

FALL 2011 SCHEDULE

Systems Biomedicine: Molecules, Cells and Networks

Course number: BSR1800 (G301)

Systems Biology of Disease and Therapeutics (SBDT) Core Course

COURSE DESCRIPTION

Course Director:

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6 Credit Course

Teaching Assistants: Marshall Crumiller & Jay Pendse

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 HIGHLIGHTS

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

RESOURCES

Systems Biology of Disease and Therapeutics (SBDT)

Multidisciplinary training area which trains students to integrate approaches in systems biology, genomics and pharmacology in order to elucidate the pathophysiology of complex human diseases and develop novel therapeutic strategies.



Systems Biology Center New York (SBCNY)

A National Center for Systems Biology funded by the National Institute of General Medical Sciences (P50 GM071558)

Integrated Predoctoral Training Program in Pharmacological Sciences

Interdisciplinary predoctoral training program in Pharmacological Sciences supported by a training grant from the National Institute of General Medical Sciences (T32 GM062754)

Links:

www.mssm.edu/gradschool/psb/overview.shtml

www.sbcny.org

www.mssm.edu/pharmacology/predoc/training_grant.shtml



ACADEMIC YEAR 2011-2012

Annenberg Building, 19th Floor, Room 19-50

DATE	DAY	TIME	MODULE	FACULTY	TOPIC	
MODULE 1						
Aug 22	Mon	12 – 1:50pm	Introduction	Iyengar	Introduction/RCR/Protein Structure	
Aug 25	Thu	12 – 1:50pm	Introduction	Krulwich	Membrane Transport	
Aug 26	Fri	12 – 1:50pm	Introduction	Hanss	Physiological Homeostasis	
Aug 29	Mon	12 – 1:50pm	Introduction	Neves	Enzyme Kinetics	
Aug 30	Tue	12 – 1:50pm	Introduction	Devi	Receptor Binding Collaborative problem set distributed	
Aug 31	Wed	9 – 10:50am	Introduction	Sobie, TAs	Introduction to MatLab	
Sep 1	Thu	12 – 1:50pm	Introduction	Sobie, TAs	MatLab Workshop: Simulation of Enzyme Kinetics	
Sep 5	Mon	Collaborative problem set due by 8pm				
Sep 6	Tue	9 – 10:50am	Introduction	Walsh	Transcription	
Sep 7	Wed	10 – 11:50am	Introduction	Li	Epigenetics	
Sep 8	Thu	9 – 10:50am	Introduction	Blitzer	Protein Translation I	
Sep 9	Fri	9 – 10:50am	Introduction	Blitzer	Protein Translation II	
Sep 12	Mon	10 – 11:50am	Introduction	Zaslavsky	Analysis of Large Datasets	
Sep 13	Tue	9 – 10:50am	Introduction	Hirsch	Classical Genetics Final problem set distributed	
Sep 14	Wed	10 – 11:50am	Introduction	Peter	Advanced Genetic Techniques	
Sep 15	Thu	9 – 9:50am	Introduction	TAs	Problem Discussion Session	
Sep 18	Sun	Final problem set due by 8pm				
MODULE 2						
Sep 19	Mon	9 – 10:50am	Diabetes	LeRoith	Overview of Diabetes	
Sep 20	Tue	9 – 10:50am	Diabetes	Krulwich	Glucose Metabolism	
Sep 22	Thu	9 – 10:50am	Diabetes	Cagan	Drug Discovery	
Sep 23	Fri	9 – 10:50am	Diabetes	Chung	Genetics of Diabetes/Journal Club Collaborative problem set distributed	
Sep 26	Mon	9 – 10:50am	Diabetes	Ma	Insulin Secretion/Journal Club	
Sep 27	Tue	9 – 10:50am	Diabetes	Krulwich	Glucose/Fatty Acid Metabolism and OXPHOS/Journal Club	
Sep 28	Wed	9 – 10:50am	Diabetes	Sobie, TAs	MatLab Workshop: Modeling Metabolism	
Sep 29	Thu	Collaborative problem set due by 8pm				
Oct 3	Mon	9 – 10:50am	Diabetes	LeRoith	RTK Signaling/Journal Club Final problem set distributed	
Oct 4	Tue	9 – 10:50am	Diabetes	Buettner	Organ Cross-talk in Pathogenesis of Diabetes/Journal Club	
Oct 5	Wed	10 – 11:50am	Diabetes	TAs	Problem Discussion Session	
Oct 6	Thu	9 – 10:50am	Diabetes	LeRoith	Drug Strategies	
Oct 7	Fri	Final problem set due by 8pm				
MODULE 3						
Oct 10	Mon	9 – 10:50am	Cancer	Hirsch	Growth Control: Cell Cycle and Apoptosis	
Oct 11	Tue	9 – 10:50am	Cancer	Sobie, TAs	MatLab Workshop: Modeling the Cell Cycle Pathways discussion assignment distributed	
Oct 12	Wed	10 – 11:50am	Cancer	Aguirre-Ghiso	Oncogenes and Tumor Suppressors	
Oct 13	Thu	9 – 10:50am	Cancer	Pfleger	Use of Model Organisms in Studying Cancer	
Oct 17	Mon	9 – 10:50am	Cancer	Martignetti	Cancer Genetics	
Oct 18	Tue	9 – 10:50am	Cancer	Class Discussion	Signaling Pathways in Cancer	
Oct 19	Wed	9 – 10:50am	Cancer	Skobe	Metastasis Collaborative problem set distributed	
Oct 24	Mon	10 – 11:50am	Cancer	Hall	Cancer Pathology	
Oct 25	Mon	9 – 9:50am	Cancer	TAs	Problem Discussion Session	
Oct 26	Wed	Collaborative problem set due by 8pm				
Oct 28	Fri	9 – 10:50am	Cancer	Aaronson	Cancer Biology/Journal Club	
Oct 31	Mon	10 – 11:50am	Cancer	Gallo	Chemotherapeutics	
Nov 2	Wed	9 – 10:50am	Cancer	Teitelbaum	Cancer Epidemiology Final problem set distributed	
Nov 3	Thu	9 – 9:50am	Cancer	TAs	MatLab Skill Enhancement	
Nov 4	Fri	9 – 10:50am	Cancer	Sobie, TAs	MatLab Workshop: Chemotherapeutics	
Nov 7	Mon	Final problem set due by 8pm				
MODULE 4						
Nov 8	Tue	9 – 9:50am	Renal	Hanss	Introduction to the Module and Renal Physiology	
Nov 8	Tue	10 – 11:50am	Renal	Felsenfeld	Cytoskeleton in Polarized Epithelium	
Nov 9	Wed	9 – 10:50am	Renal	He, Chuang	Disease of Renal Podocytes, Cytoskeleton Disorders, Cytoskeleton and Cell Shape/Journal Club	
Nov 14	Mon	9 – 10:50am	Renal	He, Chuang	Actin Regulation in Podocyte Disease/Journal Club	
Nov 15	Tue	9 – 9:50am	Renal	Hanss	Introduction to Channelopathies Collaborative problem set distributed	
Nov 16	Wed	10 – 11:50am	Renal	Satlin	Channel Disorders: Barter and Liddle's Syndromes	
Nov 17	Thu	9 – 10:50am	Renal	Satlin	Liddle's Syndrome/Journal Club	
Nov 18	Fri	9 – 9:50am	Renal	Neves	Paper Discussion of Modeling Signaling Pathways, Cytoskeleton and Cell Shape	
Nov 18	Fri	10 – 11:50am	Renal	Ma'ayan	Paper Discussion/Data Analysis of Implication of Network Analysis in Disease	
Nov 21	Mon	9 – 9:50am	Renal	TAs	Problem Discussion Session	
Nov 21	Mon	10 – 10:50am	Renal	Bottinger	Personalized Medicine in Kidney Disease Final problem set distributed	
Nov 21	Mon	Collaborative problem set due by 8pm				
Nov 22	Tue	9 – 9:50am	Renal	Hanss, He	Review of 1 st Problem Set	
Nov 28	Mon	Final problem set due by 8pm				
MODULE 5						
Nov 29	Tue	9 – 10:50am	Drug Abuse	Devi	Receptors, Transporters and Signaling	
Nov 30	Wed	9 – 10:50am	Drug Abuse	Russo	Synaptic and Structural Plasticity	
Dec 1	Thu	9 – 10:50am	Drug Abuse	Blitzer	Channels and Transporters in Addiction	
Dec 5	Mon	9 – 10:50am	Drug Abuse	Hodes	Introduction to Animal Models of Addiction/Journal Club Collaborative problem set distributed	
Dec 5	Mon	11 – 11:50am	Drug Abuse	TAs	Problem Discussion Session	
Dec 6	Tue	9 – 10:50am	Drug Abuse	Neves	Modeling in Addiction Signaling	
Dec 8	Thu	9 – 10:50am	Drug Abuse	Hurd	Neurocircuitry in Addiction	
Dec 9	Fri	9 – 10:50am	Drug Abuse	Han	Neuroadaptive Mechanisms in Addiction	
Dec 9	Fri	Collaborative problem set due by 8pm				
Dec 12	Mon	9 – 10:50am	Drug Abuse	Ivanov	Neuroimaging of Receptors and Transporters	
Dec 14	Wed	9 – 10:50am	Drug Abuse	Nestler	Clinical Perspective on Drug Addiction Disorders Final problem set distributed	
Dec 15	Thu	9 – 10:50am	Drug Abuse	Ma'ayan	Systems Modeling of Addiction Signaling Networks	
Dec 16	Fri	9 – 10:50am	Drug Abuse	Student Presentations		
Dec 19	Mon	Final problem set due by 8pm				