

Pathology (HBP)

Chairperson: Jay L. Bock, Health Sciences Center BHS T-9, Room 140 (631) 444-3000

Graduate Program Director: W. Todd Miller, Health Sciences Center, Basic Science Tower, T-6, Room 183 (631) 444-3533

Graduate Program Secretary: Carol Juliano, Life Sciences Building 550 (631) 632-8616

Degree awarded: Ph.D. in Molecular and Cellular Pathology

The Department of Pathology, in the Health Sciences Center, offers a graduate program leading to the Ph.D. degree. This program is a specialization within a larger "umbrella" program in Molecular and Cellular Biology, which also offers specializations in Molecular Biology and Biochemistry and Cellular and Developmental Biology. Students are admitted to the umbrella program and choose a specialization at the end of the first year. The goal of this approach is to provide incoming students with the largest possible choice of research opportunities.

The Immunology and Pathology specialization provides a unique, interdisciplinary approach to experimental pathology, with emphasis on the cellular and molecular bases of human disease. The faculty is derived from the Pathology Department and other basic science and clinical science departments. Research training is available in a broad range of areas, including cancer biology, immunology, inflammation, hemostasis, and infectious disease. The program is designed to instill mastery of the methodologies and philosophy of modern cellular and molecular biology, while retaining a practical orientation toward understanding specific disease processes. Graduates of the program will be equipped with the knowledge and skills to bridge the gap between basic and clinical research as they continue in their careers.

In the first year of study, students take comprehensive "core" courses in biochemistry, molecular biology, and cell biology. They are also given the opportunity to pursue research in four different laboratories to help in choosing a mentor for their dissertation work, a decision that is generally made by the end of the first academic year. In the second year, students who elect to specialize in Immunology and Pathology take advanced courses in these subjects and continue to develop their dissertation research projects. A student is advanced to candidacy for the Ph.D. degree after successfully defending his or her dissertation research proposal before a committee comprised of at least four faculty members. This committee continues to

meet with the student on a regular basis to review progress and provide guidance. The numerous formal and informal interactions among faculty in the program ensure that each student receives an individualized yet well-rounded education of the highest quality.

Further details about the program and applications for admission may be obtained from the graduate program secretary.

Facilities

Together, individual faculty laboratories, the Pathology Department, the Health Sciences Center, and the Division of Biological Sciences provide a full array of up-to-date equipment and services needed for research in molecular and cellular biology. These include the Flow Cytometry Facility, the Cell Culture and Hybridoma Facility, the Transgenic Mouse Facility, the University Microscopy Imaging Center, and the Center for Analysis and Synthesis of Macromolecules. The Health Sciences Library contains a comprehensive collection of biomedical journals and books and is complemented by the main Melville Library on campus. The Pathology Department also provides students with access to a networked computer system for word processing, data analysis, preparation of graphics and slides, and searches of biomedical databases.

Admission

In addition to the minimum requirements of the Graduate School, the following are suggested requirements:

A. A bachelor's degree with the following minimal preparation: mathematics through one year of calculus; chemistry, including organic chemistry; general physics; and one year of biology, including laboratory;

B. A minimum grade point average of 3.0 (B) in undergraduate courses including science and mathematics courses;

C. Letters from three instructors;

D. Results of the Graduate Record Examination (GRE) General Test;

E. Acceptance by both the Department of Pathology and the Graduate School.

In special cases, students not meeting requirements A and B may be admitted on a provisional basis. These students must act to remedy deficiencies within the first year.

Faculty

Professors

Bar-Sagi, Dafna², Ph.D., 1984, Stony Brook University: Ras proteins in proliferation and transformation.

Benach, Jorge L.², Ph.D., 1972, Rutgers University: Pathogenesis of spirochetal infections; utilization of host macromolecules.

Bingham, Paul M.¹, Ph.D., 1979, Harvard University: Genetic control of development and gene expression in animals.

Bogenhagen, Daniel F.⁴, M.D., 1977, Stanford University: Mitochondrial DNA; DNA repair.

Chen, Wen-Tien⁸, Ph.D., 1979, Yale University: Proteases and integrins in cancer invasion, metastasis, and angiogenesis.

Edmunds, Leland N.¹², Ph.D., 1964, Princeton University: Regulation of cell cycles by circadian oscillators in *Euglena*.

Fisher, Paul⁴, M.D./Ph.D., 1980, Stanford University: Nucleus structure/function; eukaryotic DNA synthesis.

Furie, Martha⁵, Ph.D., 1980, Rockefeller University: Interactions between leukocytes and endothelium.

Gergen, J. Peter¹, Ph.D., 1982, Brandeis University: Gene expression and development in *Drosophila*.

Ghebrehiwet, Berhane⁹, D.V.M./D.Sc., 1974, University of Paris, France: Biochemistry; function of the complement system.

Grollman, Arthur, P.⁴, M.D., 1959, Johns Hopkins Medical School: Mechanisms of chemical mutagenesis/carcinogenesis.

Habicht, Gail⁵, Ph.D., 1965, Stanford University: Lyme disease: evolution of cytokines.

Halegoua, Simon³, Ph.D., 1978, Stony Brook University: Molecular control of the neuronal phenotype.

Hayman, Michael², Ph.D., 1973, Institute for Medical Research, England: Viral/cellular oncogenes: differentiation of erythroid cells.

Jesty, Jolyon⁸, D.Phil., 1972, University of Oxford, England: Regulatory controls of blood coagulation.

Johnson, Roger A.⁶, Ph.D., 1968, University of Southern California, Los Angeles: Intracellular signal transduction.

- Katz, Eugene^{2,14}, Ph.D., 1969, University of Cambridge, England: Genetics/development in cellular slime molds.
- Lennarz, William J., *Chairperson*¹ Ph.D., 1959, University of Illinois: Biosynthesis and function of glycoproteins in cell-cell interactions.
- Levine, Joel M.³, Ph.D., 1980, Washington University: Cell-surface molecules of the developing nervous system.
- London, Erwin¹, Ph.D., 1979, Cornell University: Membrane protein structure/translocation/folding.
- Malbon, Craig C.⁴, Ph.D., 1976, Case Western Reserve University: Heterotrimeric G-proteins in development and cancer.
- Mandel, Gail³, Ph.D., 1977, University of California, Los Angeles: Gene expression in the nervous system.
- Marcu, Kenneth B.¹, Ph.D., 1975, Stony Brook University: Antibody gene class switch regulation; NFκB kinases, and inflammatory responses.
- McLaughlin, Stuart⁶, Ph.D., 1968, University of British Columbia, Canada: Calcium/phospholipid second messenger system.
- Moll, Ute M.⁵, *Graduate Program Director*. M.D., 1985, Ulm, Germany: The p53 tumor suppressor gene family: Function/regulation in normal cells and tumor-associated inactivation.
- Reich, Nancy L.⁵, Ph.D., 1983, Stony Brook University: Signal transduction and gene expression in response to cytokines and virus.
- Schechter, Nisson¹, Ph.D., 1971, Western Michigan University: Homeobox and filament proteins in neuronal differentiation, growth and regeneration.
- Schmidt, Jakob¹, M.D./Ph.D., 1970, University of California, Riverside: Signal transduction in electrically excitable cells.
- Simon, Sanford R.¹⁵, Ph.D., 1967, Rockefeller University: Extracellular degradation by neutrophil proteases.
- Smith, Steven O.¹, Ph.D., 1985, University of California, Berkeley: Structure and function of membrane proteins.
- Steigbigel, Roy T.⁸, M.D., 1966, University of Rochester: Immune dysfunction induced by HIV infection.
- Sternglanz, Rolf¹, Ph.D., 1967, Harvard University: Chromatin structure and function; gene expression; histone acetyltransferases.
- Taichman, Lorne B.¹⁰, M.D./Ph.D., 1971, University of Wisconsin: Cutaneous gene therapy.
- Tseng, Linda¹¹, Ph.D., 1968, University of North Dakota: Reproductive molecular endocrinology.
- Williams, David L.⁴, Ph.D., 1972, University of Illinois: Cell biology of atherosclerosis and lipoprotein receptors.
- Van Nostrand, William E.⁸, Ph.D. 1985, University of California, Irvine: Alzheimer's disease and related disorders.
- Wimmer, Eckard², Ph.D., 1962, University of Göttingen, Germany: RNA virus genetics, replication, and pathogenicity: cellular virus receptors.
- University: Nuclear polypeptide domains, structure, and function.
- Brown, Deborah¹, Ph.D., 1987, Stanford University: Cholesterol/sphingolipid-rich membrane domains in signal transduction and membrane traffic.
- Citovsky, Vitaly¹, Ph.D., 1987, Hebrew University, Israel: Nuclear targeting and inter-cellular communication in plants.
- Dean, Neta¹, Ph.D., 1988, University of California, Los Angeles: Membrane enzymes involved in glycosylation; yeast molecular genetics; fungal pathogenesis
- Deutsch, Dale¹, Ph.D., 1972, Purdue University: Molecular neurobiology of anandamide hydrolase (the endogenous marijuana).
- Engbrecht, JoAnne⁴, Ph.D., 1986, University of California, San Diego: Meiosis and cellular signaling.
- Fleit, Howard B.⁵, Ph.D., 1980, New York University: Leukocyte Fc receptors; macrophage differentiation.
- Frohman, Michael A.⁴, M.D./Ph.D., 1986, University of Pennsylvania: Early mammalian development: gene regulation.
- Galanakis, Dennis K.⁵, M.D., 1962, University of Saskatchewan, Canada: Biochemistry; physiology of fibrinogen.
- Haltiwanger, Robert¹, Ph.D., 1986, Duke University: Glycobiology; biosynthesis, structure, and function of the carbohydrates on glycoproteins.
- Hod, Yaacov⁸, Ph.D., 1977, Israel Institute of Technology, Israel: Hormonal control of gene expression; mRNA turnover.
- Holdener, Bernadette¹, Ph.D., 1990, University of Illinois: Genetic regulation of early mammalian development.
- Hollingsworth, Nancy¹, Ph.D., 1988, University of Washington, Seattle: Chromosome structure and function during meiosis in yeast.
- Kernan, Maurice³, Ph.D., 1990, University of Wisconsin: Molecular basis of mechanical senses.
- Kew, Richard B.⁵, Ph.D. 1986, Stony Brook University: Leukocyte chemotaxis/inflammation.
- Konopka, James³, Ph.D., 1985 University of California, Los Angeles: Hormone signal transduction; yeast cell development.
- Lyman, Harvard¹, Ph.D., 1960, Brandeis University: Photocontrol of chloroplast development.
- Mackow, Erich R.⁸, Ph.D., 1984, Temple University: Rotavirus molecular genetics; determinants of viral neutralization and pathogenesis; reverse genetics; biochemistry of cell fusion.
- McKinnon, David³, Ph.D., 1987, John Curtin School of Medical Research, Australia: Molecular physiology of sympathetic neurons and cardiac muscle.
- Miller, Todd W.⁶, Ph.D., 1989, Rockefeller University: Tyrosine phosphorylation and signal transduction.
- Moriya, Masaaki⁴, Ph.D. 1981, Nagoya University, Japan: Cellular responses to DNA damage.
- Prives, Joav⁴, Ph.D., 1968, McGill University, Canada: Cytoskeletal membrane interactions in muscle cells.
- Rebecchi, Mario J.⁸, Ph.D., 1984, New York University: Phospholipases and signal transduction.
- Sampson, Nicole⁹, Ph.D., 1990, University of California, Berkeley: Protein structure-function; mammalian fertilization.
- Scarlata, Suzanne⁶, Ph.D., 1984, University of Illinois: Structure /oligomerization of membrane proteins.
- Spector, Illan⁶, Ph.D., 1967, University of Paris, France: Neuronal differentiation and microfilaments.
- Spitzer, Eric D.⁵, M.D./Ph.D., 1985, Johns Hopkins University: Molecular biology of *Cryptococcus neoformans*
- Thomsen, Gerald H.¹, Ph.D., 1988, Rockefeller University: Growth factors and signal transduction in early vertebrate development; T-box genes.
- Tonge, Peter J.⁹, Ph.D., 1986, University of Birmingham, England: Spectroscopic insights into enzyme mechanisms and protein structure; drug design.
- Trimmer, James¹, Ph.D., 1987, University of California, San Diego: Structure/expression of ion channels.
- VanNostrand, William E.⁸, Ph.D., 1985, University of California, Irvine: Physiologic and pathophysiologic vascular functions of the Alzheimer's disease amyloid beta-protein precursor.
- Zieve, Gary⁵, Ph.D., 1977, Massachusetts Institute of Technology: Assembly/transport of snRNP particles.

Assistant Professors

- Garlick, Jonathan¹⁰, D.D.S., 1985, Ph.D., 1993, Stony Brook University: Oral and epidermal carcinogenesis/cancer gene therapy.
- Hsieh, Jen-Chih¹, Ph.D. 1994, Duke University: Wnt signaling pathways.
- Karzai, Wali¹, Ph.D. 1995, Johns Hopkins University: Translational control of gene expression.
- Kisker, Caroline⁴, Ph.D., 1994, Free University, Berlin, Germany: Crystallographic and biochemical studies of DNA repair enzymes and molybdenum.
- Leatherwood, Janet², Ph.D., 1993, Johns Hopkins University: Cell-cycle control and DNA replication; fission yeast molecular biology.
- Neiman, Aaron¹, Ph.D., 1994, University of California, San Francisco: Vesicle trafficking and intracellular signaling in yeast
- Raleigh, Daniel P.⁹, Ph.D., 1988, Massachusetts Institute of Technology: Experimental studies of protein folding and amyloid formation.
- Schindelin, Hermann¹, Ph.D., 1994, Free University, Berlin, Germany: Structure and function of metalloenzymes and enzymes involved in metallo-cofactor biosynthesis; protein crystallography.
- Simmerling, Carlos⁹, Ph.D. 1994, University of Illinois, Chicago: Structure and motion of biomolecules.
- Thanassi, David G.², Ph.D. University of California, Berkeley: Virulence factors of pathogenic bacteria.
- Tsirka, Styliani-Anna⁷, Ph.D., 1989, University of Thessaloniki, Greece: Neuronal-microglial interactions in the physiology and pathology of the central nervous system.

Adjunct Faculty

Dunn, John, *Microbiologist*.¹³ Ph.D., 1970, Rutgers University: Structure/function of bacteriophage T7 RNA polymerase.

Grewal, Shiv, *Assistant Professor*.¹⁵ Ph.D. 1992, University of Cambridge, England. Gene repression in fission yeast.

Hannon, Gregory, *Associate Professor*.¹⁵ Ph.D., 1991, Case Western Reserve University: Genetics of growth in mammalian cells and dsRNA-induced gene silencing.

Helfman, David, *Professor*.¹⁵ Ph.D., 1981, Emory University: Cytoskeleton organization and function.

Hernandez, Nouria, *Professor*.¹⁵ Ph.D., 1983, University of Heidelberg, Germany: Transcription by mammalian RNA polymerase II and III.

Herr, Winship, *Dean*.¹⁵ Ph.D., 1982, Harvard University: Control of eukaryotic transcription.

Krainer, Adrian, *Professor*.¹⁵ Ph.D., 1986, Harvard University: mRNA splicing; gene expression; RNA-protein interaction.

Lazebnik, Yuri, *Associate Professor*.¹⁵ Ph.D., 1986, St. Petersburg State University, Russia: Molecular mechanisms of apoptosis.

Setlow, Richard, *Professor*.^{1,13} Ph.D., 1947, Yale University: DNA damage and repair; carcinogenesis in fish.

Spector, David L., *Professor*.¹⁵ Ph.D., 1980, Rutgers University: Spatial organization of gene expression.

Stenlund, Arne, *Associate Professor*.¹⁵ Ph.D., 1984, Uppsala University, Sweden: DNA replication of papillomaviruses.

Stillman, Bruce, *Director*.¹⁵ Ph.D., 1979, Australian National University: DNA replication and chromatin assembly in human and yeast cells.

Studier, William F., *Professor*.^{1,13} Ph.D., 1963, California Institute of Technology: Phage T7 replication; large-scale nucleotide sequencing.

Tansey, William P., *Assistant Professor*.¹⁵ Ph.D., 1991, University of Sydney, Australia: Regulation of oncoprotein stability.

Tonks, Nicholas, *Professor*.¹⁵ Ph.D., 1985, University of Dundee, Scotland: Characterization of protein tyrosine phosphatases.

Van Aelst, Linda, *Associate Professor*.¹⁵ Ph.D., 1991, University of Leuven, Belgium: Role of ras in mammalian cell transformation.

Wigler, Michael, *Professor*.¹⁵ Ph.D., 1978, Columbia University: Genomics and cancer.

Number of teaching, graduate, and research assistantships, fall 2003: 87

- 1) Department of Biochemistry and Cell Biology
- 2) Department of Microbiology
- 3) Department of Neurobiology and Behavior
- 4) Department of Pharmacological Sciences
- 5) Department of Pathology
- 6) Department of Physiology and Biophysics
- 7) Department of Psychiatry
- 8) Department of Medicine
- 9) Department of Chemistry
- 10) Department of Oral Biology and Pathology
- 11) Department of Obstetrics and Gynecology
- 12) Department of Anatomical Sciences
- 13) Brookhaven National Laboratory

14) *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1975*

15) *Cold Spring Harbor Laboratory*

Degree Requirements

In addition to the minimum requirements of the Graduate School, the following are required:

A. Course Requirements

1. MCB 503 Molecular Genetics
2. MCB 517 Biomembranes
3. MCB 520 Graduate Biochemistry
4. MCB 656 Cell Biology
5. HBP 531 General Pathology
6. HBP 533 Immunology

Courses 1 through 6 are taken in the first and second years of the program. Students in the first year also rotate in four laboratories with the goal of selecting an environment for their post-first-year research.

B. Participation in HBP 691, Pathology Journal Club, HBP 590, Seminars in Immunology, and MCB 603/604, Student Seminars in Molecular Biology.

C. Satisfactory performance on a written qualifying exam following the third semester.

D. Submission and successful defense of a research proposal before a preliminary examination committee. This obligation must be addressed before the end of the sixth semester. The committee is selected by the graduate program director on the recommendation of the student and his or her advisor.

E. All students are required to gain faculty-guided experience in teaching. This requirement is generally completed in the first year. Most first-year students are supported by teaching assistantships.

F. When requirements A through E have been met, the student is advanced to candidacy and his or her research is monitored by a dissertation research committee that meets with the student at least once a year.

G. The dissertation committee recommends when the dissertation is suitable for presentation. A successful oral defense before the committee and a seminar before all faculty and graduate students are required before the Ph.D. degree is awarded.

Courses

HBP 511 Pathobiology for Graduate Health Care Practitioners

For graduate students who have obtained primary health care baccalaureate degrees through the case study approach. Covers the underlying principles of modern experimental pathology. Focuses on the clinical aspects of the body system, including relevant underlying biochemistry, structure, or pathophysiology at the organ, tissue, cell, or molecular level.
Prerequisites: Undergraduate degree; health care experience; biochemistry or cell biology; anatomy and microbiology; admission to graduate Health Sciences Center program Fall and spring, 3 credits, ABCF grading

HBP 531 General Pathology

Introduces the nature and causes of disease, death, reaction to injury, and repair. Analyzes associated structural changes in cells and tissues, with reference to their functional correlates.
Prerequisites: Histology, gross anatomy, physiology, and biochemistry, prior or concurrent microbiology, or permission of instructor; admission to graduate Health Sciences Center program Spring, 3 credits, ABCF grading

HBP 532 Medical Immunology

Introduces the principles of immunology for professional students, including definition of antigens and antibodies, description of cellular events in the immune response, theories of antibody formation, mechanism of inflammation, hypersensitivity states, and diseases associated with responsiveness of the immune system.
Prerequisites: Advanced course in biology, biochemistry, genetics, and histology (or taken concurrently); permission of the instructor; admission to graduate Health Sciences Center program Spring, 2 credits, ABCF grading

HBP 533 Immunology

Principles of immunology for graduate students in the biological sciences, including definition of antigens and antibodies, specificity of the immune response, immunoglobulin structure, the genetics of immunoglobulin synthesis, cellular cooperation in the immune response, hypersensitivity, tolerance immunogenetics. Open to advanced undergraduates.
Prerequisites: Advanced courses in biology and biochemistry; permission of instructor; admission to graduate Health Sciences Center program Fall, 3 credits, ABCF grading

HBP 546 Human Diseases: Mechanisms in Therapy

Human disease will be studied at biochemical and molecular cell lines. Aspects of mechanism will be considered with particular attention to pathogenesis and therapeutic intervention.
Prerequisite: Permission of instructor; admission to graduate Health Sciences Center program Spring, 3 credits, ABCF grading

HBP 553 Pathology of Neoplasia

Studies the nature and behavior of neoplastic tissue, the etiologies of cancer, the effect of tumors upon the host. Includes laboratories to acquaint the student lacking a background in histology or physiology with the appearance and behavior of cancer on the tissue and organ level.

Prerequisites: Permission of instructor; admission to graduate Health Sciences Center program
 Spring, 2 credits, ABCF grading

HBP 554 Advanced Immunology

Selected topics in immunology are discussed using original research literature as the central focus. Students present and discuss the literature in a seminar format.

Prerequisites: HBP 531 or 533; permission of instructor; admission to graduate Health Sciences Center program
 Spring, 2 credits, ABCF grading

HBP 556 Laboratory Medicine

A four-week, full-time course dealing with clinical laboratory decision making and the basis for the laboratory evaluation of human evaluation of human disease. Didactic and practical presentations by interdepartmental faculty. Intended principally for senior medical students, but also for advanced microbiology or biochemistry students interested in clinical applications.

Prerequisites: Permission of instructor; admission to graduate Health Sciences Center program
 Spring, 6 credits, ABCF grading

HBP 561 Electron Microscopy for Experimental Pathologists

Uses electron microscope (EM), alone and in conjunction with other methodologies in studies of biological dysfunction. Special techniques include histochemistry, enzyme histochemistry, immunohistochemistry, diffraction, stereo-EM and scanning EM. Design of protocols, preparation and interpretation of data.

Prerequisites: Permission of instructor; admission to graduate Health Sciences Center program
 Fall and spring, 2-6 credits, ABCF grading

HBP 580 Teaching Honors

Selected students whose performance in the basic required courses for the graduate program is in the top 10 percent conduct tutorials for first-year graduate students in the program and other students taking graduate courses for credit. The tutors are supervised and graded by program faculty of the graduate program. Successful completion of this course will make the students eligible to receive an "Honors in Teaching" on their transcript.

Prerequisites: Permission of instructor; admission to graduate Health Sciences Center program
 Fall and spring, 1 credit, ABCF grading

HBP 590 Seminars in Immunology

A series of monthly seminars focusing on research in progress by the participants, current journal articles in the field of immunobiology, and prepared reviews of specified areas in the general field.

Prerequisites: MCB graduate students; admission to graduate HSC program
 Fall and spring, 1 credit, S/U grading

HBP 622 Clinical Pathologic Correlations:**Gross Pathology**

Correlative exercises in clinical pathology and human gross anatomic pathology including surgical biopsy material. Open to students in medical sciences.

Prerequisites: Systems pathology and general pathology course; permission of instructor; admission to graduate Health Sciences Center program
 Fall, 1-3 credits, ABCF grading
 May be repeated for credit

HBP 691 Journal Club in Pathology

Provides students with a forum for acquiring skills involved in the critical analysis and presentation of scientific data by active participation in seminars of major topics in cellular and molecular pathology, and critical discussion of selected topics with presentation of papers from the literature.

Prerequisites: MCB graduate students; admission to graduate Health Sciences Center program
 Fall and spring, 1 credit, ABCF grading

HBP 800 Summer Research

Full-time laboratory research projects supervised by staff members.

Prerequisites: Permission of instructor; full-time graduate student status; admission to graduate Health Sciences Center program
 0 credits, S/U grading

HBP 966 Hematology Conference

Teaches a given aspect of hematology, oncology or immunology. Staff from medicine, pathology, and nuclear medicine participate, and usually presents a case to introduce the subject. Various teaching aids, such as review of pathological material, are used. Primarily for health sciences professionals.

Prerequisite: Permission of instructor; admission to graduate Health Sciences Center program
 1 - 3 credits, ABCF grading
 May be repeated for credit

HBP 967 Tumor Conference

Considers problems in the management of patients with a malignancy and recommendations for a course of therapy for each patient including a review of a particular aspect of cancer treatment or natural history in depth. Functions as the link between the hospital and the Eastern Oncology Cooperative Group. Primarily for health science professionals.

Prerequisite: Permission of instructor; admission to graduate Health Sciences Center program
 1-3 credits, ABCF grading
 May be repeated for credit

HBP 968 Advanced Clinical Pathologic Correlations: Gross Pathology

Postgraduate correlative exercises in human gross pathologic anatomy that emphasize the gross pathologic basis for altered function and clinical manifestations of disease. Open to physicians and others with advanced degrees in medical sciences.

Prerequisite: Permission of instructor; admission to graduate Health Sciences Center program
 1-3 credits, ABCF grading
 May be repeated for credit

HBP 969 Anatomical and Surgical Pathology for Residents in Pathology

To provide practical and clinical experience in tissue pathology. During the four week elective the student is given the opportunity to participate in all aspects of autopsies as well as gross and microscopic examination of surgical specimens. There is ongoing review of general and organ system pathology to reinforce structural-functional correlations. This elective is selected by students who plan a career in pathology as a "hands-on" introduction to the specialty. The elective is also chosen by others, particularly individuals who will enter radiology, and who seek to correlate radiographic and pathologic anatomy. Students who are sufficiently interested and motivated may become involved in relatively independent work-up of selected cases. Primarily for health sciences professionals.

Prerequisite: Permission of instructor; admission to graduate Health Sciences Center program
 1-3 credits, ABCF grading
 May be repeated for credit

HBP 970 Gross Neuropathology

This elective is intended to expose the student to what it means to be a neuropathologist and to allow the student to read and directly study major diseases of the brain, spinal cord, nerve and skeletal muscle. The focus of such study will be individualized. Available to the student will be (1) attendance at two weekly neuropathology autopsy brain clinical correlation conferences held at University Hospital and at the Suffolk County Medical Examiner's Office in Hauppauge; (2) individual autopsy brain case assignment with attending student review and case sign-out; (3) Neurosurgical, neuropathological rotation to include: review of films and patient data, participation in frozen section diagnosis and final neurosurgical sign out (at University Hospital only); (4) focus on peripheral nerve and skeletal muscle to include independent review of: clinical findings, muscle histochemistry, routine microscopy, electron microscopy, teased fiber preparations and immunofluorescence to be followed by participation at final case review and sign-out with neuropathology attending (at University Hospital only); (5) independent study of study sets, which include Kodachrome sets and microscope slide sets by topic (at University Hospital only).

Prerequisites: Permission of instructor; admission to graduate Health Sciences Center program
 1-3 credits, ABCF grading

HBP 971 Renal Clinicopathologic Correlations

A case-oriented, postgraduate course in renal biopsy interpretation and its relationship to patient management.

Prerequisites: M.D. or Ph.D. degree and clinical experience; admission to graduate Health Sciences Center program
 1 credit, ABCF grading
 May be repeated for credit