

# Systems Biomedicine: Molecules, Cells and Networks

## Pharmacology and Systems Biology (PSB) Core Course BSR1800 (G301)



FALL 2010 SCHEDULE

<http://webed.mssm.edu>

Location: Annenberg Building, 19<sup>th</sup> Floor, Room 19-50

DATE	DAY	TIME	MODULE	FACULTY	TOPIC	
Aug 23	Mon	12 – 1:50pm	Introduction	Krulwich	Introduction/RCR/Membrane Transport	
Aug 26	Thurs	12 – 1:50pm	Introduction	Iyengar	Protein Structure	
Aug 27	Fri	12 – 1:50pm	Introduction	Devi	Enzyme Kinetics/Receptor Binding	
Aug 30	Mon	12 – 1:50pm	Introduction	Sobie/TAs	Introduction to MatLab	
Aug 31	Tues	12 – 1:50pm	Introduction	Sobie/TAs	MatLab Workshop: Simulation of Enzyme Kinetics	Collaborative problem set distributed
Sep 1	Wed	9 – 10:50am	Introduction	Hanss	Physiological Homeostasis	
Sep 6	Mon	<b>Collaborative problem set due 8pm</b>				
Sep 7	Tues	9 – 10am	Introduction	Walsh	Nucleic Acid Structure	
Sep 7	Tues	10 – 10:50am	Introduction	Blitzer	Protein Translation	
Sep 13	Mon	10 – 11:50am	Introduction	Walsh	Transcription and Epigenetics	
Sep 14	Tues	9 – 10:50am	Introduction	Khitrov	Microarrays: Approaches, Problems, and Potential	
Sep 15	Wed	10 – 11:50am	Introduction	Hirsch	Genetics	
Sep 15	Wed	4 – 4:50pm	Introduction	TAs	Problem Discussion Session	Final problem set distributed
Sep 19	Sun	<b>Final problem set due 8pm</b>				
Sep 20	Mon	9 – 10:50am	Diabetes	LeRoith	Overview of Diabetes	
Sep 21	Tues	9 – 10:50am	Diabetes	Krulwich	Glucose Metabolism	
Sep 22	Wed	10 – 11:50am	Diabetes	Krulwich	Glucose/Fatty Acid Metabolism and OXPHOS/Journal Club	
Sep 27	Mon	9 – 10:50am	Diabetes	Shuldiner	Genetics of Diabetes/Journal Club	
Sep 28	Tues	9 – 10:50am	Diabetes	LeRoith	RTK Signaling/Journal Club	
Sep 29	Wed	9 – 10:50am	Diabetes	TAs	Problem Discussion Session	Collaborative problem set distributed
Oct 3	Sun	<b>Collaborative problem set due 8pm</b>				
Oct 4	Mon	10 – 10:50am	Diabetes	Sobie/TAs	MatLab Workshop: Modeling Metabolism	
Oct 5	Tues	9 – 10:50am	Diabetes	Ma	Insulin Secretion/Journal Club	
Oct 6	Wed	9 – 10:50am	Diabetes	Buettner	Organ Cross-talk in Pathogenesis of Diabetes/Journal Club	
Oct 7	Thu	9 – 10am	Diabetes	Cagan	Drug Discovery/Journal Club	
Oct 7	Thu	10 – 10:50am	Diabetes	Caplan	ER Stress	
Oct 8	Fri	9 – 10:50am	Diabetes	LeRoith	Drug Strategies	Final problem set distributed
Oct 11	Mon	<b>Final problem set due by 8pm</b>				
Oct 12	Tues	9 – 10:50am	Cancer	Hirsch	Growth Control: Cell Cycle and Apoptosis	
Oct 13	Wed	9 – 10:50am	Cancer	Class Discussion	Signaling Pathways in Cancer	
Oct 14	Thurs	9 – 10:50am	Cancer	Sobie/TAs	MatLab: Modeling the Cell Cycle	
Oct 15	Fri	9 – 10:50am	Cancer	Reddy	Signaling Pathways in Cancer	Collaborative problem set distributed
Oct 17	Sun	<b>Collaborative problem set due by 8pm</b>				
Oct 18	Mon	9 – 11am	Cancer	Martignetti	Cancer Genetics	
Oct 18	Mon	11 – 11:50am	Cancer	TAs	MatLab Skill Enhancement	
Oct 19	Tues	9 – 9:50am	Cancer	Aaronson	Cancer Biology/Journal Club	
Oct 20	Wed	9 – 10:50am	Cancer	Hall	Cancer Pathology	
Oct 25	Mon	10 – 11:50am	Cancer	Gallo	Chemotherapeutics	
Oct 26	Tues	9 – 9:50am	Cancer	Pfleger	Use of Model Organisms in Studying Cancer	
Oct 28	Thurs	9 – 10:50am	Cancer	Skobe	Metastasis	
Oct 29	Fri	9 – 10:50am	Cancer	Teitelbaum	Cancer Epidemiology	
Nov 1	Mon	10 – 11:50am	Cancer	Gallo, Sobie, TAs	MatLab Workshop: Chemotherapeutics	
Nov 3	Wed	10 – 10:50am	Cancer	TAs	Problem Discussion Session	Final problem set distributed
Nov 7	Sun	<b>Final problem set due by 8pm</b>				
Nov 8	Mon	10 – 11am	Renal	Hanss	Introduction to the Model and Renal Physiology	
Nov 8	Mon	11 – 11:50am	Renal	Hanss	Introduction to Channelopathies/Paper Discussion	
Nov 9	Tues	9 – 9:50am	Renal	Satlin	Channel Disorders and Barter Syndrome	
Nov 9	Tues	4 – 4:50pm	Renal	Satlin, Lipkowitz	Barter Syndrome Journal Club/Channel Disorders and Liddle's Syndrome	
Nov 10	Wed	9 – 9:50am	Renal	Satlin, Lipkowitz	Liddle's Syndrome Journal Club	
Nov 12	Fri	10 – 11:50am	Renal	Felsenfeld	Cytoskeleton in Polarized Epithelium	Collaborative problem set distributed
Nov 14	Sun	<b>Collaborative problem set due by 8pm</b>				
Nov 15	Mon	9 – 10:50am	Renal	He, Chuang	Disease of Renal Podocytes, Cytoskeleton Disorders, Cytoskeleton and Cell Shape/Journal Club	
Nov 16	Tues	9 – 9:50am	Renal	He, Chuang	Actin Regulation in Podocyte Disease/Journal Club	
Nov 17	Wed	9 – 10am	Renal	TAs	Problem Discussion Session	
Nov 17	Wed	10 – 10:50am	Renal	Neves	Paper Discussion of Modeling Signaling Pathways, Cytoskeleton and Cell Shape	
Nov 18	Thurs	9 – 10:50am	Renal	Ma'ayan, He	Implication of Network Analysis in Disease	
Nov 19	Fri	9 – 9:50am	Renal	Ma'ayan, He	Paper Discussion/Data Analysis of Implication of Network Analysis in Disease	
Nov 22	Mon	9 – 10am	Renal	Bottinger	Personalized Medicine in Kidney Disease	
Nov 22	Mon	10 – 11am	Renal	Hanss, He	Review of 1 <sup>st</sup> Problem Set	Final problem set distributed
Nov 22	Mon	11 – 11:50am	Renal	TAs	Problem Discussion Session	
Nov 29	Mon	<b>Final problem set due by 8pm</b>				
Nov 30	Tues	9 – 10:50am	Drug Abuse	Ramos, Jacobs	Introduction to Animal Models of Addiction/Journal Club	
Dec 1	Wed	9 – 10:50am	Drug Abuse	Devi	Receptors, Transporters and Signaling	
Dec 2	Thurs	9 – 10:50am	Drug Abuse	Russo	Synaptic and Structural Plasticity	
Dec 3	Fri	2 – 3:50pm	Drug Abuse	Blitzer	Channels and Transporters in Addiction	
Dec 6	Mon	9 – 10am	Drug Abuse	Neves	Modeling in Addiction Signaling	
Dec 6	Mon	10 – 10:50am	Drug Abuse	Fossella	Genetic Polymorphisms in Affective Disorders	
Dec 7	Tues	9 – 10:50am	Drug Abuse	Alberini	Learning and Memory in Addiction	
Dec 8	Wed	9 – 10:50am	Drug Abuse	Ivanov	Neuroimaging of Receptors and Transporters	
Dec 9	Thurs	9 – 10:50am	Drug Abuse	Hurd	Neurocircuitry in Addiction	
Dec 10	Fri	9 – 9:50am	Drug Abuse	TAs	Problem Discussion Session	Collaborative problem set distributed
Dec 12	Sun	<b>Collaborative problem set due by 8pm</b>				
Dec 13	Mon	9 – 10:50am	Drug Abuse	Nestler	Clinical Perspective on Drug Addiction Disorders	
Dec 15	Wed	9 – 10:50am	Drug Abuse	Ma'ayan	Systems Modeling of Addiction Signaling Networks	Final problem set distributed
Dec 19	Sun	<b>Final problem set due by 8pm</b>				

### COURSE DESCRIPTION

**Course Directors:** Terry A. Krulwich, PhD and Jeanne P. Hirsch, PhD, Department of Pharmacology and Systems Therapeutics

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### 6 Credit Course

**Teaching Assistants:** Archana Vijayakumar & Julian Gingold

This active-learning course will introduce core biochemical, cell biological and molecular mechanisms together with basic bioinformatic and systems biology concepts and applications in the context of human biomedical research. The emphasis is 'topdown', beginning with a pathophysiological condition studied from a clinical perspective and moving towards explication of the molecular and metabolic logic, regulatory circuits and cell and tissue specific properties that distinguish the disease and normal state. The goals of this course are to provide inquisitive, self-directed students with an appreciation of the complexity of biological systems across scales and to give insight into pathophysiology as a basis for scientific enquiry and development of new therapeutic strategies. Students will be guided to relevant textbook material and current reviews, and will also participate in analyses of primary journal articles to enhance their study of scientific method and to illustrate a variety of experimental and computational approaches to contemporary translational biomedicine. Problem sets and the methodologies for handling large data sets, including epidemiological and genetic data, will be introduced.

### COURSE FEATURES

- Integrates molecular biology with physiology and systems biology
- Translational perspective
- Active-learning
- Problem set based
- Integrated journal club

### WEB RESOURCES



**MSSM WebEd Course Management**  
<http://webed.mssm.edu/>



### Pharmacology and Systems Biology Training Area (PSB)

[www.mssm.edu/gradschool/psb/overview.shtml](http://www.mssm.edu/gradschool/psb/overview.shtml)



**Systems Biology Center New York**  
[www.sbcny.org](http://www.sbcny.org)