Molecular and Cellular Pharmacology Program

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Web Site
https://www.stonybrook.edu/commcms/mcp/index.php

Degrees Awarded
Ph.D. in Molecular and Cellular Pharmacology; MS in Biomedical Science (Molecular and Cellular Pharmacology track)

Application
https://graduateadmissions.stonybrook.edu/apply/

Molecular and Cellular Pharmacology Ph.D. Program

The faculty of the Department of Pharmacological Sciences, in conjunction with faculty in other departments at Stony Brook, offers the Graduate Program in Molecular and Cellular Pharmacology leading to the Ph.D. degree. Because the program emphasizes early research experience and provides a broad curriculum, students lay the foundation for subsequent independent research. Graduate research opportunities are provided in a broad range of areas including biochemical and molecular pharmacology, chemical pharmacology and toxicology, and cellular and physiological pharmacology. Students, in consultation with faculty advisors, pursue basic and elective courses and begin thesis research during the first two years of training. During this time, they participate in several research projects directed by faculty members associated with the program. Students then select a research advisor from the faculty and, upon completion of the qualifying exam, devote full effort to dissertation research. Students have the opportunity to perform research rotations and/or thesis research in any of 52 associated laboratories in Department of Pharmacological Sciences or other University departments or at Brookhaven National and Cold Spring Harbor Laboratories. Further details may be obtained from the graduate program director.

Admission Requirements of Molecular and Cellular Pharmacology Graduate Programs

For admission to the Graduate Program in Molecular and Cellular Pharmacology, the following, in addition to the minimum Graduate School requirements, are normally required:
A. A bachelor's degree in an appropriate field (biology, chemistry, biochemistry, microbiology, physics) with evidence of superior performance in science courses. Coursework in biochemistry, physical chemistry, organic chemistry, and physiology is highly recommended.
B. Three letters of reference are required.
C. TOEFL may be required for foreign students. GRE is not required.
D. Acceptance by both the Department of Pharmacological Sciences and the Graduate School.
E. Only Students accepted into the graduate Ph.D. graduate program = receive stipend support and full tuition scholarships. The current stipend level (2021-2022) is $30,900 and includes health insurance coverage.

Facilities of the Department of Pharmacological Sciences

The Department of Pharmacological Sciences is the primary training facility for graduate studies in Molecular and Cellular Pharmacology. The department occupies 32,000 square feet in the University's Basic Sciences Tower, 5,000 square feet in the Center for Molecular Medicine, and 5,000 square feet in the Graduate Chemistry Building. Faculty laboratories are equipped for all types of modern molecular and cell biological, biochemical, neurochemical, chemical, biophysical, and toxicological research. Specialized facilities are provided for tissue culture, recombinant DNA work, ultracentrifugation, scintillation and gamma spectrometry, transgenic mouse research, electron microscopy, confocal microscopy, molecular modeling, gas and high-performance liquid chromatography, proteomics, nuclear magnetic resonance, X-ray crystallography, and mass spectrometry. Research activities are supported by various shops, University computing facilities, animal-care facilities, and media services. Excellent library facilities, including include the Health Sciences Library, the Pharmacological Sciences Library and online resources, comprising of databases, E-books and E-journals, Program faculty members currently receive more than $14 million in annual research support from federal and private agencies.

Requirements for the Ph.D. Degree in Molecular and Cellular Pharmacology

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

A. Course Requirements
1. Biomolecular Structure & Analysis (CHE 541)

2. Graduate Physiology (HBY 501)

3. Biochemical Laboratory Techniques (HBH 545, HBH 546)

4. Cell Biology (MCB 656)

5. Principles of Pharmacology series (HBH 631, HBH 632)

6. Integrity in Science (GRD 500)

7. Proposal Preparation in Regulatory Biology (HBH 560)

8. One elective

9. Practicum in Teaching Pharmacology (HBH 601)

10. Journal Club (HBH 580)

11. Seminar (HBH 590)—every semester

12. Research (HBH 599 before advancement to candidacy, HBH 699 after advancement to candidacy).

Depending on prior course work, students may adjust these requirements with the consent of the Steering Committee of the Graduate Program.

B. Research Rotations
Students are required to complete three rotations in laboratories affiliated with the program during the first two semesters and the following summer. The host laboratory for thesis research is typically selected from one of these three rotations.

C. Qualifying Exam
In the second year, students are required to write and orally defend a research proposal on a topic unrelated to their thesis research.

D. Thesis Proposal Examination
In the fall semester of the third year, students select a thesis committee including three program faculty and one extramural faculty member to evaluate their written thesis proposal and their oral defense of the proposal.

E. Advancement to Candidacy
Following completion of coursework, and satisfactory performance on the qualifying examination and research proposal examination, students will be recommended to the Graduate School for advancement to Ph.D. degree candidacy.

F. Ph.D. Dissertation
The research for the Ph.D. dissertation is conducted under the supervision of the thesis committee. Upon approval of the completed dissertation by this committee, a dissertation examining committee is appointed by the Dean of the Graduate School. A formal public oral defense of the dissertation is scheduled, at which the student presents his or her findings and is questioned by members of the examining committee and by other members of the audience.

G. Teaching Requirement
It is expected that each graduate student completing a doctoral degree will have functioned as a teaching assistant during at least one semester of his or her graduate career (HBH 601).

H. Residence Requirement
The University requires at least two consecutive semesters of full-time graduate study. The demands of the program necessitate a longer period of residence.

I. Electives
To complete their course requirements, students must take one elective course. The following is a list of courses offered by other programs in the university. This subset of elective courses represents courses that are recommended or that students have taken in the last several years.

Biology: MCB 657 Principles of Development

Biology: MCB 517 Biomembranes

Biology: MCB 503 Molecular Genetics

Chemistry: CHE 542 Chemical Biology

Genetics: BGE 510 Graduate Genetics

Biochemistry: BMO 512 Physical Biochemistry

Microbiology: HBM 640 Mol. Mechanisms of Microbial Pathogenesis

Pathology: HBP 533 Immunology

Pharmacology: HBH 550 Statistics in the Life Sciences Pharmacology/Neurobiology: HBH 655 Neuropharmacology Pharmacology: HBH 585 Advanced Structure Biology/Structural Methods in Drug Discovery
Physiology: HBY 561 Statistical Analysis of Physiological Data

Physiology: HBY 564 Experimental Techniques in Systems Physiology

Requirements of the MS Degree in Biomedical Science (Molecular and Cellular Pharmacology track)

Completion will require 33 graduate level credits and a thesis. 23-28 credits in required courses, up to 6 credits in electives and 5-10 research credits.
Thesis-Option Requirements:
1. Principles of Pharmacology (HBH 501)
2. Advanced Pharmacology (HBH 502)
3. Seminar (three times) (HBH 590)
4. Graduate Biochemistry (MCB 520)
5. Cell Biology (MCB 656)
6. Integrity in Science (GRD 500)

7. Lab Methods (HBH 545, HBH 546)

8. Statistics (HBH 550)

9. Research (HBH 599)

Electives (choose 0 to 6 credits)
1. Principles of Development (MCB 657)
2. Signal Transduction (HBH 553)
3. Neuropharmacology (HBH 655)

4. Molecular Genetics (MCB 503)

5. Communicating Science (JRN 501-505)

7. Pharmacology Colloquium (HBH 506)

Final Written Thesis
In their final semester of the Program, students will select a thesis committee that includes three program faculty to evaluate their written thesis. Students will also give a seminar on their research during their final semester in the program.

Non-Thesis-Option Requirements:

1. Principles of Pharmacology (HBH 501)
2. Advanced Pharmacology (HBH 502)

3. Pharmacology Colloquium (HBH 506)
4. Seminar (three times) (HBH 590)
5. Graduate Biochemistry (MCB 520)
6. Cell Biology (MCB 656)
7. Integrity in Science (GRD 500)

8. Lab Methods (HBH 545, HBH 546)

9. Research (HBH 599)

Electives (choose 0 to 6 credits)
1. Principles of Development (MCB 657)
2. Signal Transduction (HBH 553)
3. Neuropharmacology (HBH 655)

4. Molecular Genetics (MCB 503)

5. Communicating Science (JRN 501-505)

6. Statistics (HBH 550)

The non-thesis option requires a total of 33 graduate level credits and a culminating literature review project that must be developed in consultation with the Program Director. Additional approved elective courses are also required, and must be chosen in consultation with the Program Director.

Faculty of the Molecular and Cellular Pharmacology Program

Distinguished Professors
Frohman, Michael A., Chair, M.D., Ph.D., 1985, University of Pennsylvania: Neural differentiation and signal transduction.

Grollman, Arthur P., M.D., 1959, Johns Hopkins University: Chemical carcinogenesis and mutagenesis.

Hannun, Yusuf, M.D., 1981, American University in Beirut. Sphingolipid metabolism.

Leading Professor

Cohen, Ira S., M.D., Ph.D., 1974, New York University: Electrophysiology of the heart.

Professors
Biegon, Anat, Ph.D., Weizmann Institute of Science; Brain response to traumatic, ischemic or inflammatory insults

Bogenhagen, Daniel, M.D., 1977, Stanford University School of Medicine: Replication, transcription and repair of mammalian mitochondrial DNA; mitochondrial proteomics.

Boon, Elizabeth, Ph.D., California Institue of Technology, 2003, Chemical Biology, Enzymology, Bioinorganic Chemistry, and Spectroscopy

Demple, Bruce, Ph.D.,UC Berkeley; Mechanisms and roles of human enzymes that repair oxidative (free radical) damage in DNA

Du, Congwu, Ph.D. Luebeck University, Germany; In vivo optical imaging of neuronal-glio-vascular interactions and the effects of drug-elicited brain functional changes.

Enikolopov, Grigori, Ph.D., Moscow State University; Adult neural stem cells and adult neurogenesis

Ghebrehiwet Berhane, D.V.M., D.Sc.: C1q receptor mediated cellular responses with particular emphasis on inflammation and microbial infection.

Hearing, Patrick, Ph.D., 1980, Northwestern University: Adenovirus regulation of cellular proliferation and gene expression; adenovirus vectors for human gene therapy.

Joshua-Tor, Leemor, Ph.D., 1991, The Weizmann Institute of Science. Nucleic acid regulation; RNAi; molecular recognition.

Karzai, Wali A., Ph.D., 1995, Johns Hopkins University: Biochemistry and structural biology of RNA-protein interactions, translational control of gene expression, and drug discovery.

Lin, Richard, M.D., University of California San Francisco. Intracellular signaling molecules that regulate cell growth.

Ma, Yupo, M.D., Ph.D., Jinhan College of Medicine/University of South Alabama. Leukemic stem cells/Stem cell therapy.

McKinnon, David, Ph.D., 1987, Australian National University, Australia: Molecular physiology of neurons and cardiac muscle.

Miller, W. Todd, Ph.D., 1987, Rockefeller University: Signal transduction by tyrosine kinases.

Miller, Lisa, Ph.D., 1995, Albert Einstein College of Medicine. The chemical makeup of tissue in disease using high-resolution infrared and xray imaging.

Moll, Ute M., M.D., 1970, Ulm, Germany: Tumor suppressor gene research; mechanism of p53 inactivation.

Reich, Nancy C., Ph.D., 1983, University at Stony Brook: Signal transduction and gene expression induced by cytokines and viral infection.

Rigas, Basil, M.D. 1972, Athens Univ Med School; D.Sc. 1975, Athens Univ. Med. School, Greece: NSAIDs in the prevention of colon cancer.

Rizzo, Robert, Ph.D. 2001, Yale University: Computational Research Projects in Cancer, HIV/AIDS, Influenza, and Method Development.

Sampson, Nicole, Ph.D., 1990, University of California, Berkeley: Integrin receptor interactions in mammalian fertilization/enzymology of cholesterol oxidase.

Simmerling, Carlos, Ph.D., 1994, University of Illinois, Chicago: Computational chemistry and structural biology; molecular dynamics of biological macromolecules.

Shroyer, Kenneth, M.D. 1987, Ph.D. 1983, University of Colorado. The molecular characterization of benign, premalignant, and malignant lesions of the female genital tract

Tonge, Peter, Ph.D. 1986, University of Birmingham, England: Biological chemistry and enzyme mechanisms; quantitating substrate strain in enzyme-substrate complexes using vibrational spectroscopy; rational drug design.

Tsirka, Styliani-Anna (Stella) E., Graduate Program Director, Ph.D., 1989, University of Thessaloniki, Greece: Neuronal-microglial interactions in the physiology and pathology of the central nervous system.

Tuveson, David, M.D./Ph.D., Johns Hopkins University; Detection and treatment of pancreatic cancer

Van Nostrand, William, Ph.D., 1985, University of California: Cerebrovascular pathology in Alzheimer's disease and related disorders

White, Thomas, Ph.D., 1994, Harvard University; Molecular biology and physiology of gap junction channels.

Wollmuth, Lonnie, Ph.D., 1992, University of Washington: Molecular mechanisms of synaptic transmission.

Associate Professors

Bowen, Mark, Ph.D., University of Illinois, 1998, Single molecule spectroscopy; Coordination of post-synaptic glutamate receptor signaling by the MAGUK family of scaffolds.

Carpino, Nicolas, Ph.D., 1997, Stony Brook University. Positive and Negative Regulation of T cell Receptor Signaling.

Carrico, Isaac, Ph.D., 2003, California Institute of Technology. Chemical Biology, Bioorganic Chemistry and Protein Engineering

Colognato, Holly, Ph.D. 1999, Rutgers University: Extracellular matrix in the brain: roles during development and during neurodegeneration.

Chung, Jun, Ph. D. 1999, Washington University in St. Louis. Cancer invasion and metastasis.

Egeblad, Mikala, Ph.D., University of Copenhagen, 2000. Tumor microenvironment; intravital imaging; tumor-associated myeloid cells; breast cancer.

Enikolopov, Grigori N., Ph.D. 1978, Institute of Molecular Biology, USSR Academy of Science: Stem cells; neurogenesis; development; signal transduction

Garcia-Diaz, Miguel; Ph.D. 2003, University Autonoma of Madrid, Spain: Mechanisms of mitochondrial gene expression/Mechanisms of DNA synthesis and repair.

Ge, Shaoyu, Ph.D. University of Science and Technology (China). To examine the functional integration of new neurons into brain circuits

Luk, Ed, Ph.D., How cells organize chromatin structure to accommodate and control gene expression.

Martin, Benjamin, Ph.D., Molecular basis of stem cell development and cancer pathogenesis.

Martinez, Luis, Ph.D. 1994, University of Texas at Austin. Alterations of p53 in cancer development.

Okeoma, Chioma, Ph.D.; Host factors in viral pathogenesis and breast oncogenesis

Seeliger, Markus, Ph.D., 2003, Cambridge University, Trinity College; Using NMR and ligand binding kinetics to study Abl and Src kinase domains.

Takemaru, Ken-Ichi, Ph.D., 1997, Graduate University for Advanced studies, Japan: Wnt Signaling in Development and Disease.

Van der Velden, Adrianus, Ph.D., Oregon Health and Science University; The mammalian T cell response to Salmonella enterica serovar Typhimurium

Assistant Professors

Acosta-Martinez, Maricedes, PhD. 202, Albert Einstein College of Medicine; Neuroendocrine regulation of the hypothalamus-pituitary-gonad (HPG) axis.

Brouzes, Eric, Ph.D. Institut Curie, Paris. Analyzing heterogeneity of cancer tissues.

Chan, Chia-Hsin, Ph.D. National Taiwan University. Cancer Metabolism and Stemness.

Dos Santos, Camila, Ph.D. Universidade Estadual de Campinas, Brazil; epigenetic regulation of normal and malignant mammary gland development.

Glynn, Steven, Ph. D. The University of Sheffield. Proteolytic machines in mitochondria.

Kaczocha, Martin, Ph.D., Stony Brook University; Neuroscience, acute and chronic pain, drug development, lipid signaling.

Kim, Hyungjin, Ph.D., Washington University in St. Louis. Regulation of DNA repair in cancer susceptibility pathways.

Matus, David, Ph.D., University of Hawaii; Cell, developmental and evolutionary biological approaches to understand cell invasion

Moffitt, Richard, Ph.D., 2009, Georgia Institute of Technology; Bioinformatics, personalized medicine, pancreatic adenocarcinoma, mixture modeling.

Monstrose, David, Ph.D. University of Connecticut; Colon cancer, inflammatory bowel disease, microbiota, metabolism.

Plotkin, Joshua, Ph.D. UCLA; Striatal microcircuitry underlying normal behavior and disorders such as OCD

Puopolo, Michelino, Ph.D., University of Ferrara; Ion channels and neuronal excitability. Mechanisms of pain.

Seeliger, Jessica, Ph.D., Stanford University. Membrane biosynthesis, structure & behavior in bacterial pathogenesis

Talos, Flaminia, Ph.D., 2006, Stony Brook University; Specification and clonal fate analysis of prostate epithelial cells in organogenesis and cancer.

Tan, Dongyan, Ph.D., Albert Einstein College of Medicine; Structure and function of macromolecules in epigenetic regulation

Zhan, Huichun, M.D., Peking Union Medical College; Pathogenesis and treatment of myeloproliferative neoplasms.

Number of teaching, graduate, and research assistants, Fall 2018: 42

NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.