester, 1978; Ph.D. 1982.

Martha L. Blair. B.A. Wellesley, 1969; Ph.D. University of Washington, 1974.

David J. Culp, and Center for Oral Biology and Dentistry. B.S. University of California (Berkeley), 1974; Ph.D. 1981.

Michael F. Flessner, and *Medicine*. B.S. U.S. Coast Guard Academy, 1970; M.S.E. Michigan, 1975; M.S. 1975; Ph.D. 1981; M.D. Maryland, 1985.

Robert S. Freeman, and *Neurology and Oncology*. B.S. Delaware, 1985; M.S. University of California (San Diego), 1987; Ph.D. 1991.

Robert A. Gross, and *Neurology*. A.B. Harvard, 1975; M.D./Ph.D. Washington, 1981.

James E. Melvin, and *Dentistry in the Center for Oral Biology*, and *Neurobiology and Anatomy*. B.A. Kent State, 1975; D.D.S. Case Western Reserve, 1978; M.S. Rochester, 1983; Ph.D. 1987.

Richard J. Rivers, and *Anesthesiology*. B.S. Clarkson, 1977; M.D. Ohio, 1983; Ph.D. Virginia, 1990.

Alan V. Smrcka, and *Oncology*. B.S. Connecticut, 1981; M.S. Arizona, 1984; Ph.D. 1990.

Jay Yang, and *Anesthesiology*. Sc.B. Brown, 1977; M.S.E.E., 1980; Ph.D. 1982; M.S. Washington University, 1986.

Adjunct Associate Professors

Daniel A. Hammer. M.S.E. Pennsylvania, 1985; Ph.D. 1987.

Daniel J. Williford, and *Medicine*. B.S. Albany College of Pharmacy, 1976; Ph.D. Georgetown, 1982; M.D. 1983.

Dianqing Wu, and *Oncology*. B.S. Nanjing (China), 1985; Ph.D. Clarkson, 1991.

Assistant Professors

Robert T. Dirksen. B.S. Notre Dame, 1985; Ph.D. Rochester, 1992.

Denise Hocking. B.S. Hartwick, 1983; Ph.D. Albany, 1992.

Nancy S. Krieger, and *Medicine*. B.A. Indiana, 1972; Ph.D. Stanford, 1976.

Gene E. Watson, and *Dentistry*. B.A. West Virginia, 1975; D.D.S. 1980; M.S. Rochester, 1992; Ph.D. 1995.

David I. Yule. B.Sc. Portsmouth (United Kingdom), 1986; Ph.D. Liverpool (United Kingdom), 1989.

Research Assistant Professors

Jorge Arreola, in the Center for Oral Biology. B.S. Metropolitan Autonomous University (Mexico), 1981; M.S. National Polytechnic Institute, 1985; Ph.D. 1988.

Jane C. Chisholm. B.A. Mt. Holyoke, 1974; Ph.D. Rochester, 1982.

David R. Giovannucci. B.S. and B.A. Wayne State, 1984; Ph.D. 1993.

Shao-Ming P. Lu, in the Center for Aging and Developmental Biology. B.S. Chung-Yuan Christian College (China), 1975; M.A. Northern Illinois, 1981; Ph.D. Duke, 1988.

Virendra K. Sharma. B.Vsc. Punjab (India), 1966; M.S. All India, 1969; Ph.D. Massachusetts College of Pharmacy, 1974.

Xiaoguang Wang, part-time. B.S. Qinhai (China), 1985; Ph.D. Changchun (China), 1989.