

# HBH

## Pharmacology

### HBH 501: Principles of Pharmacology

Basic principles and mechanism of drug distribution, absorption, metabolism and elimination. Principles of chemical carcinogenesis and tumor promotion. Autonomic, Smooth Muscle and CNS Pharmacology. Pharmacology of specific drugs of historical interest including alcohol, antibiotics, aspirin, nicotine and morphine. Review of anticoagulants & thrombolytic agents, antiparasitic, and drugs for the treatment of allergic conditions and gout. Includes discussion of specific cases taken from clinical practice and a presentation based on a set of selected readings. Crosslisted with BCP 401

*Fall, 4 credits, Letter graded (A, A-, B+, etc.)*

### HBH 502: Advanced Principles of Pharmacology

Advanced concepts of drug metabolism, pharmacokinetics, biochemical and molecular mechanisms of drug action and drug resistance in human disease states. Toxicological agents and environmental pollutants. The pharmacology of autocoids, anti-inflammatories, immunosuppressants and anti-asthmatics. Rational drug design and drug receptor interactions using computer molecular modeling techniques. Includes discussion of specific cases taken from clinical practice and a presentation based on a set of selected readings. Cross-listed with BCP 402

*Spring, 4 credits, Letter graded (A, A-, B+, etc.)*

### HBH 505: Pharmacology to Pharmacy: Practical Clinical Aspects for Non-Clinicians (Didactic)

This course, to be offered exclusively online, is designed for students interested in health care (either basic medical science-oriented or clinical). The class introduces many aspects of clinical pharmacology, but is geared toward non-clinicians. Clinical Vignettes and case discussions will be presented. Several medical procedures will be first described and then demonstrated. Understanding these procedures will be integral to appreciating the vignettes and clinical case discussions. The multidisciplinary course faculty will include physicians, scientists, educators, nurses and pharmacists. Enrolled students will have the opportunity to ask questions directly through online chats.

*0-3 credits, S/U grading*

### HBH 506: Graduate Pharmacology Colloquium

Research seminars in pharmacology and toxicology presented by faculty and distinguished scientists from academic and industrial institutions. A 1 hr. Journal Club/ Discussion Session precedes seminar to review a reference paper relevant to the research concepts to be presented. Students are expected to develop an understanding of the scientific principles given in the colloquium. Students are required to give a formal presentation. Co-scheduled with BCP 406. Offered

*Spring, 2 credits, Letter graded (A, A-, B+, etc.)*

*May be repeated 1 times FOR credit.*

### HBH 510: Practical Clinical Exposure for Translational Basic Scientists Hospital Clinical Rotations-Physician

Course faculty will arrange two, two-week-long rotations (four weeks total). The following services are committed to participate: Anesthesiology-students will be offered opportunities in operating room (OR) observation; pre-admission patient evaluations; pain management clinic; and others depending upon availability. Internal Medicine-students will be offered opportunities in the medical intensive care unit (MICU); coronary care unit (CCU); medical oncology; and others depending upon availability. Others depending upon availability. Student will be expected to spend 3-4 hours daily in their assigned clinical activates (15-20 hours weekly; 60-80 hours for the course). In addition, they will be asked to participate in special medical exercises arranged for them on an ad hoc basis by course faculty, both in the hospital pharmacy and elsewhere. Finally all students will attend weekly case conferences, 2hr each for all 4 weeks. At these conferences, students will be asked to prepare and present two clinical cases, based on two of the patients they have seen on their clinical rotations. It is expected that each student will be responsible for at least two presentations during the four-week course. Presentations will be graded by course faculty, S (satisfactory) or U (unsatisfactory). The final grade for the course, also S or U, will be determined both by these grades as well as by overall attendance at all course activities.

*0-3 credits, S/U grading*

*May be repeated for credit.*

### HBH 531: Pharmacology-Dental

Basic principles that underlie actions of drugs on physiological processes with particular reference to their therapeutic and toxic actions. For medical and dental students. Prerequisites: Physiology, biochemistry, permission of

instructor and admission to Graduate Health Sciences Center Program. Modules 4-6, *5 credits, Letter graded (A, A-, B+, etc.)*

### HBH 545: Biochemical Laboratory Techniques

Introduces theoretical principles and experimental techniques used in modern biochemical research. Lectures and homework assignments explore topics in basic molecular and cellular techniques. Prerequisites: Admission to Health Sciences Center program.

*Fall, 1 credit, Letter graded (A, A-, B+, etc.)*

*May be repeated 2 times FOR credit.*

### HBH 546: Biochemical Laboratory Techniques

Continuation of HBH545. Lectures and demonstrations present topics in chromatography, mass spectrometry, protein sequencing, sedimentation, electrophoresis, ligand binding, basic pharmacological methods and statistical analysis of data. Includes procedures for the safe handling of toxic chemicals and radioisotopes. Prerequisites: Permission of instructor, admission to graduate Health Sciences Center program.

*Spring, 1 credit, Letter graded (A, A-, B+, etc.)*

*May be repeated 2 times FOR credit.*

### HBH 549: Legal & Regulatory Issues in Clinical Research combined with Ethics & Professionalism in Clin. Rsrch.

Some of the sessions are part of the SBU course on Responsible Conduct of Research and Scholarship (RCRS, formerly known as GRD 500). During the course, major contemporary issues in legal and regulatory arenas associated with scientific research are discussed. The course introduces students to the history behind the regulations that safeguard human subjects, and educates students in detail about their responsibilities as clinical investigators. Using an interactive case based format the topics covered include: justification for human research and reasonable balance of risk versus benefits; the use of animals in research; informed consent; the ethical challenges of clinical research; ethical concerns associated with genetic testing and screening; research in minors and adults of questionable capacity to consent; conflict of interest; investigator responsibilities with regard to fulfilling government regulation; scientific fraud and whistle blowing; the scientific community and mentoring; authorship and attribution; special populations and inclusion of minorities; and emergency research-related special requirements.

*1 credit,*

### HBH 550: Statistics in Life Sciences

This course covers statistical concepts and issues in the life sciences. Basic algebra is assumed as a prerequisite. Topics covered include: descriptive statistics, foundation of statistical inference, sampling distribution, point estimate and confidence interval, comparison of independent and paired samples, analysis of categorical data, correlation, ANOVA, linear regression, and nonparametric test.

*1 credit, S/U grading  
May be repeated for credit.*

### **HBH 560: Proposal Preparation in Regulatory Biology**

A literature-based course focusing on major research areas in molecular and biochemical pharmacology. The first part of the course will expose students to a series of examples of recent grant proposals. The second part of the course will feature student presentations of their research proposals. Due to the coordination of this course with the Qualifying Exam, registration is limited to Pharmacology graduate students.

*Fall and Spring, 2 credits, S/U grading  
May be repeated 2 times FOR credit.*

### **HBH 580: Selected Topics in Pharmacology**

Student seminars and readings on topics arranged through consultation with staff.

*0-1 credits, Letter graded (A, A-, B+, etc.)  
May be repeated for credit.*

### **HBH 585: Advanced Structural Biology/Structural Methods in Drug Discovery**

This course is designed for students that want to gain theoretical and practical experience in macromolecular structure determination through NMR spectroscopy and/or X-ray crystallography. The course is organized into two modules: NMR spectroscopy and X-ray crystallography. Students may elect to take one or both modules. Emphasis will be placed on practical aspects of structural determination, including sample preparation, data collection and processing. In each of the modules, students will be guided through a complete structural determination project. A final project report per module will be required. Familiarity with Linux is desirable. Students are encouraged to contact instructors prior to enrolling. Crosslisted as BSB580 and HBH585.

*Spring, 0-4 credits, S/U grading*

### **HBH 590: Pharmacology Seminars**

Advanced research seminars by staff and visiting lecturers.

*Prerequisites: Full-time pharmacology graduate status  
Fall and Spring, 0-1 credits, S/U grading  
May be repeated for credit.*

### **HBH 599: Graduate Research in Pharmacological Sciences**

Original research projects under faculty supervision.

*Prerequisites: Full-time pharmacology graduate status  
Fall, Spring, and Summer, 0-12 credits, Letter graded (A, A-, B+, etc.)  
May be repeated for credit.*

### **HBH 601: Practicum in Teaching Pharmacology**

Practical experience and instruction in the teaching of pharmacology carried out under faculty orientation and supervision.

*Prerequisites: Full-time pharmacology graduate status  
Fall and Spring, 0-1 credits, S/U grading  
May be repeated 5 times FOR credit.*

### **HBH 631: Graduate Pharmacology I**

Basic principles of pharmacology will be discussed including pharmacokinetics and pharmacodynamics in both normal and various disease states. Major problems in human pharmacology will be considered including obesity, diabetes, hypertension and heart failure. Underlying physiology as well as pathophysiologic background will be presented. Drug design and development will be discussed from both scientific and socio-economic perspectives.

*Prerequisites: Graduate Biochemistry, Physiology HB561 or consent of instructor.  
Fall and Spring, 3 credits, Letter graded (A, A-, B+, etc.)  
May be repeated 2 times FOR credit.*

### **HBH 632: Graduate Pharmacology II**

This course introduces second-year graduate students to chemotherapy agents used to combat bacterial and viral infections as well as cancers. The course develops a detailed understanding of the strategies involved in identifying drug targets in these two diverse therapeutic settings. The antibacterial lectures emphasize the problem of drug resistance and the need to develop new agents to combat resistant organisms. The anti-cancer lectures begin with a comprehensive analysis of the molecular basis of cellular transformation leading to neoplastic disease. Lectures on cancer therapy emphasize the contrast between conventional cytotoxic chemotherapy and novel therapeutic approaches guided by recent developments in cancer research. Novel computational biology and structural biology

approaches are featured throughout the course. Each student is expected to make two formal journal-club style presentations during the course and to actively participate in group discussion.

*0-3 credits, Letter graded (A, A-, B+, etc.)  
May be repeated 2 times FOR credit.*

### **HBH 633: Quantitative Methods in Pharmacology**

This course introduces second-year graduate students to the quantitative approaches that underlie modern research in Pharmacology. Students will be exposed to tools and techniques that are widely applied in different fields of biomedical research. Students will receive an introduction to the command line, coding and statistics, and learn to apply these tools to pharmacokinetic compartmental analysis, molecular modeling, image analysis, structural biology, biological big data analysis and genomics. Students will be actively engaged in data analysis and will be expected to participate in group discussion.

*3 credits,*

### **HBH 655: Neuropharmacology**

An advanced course for graduate students interested in developing an understanding of neuropharmacology and research on this topic. Following a general introduction to the nerve cell structure, synaptic and chemical transmission, three themes receptors, receptors as channels, and G-protein-coupled receptors are developed. Recent advances in cell and molecular biology provide the framework for instruction and discussion. This course is offered as both HBH 655 and BNB 655. Prerequisite: Admission to Graduate Health Sciences Center Program.

*Spring, 3 credits, Letter graded (A, A-, B+, etc.)*

### **HBH 656: Cell Biology**

Introduction to the structural and functional organization of cells and tissues and to the way structure relates to function. Particular emphasis is placed on nuclear and chromosomal structure, signal transduction, protein translocation, the cytoskeleton and the extracellular matrix. The interaction of cellular structures and components and their regulation is stressed as is the organization and interaction of cells in tissues. The course is comparative and includes examples of cells and tissues from vertebrates, invertebrates, plants, and prokaryotic systems. Prerequisite: matriculation in graduate program or permission of instructor.

*Spring, 3-4 credits, Letter graded (A, A-, B+, etc.)*

*May be repeated for credit.*

*S/U grading*

*May be repeated for credit.*

### **HBH 699: Dissertation Research in Campus**

Original investigation undertaken as part of the Ph.D. program under supervision of thesis adviser and committee. Prerequisite: Advancement to candidacy (G5); permission of thesis advisor. Major portion of research must take place on SBU campus, at Cold Spring Harbor, or at the Brookhaven National Lab.

*Prerequisite: Full-time pharmacology graduate status*

*Fall, Spring, and Summer, 0-9 credits, S/U grading*

*May be repeated for credit.*

### **HBH 700: Dissertation Research off Campus - Domestic**

Prerequisite: Must be advanced to candidacy (G5). Major portion of research will take place off-campus, but in the United States and/or U.S. provinces. Please note, Brookhaven National Labs and the Cold Spring Harbor Lab are considered on-campus. All international students must enroll in one of the graduate student insurance plans and should be advised by an International Advisor.

*Prerequisite: Full-time pharmacology graduate status*

*Fall, Spring, 1-9 credits, S/U grading*

*May be repeated for credit.*

### **HBH 701: Dissertation Research off Campus - International**

Prerequisite: Must be advanced to candidacy (G5). Major portion of research will take place outside of the United States and/or U.S. provinces. Domestic students have the option of the health plan and may also enroll in MEDEX. International students who are in their home country are not covered by mandatory health plan and must contact the Insurance Office for the insurance charge to be removed. International students who are not in their home country are charged for the mandatory health insurance. If they are to be covered by another insurance plan they must file a waiver by second week of classes. The charge will only be removed if other plan is deemed comparable.

*All international students must receive clearance from an International Advisor.*

*Fall, Spring, 1-9 credits, S/U grading*

*May be repeated for credit.*

### **HBH 800: Full-Time Summer Research**

Full-time laboratory research projects supervised by staff members. Summer Term.

Prerequisites: Full-time pharmacology graduate status.