Pharmacology (BCP)

Major in Pharmacology
Department of Pharmacological Sciences, College of Arts and Sciences

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Minors of particular interest to students majoring in Pharmacology: Biomaterials (BES), Bioengineering (BNG), Biomedical Engineering (BME), Chemistry (CHE), English (EGL), Philosophy (PHI), Political Science (POL)

Faculty

Miguel Berrios, Research Associate Professor, Ph.D., Rockefeller University: Characterization of the nucleoskeleton; nuclear pore complexes.
Daniel Bogenhagen, Professor, M.D., Stanford University: Mitochondrial molecular biology; 5S RNA gene expression.
Roger Cameron, Assistant Professor, Ph.D., Stony Brook University: Electron Microscopy; pharmacology of plasma cells secretion.
Holly Colognato, Assistant Professor, Ph.D., Rutgers University: Extracellular matrix molecules and their receptors in the central nervous system.
Kim Conlon, Instructor, Ph.D., University of Connecticut: Nuclear structure and function; the cell biology of oxidative DNA damage and repair.
Howard Crawford, Assistant Professor, Ph.D., Vanderbilt University: Pancreatic cancer.
Carlos de los Santos, Assistant Professor, Ph.D., University of Buenos Aires, Argentina: NMR solution structure of nucleic acids and proteins.
Moises Eisenberg, Professor, Ph.D., California Institute of Technology: Molecular modeling of biomolecules.
Paul A. Fisher, Professor, M.D., Ph.D., Stanford University: The extrachromosomal karyokle- tor/ekaryotic DNA replication.
Michael Frohman, Professor, M.D., Ph.D., University of Pennsylvania: Control of gene expression during mammalian embryogenesis.
Arthur P. Grollman, Distinguished Professor and Evelyn Glick Professor of Experimental Medicine, M.D., Johns Hopkins University: Molecular mechanism of cardinogenesis and DNA repair.
Charles R. Iden, Associate Professor, Ph.D., Johns Hopkins University: DNA damage produced by genotoxic substances.
Francis Johnson, Professor, Ph.D., Glasgow University: Inhibition of HIV-1 (AIDS) using rationally designed drugs; effects of chemical carcinogens on DNA.
Caroline F. Kisker, Associate Professor, Ph.D., Freie Universitat Berlin: Structural biology; x-ray crystallography in combination with biochemical methods.
Feng-Qian Li, Research Assistant Professor, Ph.D., University of Washington: Roles of Cby in the Wnt/ β-Catenin pathway.
Craig C. Malbon, Leading Professor, Ph.D., Case Western Reserve University: Signal transduction during differentiation and development; roles of G-proteins.
Holly Miller, Research Assistant Professor, Ph.D., Wake Forest University: DNA replication and mutagenesis.
Masaki Moriya, Research Associate Professor, Ph.D., Nagoya University, Japan: Cellular Response to DNA Damage.
Jeffrey Pessin, Professor, Ph.D., University of Illinois: Identification of insulin-mediated signaling cascades; Regulation of intracellular GLUT4 vesicle trafficking and biogenesis.
Joav Prives, Professor, Ph.D., McGill University: Regulation of surface receptors in muscle cells.
Edward Reich, Distinguished Professor Emeritus, M.D., Ph.D., Johns Hopkins University: Biochemistry of plasma proteins; new therapeutic systems.
Thomas A. Rosenquist, Research Assistant Professor, Ph.D., University of Wisconsin: Genetic analysis of mammalian DNA repair; genetic analysis of fibroblast growth factors.
Shinya Shibutani, Research Professor, Ph.D., Toyama Medical and Pharmaceutical University: Mechanisms of translesional DNA synthesis.
Ken-Ichi Takemaru, Assistant Professor, Ph.D., University of Washington: Wnt Signaling in Development and Disease.
Fayanne Thorngate, Instructor, Ph.D., University of North Carolina, Chapel Hill: Atherosclerosis and Peripheral Apoprotein E Synthesis.
Stella-Anna E. Tsirka, Associate Professor, Ph.D., Aristotlean University of Thessaloniki: Extracellular proteolysis in hippocampal function and degeneration.

Faculty with Joint Appointments with Pharmacological Sciences

Paul Adams, Professor, Ph.D., London University, England: Department of Neurobiology and Behavior
Laura Fochtmann, Associate Professor, M.D., University of Washington: Department of Psychiatry and Behavioral Sciences
Dax Fu, Assistant Professor, Ph.D., Mayo Graduate School of Medicine: Brookhaven National Laboratory

Sidonie Morrison, Associate Professor of Medicine, D.Phil., University of Oxford England: Department of Medicine
Roy Steigbigel, Professor, M.D. University of Rochester: Department of Medicine
Joel L. Sussman, Professor, Ph.D., Brookhaven National Laboratory and Weizmann Institute of Science
Stephen A. Vitkun, Professor and Vice-Chairman, M.D., Pacific Western University: Department of Anesthesiology
William Van der Kloot, Professor Emeritus, Ph.D., Harvard University: Department of Physiology and Biophysics

Affiliated Faculty

James Dilger, Anesthesiology
Howard Sussman, M.D., Family Medicine

Pharmacology is an interdisciplinary science which investigates the actions of drugs and chemicals on biological systems. It requires a knowledge of the sources, chemical properties, biological effects, and therapeutic uses of drugs. It is a science that is basic not only to medicine but also to pharmacy, nursing, dentistry, and veterinary medicine. Pharmacological studies range from those that determine the effects of chemical agents upon subcellular mechanisms, to those that deal with the potential hazards of drug therapy for major diseases. By unlocking mysteries of drug action, discovering new therapies, and developing new medicinal products, pharmacology inevitably touches upon all of our lives.

The curriculum in Pharmacology, leading to the Bachelor of Science degree, is designed to prepare students for careers in drug research and development and to provide a solid background for those students who choose to pursue graduate studies in the pharmacological sciences. Focusing on cellular, molecular, and human pharmacology, the program allows students to develop an understanding of this discipline in a basic science teaching and research environment.
Students majoring in Pharmacology have the conceptual and practical knowledge to pursue technical and professional careers in all areas of drug research and development within the pharmaceutical and biotechnology industry, research institutes, and government agencies. The program provides an excellent foundation for graduate programs in pharmacology, toxicology, and molecular biology. The Pharmacology curriculum teaches students the principles of pharmacology and toxicology and mechanisms of drug action to students whose career interests lie in medicine, and other branches of health care and life sciences. Current career objectives in order of choice are Ph.D. programs in pharmacology, M.D./Ph.D., and M.D. degrees, and entry-level scientist positions in industry.

Courses Offered in Pharmacology
See the Course Description listing in this Bulletin for complete information.
- BCP 394-H Environmental Toxicology and Public Health
- BCP 400 Writing in Pharmacology
- BCP 401 Principles of Pharmacology
- BCP 402 Advanced Pharmacology
- BCP 403 Principles of Pharmacology Laboratory
- BCP 404 Advanced Pharmacology Laboratory
- BCP 406 Pharmacology Colloquium
- BCP 475 Undergraduate Teaching Practicum in Pharmacology
- BCP 487 Research in Pharmacology
- BCP 488 Internship

Acceptance into the Undergraduate Pharmacology Program
Acceptance into the program requires an application process involving reference letters, a personal statement, and an interview. Applications are available through the Undergraduate Pharmacology Web site at http://www.pharm.stonybrook.edu/undergraduate/Pages.

Requirements for the Major in Pharmacology (BCP)
The major in Pharmacology leads to the Bachelor of Science degree. All courses offered for the major must be taken for a letter grade. In the requirements listed below, a minimum grade point average of 3.00 must be obtained for all 100-level and upper-division courses.

Sample Course Sequence for the Major in Pharmacology

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>Freshman</td>
<td>D.E.C. A</td>
<td>3</td>
<td>D.E.C. A</td>
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<tr>
<td></td>
<td>CHE 131</td>
<td>4</td>
<td>CHE 132</td>
<td>4</td>
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<td>CHE 133</td>
<td>1</td>
<td>CHE 134</td>
<td>1</td>
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<tr>
<td></td>
<td>MAT 131</td>
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<td>MAT 132</td>
<td>4</td>
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<tr>
<td></td>
<td>D.E.C.</td>
<td>3</td>
<td>D.E.C.</td>
<td>3</td>
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<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td>Total</td>
<td>15</td>
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</tbody>
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| Sophomore | CHE 321 | 3 | BIO 203 | 3 |
| Fall | BIO 202 | 4 | CHE 322 | 3 |
| | D.E.C. | 3 | CHE 327 | 2 |
| | D.E.C. | 3 | D.E.C. | 4 |
| | D.E.C. | 3 | D.E.C. | 3 |
| | Total | 16 | Total | 15 |

| Junior | PHY 121/123 | 4 | PHY 122/124 | 4 |
| Fall | BIO 361 | 3 | BIO 362 | 3 |
| | BIO 365 or 311 | 2 | BIO 310 | 3 |
| | HBY 350 | 3 | BCP 406 | 2 |
| | D.E.C. | 3 | D.E.C. | 3 |
| | Total | 15 | Total | 15 |

| Senior | BCP 401 | 3 | BCP 402 | 3 |
| Fall | BCP 403 | 2 | BCP 404 | 2 |
| | Upper-Division elective | 3 | BCP 406 | 1 |
| | Elective | 3 | **BCP 487 | 1 |
| | Elective | 3 | Elective | 3 |
| | Total | 14 | Total | 15 |

**BCP 487 research project is usually begun by the fall semester of the senior year.

Completion of the major requires approximately 66-67 credits.

A. Courses in Related Fields
1. CHE 131, 132 General Chemistry or CHE 141, 142 Honors Chemistry
2. CHE 133, 134 General Chemistry Laboratory or CHE 143, 144 Honors Chemistry Laboratory
3. CHE 321, 322 Organic Chemistry or CHE 331, 332 Honors Organic Chemistry
4. CHE 327 Organic Chemistry Laboratory A or CHE 333 Organic Chemistry Laboratory B
5. MAT 131, 132 Calculus I, II (See Note 1)

B. Courses in Biological Sciences
1. BIO 202 and 203 Fundamentals of Biology
2. BIO 310 Cell Biology
3. HBY 350 Physiology (BIO 328 will be allowed as a substitute under extenuating circumstances.)
4. BIO 361, 362 Biochemistry I, II
5. BIO 365 or BIO 311 Biochemistry Laboratory

C. Pharmacology
1. BCP 400 Writing in Pharmacology
2. BCP 401 Principles of Pharmacology
3. BCP 402 Advanced Pharmacology
4. PHY 121/123, 122/124 Physics for the Life Sciences and labs (See Note 1)
4. BCP 403 Principles of Pharmacology Laboratory
5. BCP 404 Advanced Pharmacology Laboratory
6. BCP 406 Pharmacology Colloquium
7. BCP 487 Pharmacology Research (for at least 3 credits)

D. Upper-Division Writing Requirement
To fulfill the upper-division writing requirement in Pharmacology, a sample of writing from an upper-division course in biological sciences, must be submitted to the Department of Pharmacological Sciences for evaluation by the Pharmacology writing committee. This writing sample can be a laboratory report, a term paper, or a report for a reading or research course, and it must contain at least 750 words of text. It is to be accompanied by a form (available in the Department of Pharmacological Sciences office) signed by the student and the instructor of the course for which the material was written. The student must enroll in BCP 400 Writing in Pharmacology for the semester in which the upper-division writing requirement is being attempted. The deadline for submission of the writing sample is December 1 for students graduating in the following May or August, and May 1 for students graduating in the following December. If the writing in this sample is judged to be satisfactory by the writing committee, the requirement is fulfilled. If the writing is judged unsatisfactory, the student is advised to seek help in writing skills from the Writing Center and must pass a writing examination administered by the Department of Pharmacological Sciences at a scheduled time prior to graduation.

E. Courses Recommended but not Required for the Major
BCP/MAR 394 Environmental Toxicology and Public Health
BCP 475 Undergraduate Teaching Practicum I
BCP 488 Internship
BIO 320 General Genetics
CHE 301 Physical Chemistry I
CHE 302 Physical Chemistry II
CHE 312 Physical Chemistry (Short Course)

Note: The following alternate sequences may be substituted for major requirements:
for MAT 131, 132:
- MAT 125, 126, 127
  or MAT 141, 142
for PHY 121/123, 122/124:
- PHY 131, 132
  or PHY 141, 142
  or PHY 125, 126, 127

Honors Program in Pharmacology
Graduation with honors in Pharmacology requires: 1) a cumulative grade point average of 3.50 or higher in all courses in Requirements A, B, and C above, and 2) presentation of an acceptable thesis based on a research project performed under BCP 487, written in the format of a paper in a scientific journal. A student interested in becoming a candidate for honors should submit an outline of the proposed thesis research project to the Department’s honors coordinator as early as possible, but no later than the second week of classes in the last semester. (Acceptance of a project for BCP 487 registration does not imply automatic acceptance of that project for honors.) The honors coordinator in consultation with the student then appoints a thesis committee consisting of the research sponsor and two additional faculty members. Two members of the thesis committee must be members of the Department of Pharmacological Sciences and one must be a member of another department in a related field.

Three copies of the finished thesis, approved by the research sponsor, must be presented to the honors coordinator at least 21 days before the date of graduation. The honors coordinator then submits the thesis for final approval to the other two members of the thesis committee.