
DEPARTMENT OF MICROBIOLOGY AND IMMUNOLOGY

The Department offers instruction in medical and general bacteriology, genetics, immunology, mycology, oral microbiology, parasitology, and virology.

In addition to courses for medical students, the Department has active programs leading to B.S., M.S., and Ph.D. degrees in microbiology and immunology and a combined degree program leading to an M.S. in microbiology and immunology/M.B.A. Through the M.D.-Ph.D. program, the Department offers combined degree training in many facets of microbiology. Electives in infectious diseases, microbiology and immunology, and research are available through special arrangements with the Department. Opportunities are available for students who wish to spend a year in the Department with staff members, working in their areas of interest. Students interested in immunology, genetics, or virology may elect to follow a special immunology, genetics, or virology track respectively, with modified course requirements. Applicants who wish to pursue doctoral graduate training in microbiology and immunology apply to, and are admitted by, the cluster in immunology, microbiology, and vaccine biology (see Graduate Education in the Biomedical Sciences). Applicants who wish a terminal M.S. or M.S./M.B.A. degree apply directly to the Department of Microbiology and Immunology.

Faculty in the Department of Microbiology and Immunology participate in and sponsor teaching in the interdisciplinary course called Host Defense for first-year medical students. This course is designed to introduce medical students to the human body's response to infectious agents, tissue injury, and cell dysfunction. The course marries the fields of immunology, microbiology, pathology, pharmacology, and dermatology. Students explore the basic nature of infectious agents and the characteristics that allow them entry to the host; observe their pathological effects on the organs, tissues, and cells of the host; understand the role of the immune response in protecting the host against the agent; and examine the way pharmaceuticals exploit the differences between the host and infectious agent in order to destroy the agent without damaging the host. The course also explores the possibilities available for disease prevention and infection control.

Courses Offered by the Department of Microbiology and Immunology

220. Introduction to Microbiology

Credit—four hours

Prerequisites: BIO 110 and 111, BIO 121, and/or equivalent

Professor Maniloff

This course provides an introduction to bacteria and viruses. Major topics discussed are: bacterial and viral structure; microbial biochemistry, molecular biology, growth, and evolution; host-parasite interactions, including nonspecific and specific (immune) host defenses and mechanisms of microbial pathogenesis; microbial diseases of humans; and microbial diversity and ecology. Three lectures per week with assigned readings from text. Fall.

221W. Microbiology Laboratory

Credit—four hours

Prerequisite: MBI 220 concurrent or previous

Assistant Professor Courtney

This course is designed to accompany MBI 220. It allows the students to have direct experience in handling microorganisms and studying their properties. Emphasis is placed on learning basic laboratory skills and techniques; collecting and recording data; and analyzing experimental results. Some exercises are performed by individual students, while others are carried out in small groups. Fall.

391. Undergraduate Readings in Microbiology

Credit—TBA

Prerequisite: Permission of instructor required

Professor Robert Marquis

This course gives undergraduates an opportunity to explore some microbiological topics on a tutorial basis. The student must first choose a faculty member willing to serve as a tutor. Then, a plan is formulated and approved. The student reads various articles in the microbiological literature and meets at regular times with the tutor to discuss the readings. The student will prepare a term paper. Fall and Spring.

395. Undergraduate Research in Microbiology

This course is designed to give undergraduates an opportunity to obtain experience in research in the laboratories of the faculty of the Department of Microbiology and Immunology. The student first chooses a faculty member who wishes to have a student working on a project under his or her direction. A list of potential instructors is available in the Department office or on the Department homepage. A written description of the project and an Independent Studies Form are submitted for approval to the Undergraduate Program in Biology and Medicine. The projects include laboratory experience and tutorial sessions. A paper describing the work must be

prepared and approved before a final grade is given. Fall and Spring.

414. Mechanisms of Microbial Pathogenesis

Credit—four hours undergraduates
three hours graduates

Prerequisites: MBI 220, 221

Associate Professor Haidaris

An examination of host-parasite interactions, and the mechanisms by which microbes evade the host response and cause disease. The emphasis is on an understanding at the molecular level of microbial pathogenesis, including colonization, invasion, antigen variation, and toxin production and mode of action. (Graduate students register for MBI 514 Seminar.) Spring, every other year.

421. Microbial Genetics

Credit—four hours undergraduates
three hours graduates

Prerequisite: MBI 220

Associate Professors Silver and Butler

This course provides an in-depth examination of representative genetic systems in bacteria and bacterial viruses. Emphasis is placed on the methods of genetic analysis used to study biological function. The material covered includes: the nature of bacterial variation, processes affecting gene synthesis and integrity, the nature of gene transfer in bacteria, and the regulation of gene expression in prokaryotes. (Graduate students register for MBI 521 Seminar.) Spring.

431. Microbial Physiology

Credit—four hours undergraduates
three hours graduates

Prerequisite: a course in biochemistry

Associate Professor Clark

This course provides a survey of microbial physiology with emphasis on metabolism, regulation, cell walls, membranes, ecology, adaptation to extreme environments. The class meets twice per week for two lectures of 75 minutes each. Extensive handout materials are provided, and readings are from the current literature. (Doctoral students register for MBI 531 Seminar.) Spring.

445. Industrial Microbiology

Credit—four hours

Prerequisites: organic chemistry and introductory biology
Professor Marquis and Associate Professor Burne

This course includes consideration of a variety of industrial microbiological processes with the presentation of the basic aspects of microbial physiology, microbial genetics, and biotechnology underlying the successful commercial exploitation and control of microbes. There are sessions on rapidly developing technologies, on environmental aspects of industrial microbiology, and on bioremediation. There is no textbook for the course, but

there are handouts, assigned readings, and problem sets. Fall, even-numbered years.

456. General Virology

Credit—five hours undergraduates
four hours graduates

Prerequisites: basic biochemistry or molecular biology

Associate Professor Dewhurst

Provides an introduction to animal virology, with emphasis on human disease. Topics covered include general properties of viruses, methods in viral research, virus structure, biochemistry of virus replication, virus-host cell interactions, pathogenesis, HIV/AIDS, emerging infections, vaccines, antivirals, and viral vectors and gene therapy. Spring.

473. Immunology

Credit—four hours undergraduates
three hours graduates

Prerequisites: BIO 121, BIO 150 or equivalent

Associate Professor Barth

Cellular and humoral immune responses; interaction of antibody and antigen; structure and genetics of immunoglobulin; T and B lymphocyte interaction; immune regulation. Fall.

483. Seminar in Neural-Immune Interactions

Credit—two hours

Associate Professor Moynihan

This is a seminar devoted to topics in neural-immune interaction. Weekly seminars, presented by graduate students and faculty, cover a range of topics including: hormones as immunoregulators; cytokines as regulators of the nervous system; the peripheral nervous system and immune responses; stress-induced immunomodulation in animals and humans; the role of the nervous system in autoimmune disease and in the aging immune system; and behaviorally conditioned immunomodulation. Fall.

491. Reading Course at the Master's Level

Credit to be arranged

Staff

Fall and Spring.

493. Master's Essay

Credit to be arranged

Staff

Fall and Spring.

495. Master's Research

Credit to be arranged

Staff

Fall and Spring.

501. Student Seminar Series

Credit—one hour

Professor W. Iglewski

A seminar program is presented each semester; continuous registration is required of all Ph.D. students in the Department of Microbiology and Immunology. Seminars are held once a week and are conducted by graduate students. First- and second-year Ph.D. candidates present a topic from the current literature. Senior graduate students present a seminar on their research in progress. The course is jointly taught by all departmental faculty. Fall and Spring.

507. Graduate Microbiology and Immunology**Laboratory Rotations**

Credit—eight hours

Associate Professor Clark

Consists of a series of laboratory experiences, each of approximately eight weeks, in laboratories of several faculty members. Usually, Ph.D. students are expected to enroll for three rotations (eight hours of credit). Fall and Spring.

514. Pathogenic Mechanisms Seminar

Credit—one hour

Prerequisites: MBI 220, 221

Associate Professor Haidaris

Seminar offered concurrently every other year with MBI 414. Required for graduate students. Spring.

521. Topics in Microbial Genetics

Credit—one hour

Prerequisite: MBI 421

Associate Professors Silver and Butler

This is the concurrent seminar required for graduate students registering for MBI 421. Spring.

531. Microbial Physiology Seminar

Credit—one hour

Prerequisite: MBI 431

Associate Professor Clark

Seminar offered concurrently in the spring every other year with MBI 431. Required for graduate students.

540. Advanced Topics in Immunology

Credit—two hours

Prerequisite: MBI 473 or equivalent

Professor Cohen

An in-depth inquiry (via student seminars, class discussions, original literature) into one contemporary facet or subfield of immunology. Selection of the topic for a given semester is at the discretion of the students and the immunology faculty member responsible for the course. Previous topics: T-cell recognition in tumor immunity and autoimmunity, behavioral regulation of immunity, gene defects in lymphocyte development and

function in man and mice, phylogeny of immunity, and molecular aspects of lymphocyte function. Spring.

570. Molecular Biology Seminar

Credit—one hour

Seminar and journal club series required for all microbiology students. Spring.

573. Immunology Seminar

Credit—two hours

Prerequisite: MBI 473

Professor Lord

This course covers a particular aspect of immunology in depth with an emphasis on critical reading of original journal articles. Two to four papers are read each week with oral presentation by the students. Fall.

580. Immunology Research in Progress Seminar

Credit—one hour

Prerequisite: MBI 473

Professor Cohen

Consists of the Immunology Journal Club (meets one hour per week). Students read and discuss recent papers from the immunology literature. The second part consists of attendance at the weekly one-hour Immunology Research-in-Progress Seminar Series. Fall and Spring.

581. Oral Microbiology

Credit—two hours

Prerequisites: Microbiology and Biochemistry

Professor Marquis and Associate Professor Burne

The bacteriology of dental caries and periodontal disease is considered in terms of current research on physiology, genetics, and pathogenic mechanisms. Virology and mycology related to oral disease are reviewed, as well as sterilization and disinfection. There is no textbook for the course, but there is a handout and assigned readings from the literature for each session. Half of each session is a lecture by one of the instructors, and the other half involves reviews of papers from the current literature given by the students. Fall, odd-numbered years.

588. Virology Research Seminar

Credit—one hour

Associate Professor Dewhurst

Seminar series required of all virology graduate students. Fall and Spring.

589. Advanced Topics in Virology

Credit—one hour

Professor Iglewski

Advanced topics in virology are investigated in a discussion course. Previous topics include anti-viral therapy, vaccine design, and viral transcription regulation. Students present reviews of the literature and write critiques. Fall.

595. Ph.D. Research

Credit—to be arranged
Staff

Research may be undertaken in virology, general medical microbiology, animal parasitology, immunochemistry, genetics, physiology, bacterial cytology, and cellular immunology. Fall and Spring.

Faculty of the Department of Microbiology and Immunology

Barbara H. Iglewski . . . *Professor of Microbiology and Immunology and Chair*. B.S. Allegheny College, 1960; M.S. Pennsylvania State, 1962; Ph.D. 1964. Postdoctoral Fellow, 1964–65; Postdoctoral Fellow, University of Colorado Medical Center, 1965–66; Postdoctoral Fellow of National Institutes of Allergy and Infectious Diseases, NIH, Public Health Research Institute of the City of New York, 1966–68; Instructor in Microbiology, University of Oregon Health Sciences Center, 1968–69; Assistant Professor of Microbiology and Immunology, 1969–73. Senior Fellow, National Research Foundation, Department of Bacterial Diseases, Walter Reed Army Institute of Research, 1976–77. Associate Professor of Microbiology and Immunology, Oregon Health Sciences University, 1973–79. Professor of Microbiology and Immunology, 1979–1986. Professor and Chair, Department of Microbiology and Immunology, University of Rochester School of Medicine and Dentistry, 1986– .

Professors

George N. Abraham, and *Medicine*, and *Oncology*, and *Pediatrics*. B.S. Hobart, 1959; M.S. Buffalo, 1961; M.D. SUNY (Buffalo), 1963.

Peter Z. Allen, Emeritus. A.B. Columbia, 1949; Ph.D. 1958.

Robert Bambara, and *Biochemistry and Biophysics*, and *Oncology*. B.A. Northwestern, 1970; Ph.D. Cornell, 1974.

William H. Bowen, and *Center for Oral Biology and Environmental Medicine*. B.D.S. National University of Ireland, 1955; M.Sc. Rochester, 1959; Ph.D. University of London, 1965; D.Sc. University of Ireland, 1974.

J. Roger Christensen, Emeritus. B.S. Iowa State, 1949; Ph.D. Cornell, 1953.

Nicholas Cohen, and *Psychiatry*, and *Oncology*. A.B. Princeton, 1959; Ph.D. Rochester, 1966.

Nicholas Crispe, and *Center for Vaccine Biology and Immunology*. B.S. University of London, 1975; M.B.B.S. 1978; Ph.D. 1984.

Howard Federoff, and *Neurology*, and *Medicine*, and *Genetics*, and *Oncology*. B.A. Earlham, 1974; M.S., Ph.D. Albert Einstein, 1979; M.D. 1983.

John G. Frelinger, and *Oncology*. B.S. Stanford, 1975; Ph.D. California Institute of Technology, 1980.

Francis Gigliotti, and *Pediatrics*. A.B. West Virginia, 1974; M.D. Virginia, 1977.

J. Donald Hare, Emeritus. A.B. Harvard, 1950; M.S. Rochester, 1953; M.D. 1955.

Wallace J. Iglewski. B.S. Case Western, 1961; M.S. Pennsylvania State, 1963; Ph.D. 1965.

Richard A. Insel, and *Pediatrics*, and *Oncology*. B.S. Pennsylvania State, 1966; M.D. Jefferson, 1969.

Edith M. Lord, and *Oncology*. B.A. Kansas, 1970; Ph.D. University of California (San Diego), 1975.

Jack Maniloff, and *Biochemistry and Biophysics*. B.A. Johns Hopkins, 1960; M.S. Yale, 1964; Ph.D. 1965.

Robert E. Marquis, and *Center for Oral Biology*. B.S. Wayne State, 1955; M.S. Michigan, 1958; Ph.D. 1961.

Dennis J. McCance, and *Oncology*. B.Sc. Queen's University (Belfast), 1969; B.Sc. 1971; Ph.D. University of Birmingham (UK), 1974.

Marilyn A. Menegus, and *Pathology and Laboratory Medicine*, and *Pediatrics*. B.S. College of St. Elizabeth, 1965; Ph.D. Cornell, 1972.

Timothy R. Mosmann, and *Center for Vaccine Biology and Immunology*. B.Sc. Rhodes (South Africa), 1968; Ph.D. British Columbia, 1973.

Moon Nahm, and *Pediatrics*, *Medicine*, *Pathology and Laboratory Medicine*, and *Oncology*. A.B. Washington, 1970; M.D. 1974.

Richard P. Phipps, and *Oncology*, and *Pediatrics*, and *Environmental Medicine*. B.S.M.T. Loyola, 1977; Ph.D. Medical College of Virginia, 1980.

Michael Pichichero, part-time, and *Pediatrics*, part-time, and *Medicine*, part-time. B.A. Rutgers, 1972; M.D. Rochester, 1976.

Richard Reichman, and *Medicine*. B.A. Utah, 1968; M.D. University of Pennsylvania, 1972.

Joseph Rosenblatt, and *Medicine*, and *Oncology*. University of California (Los Angeles), 1976; M.D. 1980.

Peter T. Rowley, and *Medicine*, and *Pediatrics*, and *Genetics*, and *Oncology*. A.B. Harvard, 1951; M.D. Columbia, 1955.

Frank E. Young, Emeritus and Dean Emeritus. M.D. SUNY (Upstate), 1956; Ph.D. Case Western, 1962.

Associate Professors

Richard K. Barth, and *Oncology*. B.S. St. Bonaventure, 1976; Ph.D. Roswell Park Memorial Institute, 1982.

Robert A. Burne, and *Center for Oral Biology*. B.S. Pennsylvania State, 1981; Ph.D. Rochester, 1987.

J. Scott Butler. B.S. University of Wisconsin (Madison), 1979; Ph.D. Illinois (Urbana), 1984.

Virginia L. Clark. B.A. Carleton, 1967; Ph.D. Rochester, 1976.

Stephen Dewhurst, and *Oncology*. B.S. University of Bristol (U.K.), 1984; Ph.D. Nebraska, 1987.

Anthony Gaspari, and *Dermatology*, and *Oncology*, and *Assistant Professor of Pediatrics*. B.A. Temple, 1976; M.D. Jefferson, 1981.

Constantine G. Haidaris, and *Center for Oral Biology*. B.A. Wittenberg, 1974; M.S. Miami University (Ohio), 1976; Ph.D. Cincinnati, 1982.

Dwight J. Hardy, and *Pathology and Laboratory Medicine*. B.S. Southwestern Louisiana, 1973; M.S. Louisiana, 1979; Ph.D. 1983.

Anne M. Haywood, and *Pediatrics*. B.A. Bryn Mawr, 1955; M.D. Harvard, 1959.

Alexandra M. Livingstone, and *Center for Vaccine Biology and Immunology*. B.Sc. Edinburgh, 1977; Ph.D. Cambridge, 1983.

Jan Moynihan, and *Psychiatry*, and *Oncology*. B.A. Rochester, 1976; M.S. 1983; Ph.D. 1985.

Robert Quivey, and *Center for Oral Biology*. B.S. Pennsylvania State, 1977; M.S. 1979, Ph.D. Texas (Austin), 1984.

Ignacio Sanz, and *Medicine*, and *Oncology*. B.S. University of Santander (Spain), 1973; M.D. 1978.

Richard P. Silver. B.A. Clark, 1963; M.S. Houston, 1966; Ph.D. Georgetown, 1970.

Patricia J. Simpson-Haidaris, and *Medicine*, and *Pathology and Laboratory Medicine*. B.A. Indiana, 1973; M.S. Notre Dame, 1980; Ph.D. 1981.

John J. Treanor, and *Medicine*. B.S. Canisius, 1975; M.D. Rochester, 1979.

J. H. David Wu, and *Chemical Engineering*. B.S. National Taiwan University, 1976; M.S. 1980; M.S. Massachusetts Institute of Technology, 1982; Ph.D. 1987.

Maurice Zauderer, and *Oncology*. B.A. Yeshiva University (Israel), 1966; Ph.D. Massachusetts Institute of Technology, 1972.

Assistant Professors

Andrea Bottaro, and *Medicine*, and *Oncology*. Ph.D. (Biological Sciences) Torino (Italy), 1987; Ph.D. (Human Genetics), 1993.

Aida E. Casiano-Colon, part-time. B.S. Rochester, 1981; M.S. 1985; Ph.D. 1990.

Mary Anne Courtney, and *Medicine*. B.A. Miami University (Ohio), 1972; Ph.D. Louisville, 1980.

Lisa Demeter, and *Medicine*, and *Oncology*. B.A. Rochester, 1979; M.S. 1980; M.D. 1984.

Deborah Fowell, and *Center for Vaccine Biology and Immunology*. B.S. University of Bristol (U.K.), 1988; Ph.D. Oxford (U.K.), 1992.

Baek Kim. M.S. Yonsei (Korea), 1987; Ph.D. Arizona, 1993.

Luciano Passador. B.S. University of Windsor (Ontario), 1982; M.S. 1985; Ph.D. University of Western Ontario, 1992.

Martin Pavelka. B.S. Cleveland State, 1988; M.S. Rochester, 1991; Ph.D. 1994.

Vicente Planelles, and *Medicine*, and *Oncology*. B.S. Universidad Complutense (Spain), 1981; M.S. 1985; Ph.D. University of California (Davis), 1991.

Robert C. Rose, and *Medicine*. B.S. SUNY (Geneseo), 1984; Ph.D. Rochester, 1994.

Edward Schwarz, and *Medicine*, and *Orthopaedics*, and *Oncology*. B.S. Worcester, 1988; M.A. Albert Einstein, 1990; Ph.D. 1993.

Benjamin Segal, and *Cancer Center*. B.S. Brown University, 1984; M.D. 1988.

David Topham, and *Center for Vaccine Biology and Immunology*. B.S. Vermont (Burlington), 1985; M.S. 1992; Ph.D. 1994.

Faith Young, and *Medicine*, and *Pediatrics*, and *Oncology*. B.A. Yale, 1978; M.D. Harvard, 1982.

Wei-Ping Zheng, and *Center for Vaccine Biology and Immunology*. B.S. Jiangxi University, 1985; Ph.D. SUNY (Buffalo), 1995.

Research Assistant Professors

Luoqing Chen, and *Center for Vaccine Biology and Immunology*. B.S. Wuhan University (P.R.C.), 1982; M.S. Wuhan Institute of Virology, 1985; Ph.D. Iowa State, 1992.

Margaret Chen, and *Center for Oral Biology*. B.S. Fu-Jen Catholic, 1984; M.S. Georgia, 1987; Ph.D. Texas (San Antonio), 1993.

Hiroko Holtfreter. B.S. Tokyo Higher Normal School for Women, 1944; Ph.D. Rochester, 1965.

Sanjay B. Maggirwar. B.S. Marathwada, 1982; M.S. 1984; M.B.A. 1986; Ph.D. Poona, 1993.

Daniela Metz, and *Center for Vaccine Biology and Immunology*. B.S. University College of North Wales, Bangor (U.K.), 1987; M.S. University of Birmingham (U.K.), 1988; Ph.D. University of London (U.K.), 1993.

Jacques A. Robert. B.A. Geneva (Switzerland), 1985; Ph.D. 1990.

Linda E. Whetter. D.V.M. Michigan, 1976; M.S. North Carolina, 1988; Ph.D. 1992.

Adjunct Assistant Professor

P. Subramonia Pillai. B.Sc. V.O.C. College (India), 1968; M.Sc. Thiagarajar College, 1970; Ph.D. Madurai University, 1978.