Pharmacology (BCP)

Major in Pharmacology

**Department of Pharmacological Sciences, College of Arts and Sciences**

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**Web Address:** http://www.pharm.stonybrook.edu/undergraduate/Pages

Minor 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; SS RNA gene expression.

Emily Chen, Assistant Professor, Ph.D., University of California San Diego: Breast Cancer Metastasis and Shotgun Proteomics.

Holly Colognato, Assistant Professor, Ph.D., Rutgers University: Extracellular matrix molecules and their receptors in the central nervous system.

Kim Conion, Instructor, Ph.D., University of Connecticut: Nuclear structure and function; the cell biology of oxidative DNA damage and repair.

Howard Crawford, Associate Professor, Ph.D., Vanderbilt University: Pancreatic cancer.

Carlos de los Santos, Associate Professor, Ph.D., Universidad de Buenos Aires, Argentina: NMR solution structure of nucleic acids and proteins.

Kate Dickman, Assistant Professor, Ph.D., University of Connecticut: Cellular and molecular mechanisms of toxic injury to the kidney.

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 karyokletoekaryokytic DNA replication.

Michael Frohman, Professor and Chairman, M.D., Ph.D., University of Pennsylvania: Signal transduction and lipid second messengers in diabetes; cancer the immune response; mitochondrial biology.

Miguel Garcia-Diaz, Assistant Professor, Ph.D., University of Madrid, Spain: Nucleic acids metabolism and environmental health.

Arthur P. Grollman, Distinguished Professor and Evelyn Glick Professor of Experimental Medicine, M.D., Johns Hopkins University: Molecular mechanism of cardogenesis 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.

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.

Masaaki Moriya, Research Professor, Ph.D., Nagoya University, Japan: Cellular Response to DNA Damage.

Joav Prives, Professor, Ph.D., McGill University: Regulation of surface receptors in muscle cells.

Thomas A. Rosenquist, Research Assistant Professor, Ph.D., University of Wisconsin: Genetic analysis of mammalian DNA repair; genetic analysis of fibroblast growth factors.

Orlando Scharer, Associate Professor, Ph.D., Harvard University: Chemical biology of mammalian DNA repair.

Shinya Shibutani, Research Professor, Ph.D., Toyama Medical and Pharmaceutical University: Mechanisms of translational DNA synthesis.

Ken-Ichi Takemaru, Assistant Professor, Ph.D., University of Washington: Wnt Signaling in Development and Disease.

David Talmage, Associate Professor, Ph.D., University of Minnesota: Neuregulin-erbB receptor signaling in the nervous system: neuronal survival and synapse formation and maintenance.

Styliani E. Tsirka, Associate Professor, Ph.D., Aristotelian University of Thessaloniki: Extracellular proteolysis in hippocampal function and degeneration.

Robert Watson, Instructor, Ph.D., University of Iowa: Insulin-stimulated translocation of the GLUT4 glucose transporter.

Noriko Yokoyama, Research Assistant Professor, Ph.D., Nihon University, Japan: Molecular mechanisms of Wnt signaling pathway.

**Faculty with Joint Appointments with Pharmacological Sciences**

Laura Fochtman, 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

Leemor Joshua-Tor, Professor, Ph.D., The Weizmann Institute of Science, Israel: Cold Spring Harbor Laboratory

Irwin Kurland, Associate Professor, M.D., University of Southern California, Ph.D., Vanderbilt University: Department of Medicine

Sidonie Morrison, Associate Professor of Medicine, D.Phil., University of Oxford England: Department of Medicine

Basil Rigas, Professor, M.D., D.Sc., Athens University Medical School, Greece: 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

Panayotis (Peter) K. Thanos, Scientist, Ph.D., East Virginia Medical School, Brookhaven National Laboratory

Stephen A. Vitkun, Professor and Vice-Chairman, M.D., Pacific Western University: Department of Anesthesiology

**Affiliated Faculty**

James Dilger, Anesthesiology

Barbara Messina, Department of Nursing

Howard Sussman, 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

Sample Course Sequence for the Major in Pharmacology

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<th>Freshman Fall</th>
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<td>CHE 132</td>
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**BCP 487 research project is usually begun by the fall semester of the senior year.**

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. Note: Students may not declare a double major among biology, biochemistry, and pharmacology.

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.

Completion of the major requires approximately 68-69 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
PHARMACY

5. MAT 131, 132 Calculus I, II
   (See Note 1)
6. PHY 121/123, 122/124 Physics for
   the Life Sciences and labs
   (See Note 1)

B. Courses in Biological Sciences
1. BIO 202 and 203 Fundamentals of
   Biology
2. BIO 204 and 205 Fundamentals of
   Scientific Inquiry I and II
3. BIO 310 Cell Biology
4. HBY 350 Physiology (BIO 328 will
   be allowed as a substitute under
   extenuating circumstances.)
5. BIO 361, 362 Biochemistry I, II
6. 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. BCP 403 Principles of
   Pharmacology Laboratory
5. BCP 404 Advanced Pharmacology
   Laboratory
6. BCP 406 Pharmacology Colloquium
7. BCP 487 Pharmacology Research
   (at least 3 credits are required to
   graduate, along with a written sen-
   ior thesis)

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 evalu-
tion 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 com-
mittee, 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 sched-
uled 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
   or MAT 171
   for PHY 121/123, 122/124:

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 outstanding 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
Pharmacology Director; no later than the
second week of classes in the last semes-
ter. (Acceptance of a project for BCP 487
registration does not imply automatic
acceptance of that project for honors.)
The Director, in consultation with the
student, then appoints a thesis commit-
tee 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.

Copies of the finished thesis, approved
by the research sponsor, must be pre-
sented to the Pharmacology Director and
thesis committee at least 21 days before
the date of graduation.