

Faculty:

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General course information: This course will utilize the D2L course management system. You must be officially registered in the course to access the D2L site. Instructors will post lecture notes, assigned papers, and other relevant material on this site. The lecturers will assume that students have a solid foundation in understanding basic principles of biochemistry and molecular biology. For this reason, BMB801 is strongly recommended as a background for the course.

Overall objectives of the course: This course is intended to provide an advanced treatment of key concepts in signal transduction and metabolic regulation. Attention will be focused on general themes that are expected to dominate future research in a particular area. The choice of lecture topics is also intended to provide students with an appreciation of the similarities and differences in signal transduction systems found in diverse organisms, including animals, yeast, plants, and bacteria.

Examinations and Grading: There will be four examinations that will comprise the majority of the grade: (I) Monday, Feb. 3 at 7:00-9:00 p.m., Room BCH 111 and covering material Jan. 6 through Jan 31 (Ducat, Wang) (**110 pts.**); (II) Monday Feb 24 at 7:00-9:00 p.m., Room BCH 111 covering material from Feb. 3 through Feb 21 (**Howe; 90 pts.**); (III) Open book take-home exam due April 1, by 5:00pm, and covering material from Feb 24 through March 27 (**Ducat; 120 pts.**); and (IV) Open book take-home exam due April 29 by 10:00am, covering material from March 30 through April 24 (total **120 pts**) (Martinez-Hackert, 30 pts; Howe, 90 pts). Final grades will be computed by summing grades (total 440 pts) from each examination. A fraction of points (<10%) may be assigned for in-class activities, per Instructor preferences.

BIOCHEMISTRY 802 Spring 2020***Metabolic Regulation & Signal Transduction*****Instructors:** Ducat, Howe, Martinez-Hackert, Wang

M,W,F 10:20-11:10 a.m.

Location: Rm. 111 Biochemistry (BMB)

Date	Instructor	Topic
M 1/6	Ducat	Overview of Signal Transduction and Class Objectives
W 1/8	Ducat	Common Themes of Signal Transduction
F 1/10	Ducat	Physical features of lipid membranes
M 1/13	Ducat	Classes of Lipids and Signaling Lipids
W 1/15	Ducat	Membrane proteins and receptors
F 1/17	Ducat	Journal Club: Membranes and/or Transmembrane Receptor Structure
M 1/20	----	<i>Martin Luther King, Jr. Day - no classes</i>
W 1/22	Wang	Phospholipases
F 1/24	Wang	Synthesis of eicosanoid hormones
M 1/27	Wang	Leukotrienes and prostaglandins
W 1/29	Wang	Prostacyclins and thromboxanes
F 1/31	Wang	Nitric oxide signaling
First Exam <u>In class</u> Monday, February 3 -- 7:00-9:00 p.m. Room BCH 111 (1/6 through 1/31 material)		
M 2/3	Howe	Ligand-receptor interactions
W 2/5	Howe	G protein-coupled receptors I
F 2/7	Howe	G protein-coupled receptors II
M 2/10	Howe	Structure and function of trimeric G proteins I
W 2/12	Howe	Structure and function of trimeric G proteins II
F 2/14	Howe	Regulation of G protein signaling I
M 2/17	Howe	Regulation of G protein signaling II
W 2/19	Howe	Nuclear receptors
F 2/21	Howe	NK-kB signaling
Second Exam <u>In class</u> Monday, Feb 24 --7:00-9:00 p.m. Room BCH 111 (2/3 through 2/21 material)		
M 2/24	Ducat	Quorum sensing I
W 2/26	Ducat	Quorum sensing II
F 2/28	Ducat	Journal Club: Quorum sensing pathways
3/2-6	----	SPRING BREAK (No classes)
M 3/9	Ducat	PII and Carbon/nitrogen balance I
W 3/11	Ducat	PII and Carbon/nitrogen balance & Light Integration
F 3/13	Ducat	Journal Club: Carbon and nitrogen metabolism
M 3/16	Ducat	Circadian rhythms
W 3/18	Ducat	Ligand-gated ion channels
F 3/20	Ducat	Receptor evolvability and modularity
M 3/23	Ducat	Conservation and modularity in signal transduction pathways
W 3/25	Ducat	Engineering through modularity of signal transduction pathways
F 3/27	Ducat	Journal Club: Modularity in engineering
Third Exam <u>Take home</u> exam due Wednesday, April 1 by 5:00 pm (2/24 through 3/27 material)		

M 3/30	Martinez-Hackert	TGF-β signaling I
W 4/1	Martinez-Hackert	TGF-β signaling II
F 4/3	Martinez-Hackert	TGF-β signaling III
M 4/6	Howe	Kinases in signal transduction I
W 4/8	Howe	Kinases in signal transduction II
F 4/10	Howe	Plant receptor kinases
M 4/13	Howe	Histidine kinases and two-component signaling pathways
W 4/15	Howe	Photoreceptors
F 4/17	Howe	Phosphatase-linked receptors
M 4/20	Howe	Ubiquitin ligase-linked receptors I
W 4/22	Howe	Ubiquitin ligase-linked receptors II
F 4/24	Howe	Engineering small-molecule sensors

Fourth Exam (Final) Take-home exam; due Wednesday, April 29 by 10:00am (3/30 through 4/24 material).