

(SP23) MCB 480 – MOLECULAR BASIS OF EUKARYOTIC CELL SIGNALING

Lectures: Tuesdays and Thursday 11:00 am - 12:20 pm

Location: 140 Burrill Hall

Office hour: To be determined after polling the class

Instructor: Jie Chen, Professor of Cell & Developmental Biology (jiechen@illinois.edu)

Course objectives:

- Emphasis on principles and molecular mechanisms of mammalian cell signaling
- Coverage of major classes of transmembrane receptors and signaling pathways
- Contemporary methods of investigation and the principles of identifying and solving problems related to signal transduction
- Importance of understanding cell signaling illustrated by examples of targeted anti-cancer therapies

Course Moodle at learn.illinois.edu:

- Lecture slides are available the night before lecture, together with all relevant references.
- Other materials including assigned readings, homework assignments, and discussion questions are posted as needed.
- Assignments are distributed, submitted and graded on Moodle.

This course does not use a textbook. Recommended books:

1. *Molecular Cell Biology* by Lodish et al. (9th edition):

Chapter 15: Receptors, Hormones and Cell Signaling

Chapter 16: Growth Factors and Cytokine Signaling Pathways That Control Gene Expression

2. *Cell Signaling – principles and mechanisms*, by Lim, Mayer & Pawson, 2015.

Readings for the class:

Optional readings: textbooks above; original research and review articles associated with each lecture (PDFs available on class Moodle).

Required readings: articles to be discussed in class, for assignments, and/or for exams.

Honors credits:

James Scholars are welcome to propose creative ideas for projects to earn honors credits in this class. Please arrange a meeting with the instructor early in the semester to discuss selection of projects.

Grading:

75%: two *open-book* exams, weighted equally

25%: three assignments –

18% on submitted assignments (6% each; see below for details)

7% on attendance of in-class discussions (2% each, extra 1% for attending all 3)

Final grade:

A: 85% (average 80 on exams if receiving full credits for assignments)

A-: 80-84%

B+: 76-79%

B: 75%

B- to F: will be assigned as appropriate.

COURSE POLICIES

Academic integrity

For this course we will follow the policies stated in the Student Code, which is available online at <http://studentcode.illinois.edu/>. All students are expected to adhere to both the letter and spirit of the Code. Any infraction of academic integrity as defined in the Code may result in a course grade of “F”, including any case of facilitating an infraction.

Students are encouraged to work together to study course materials and to discuss problems on assignments. However, each student must work independently on the assignment submissions and on the entire exams (more details below).

Assignments

For each assignment, 50% credit is given for on-time submission. Unexcused late submission of an assignment will result in complete loss of this 50% credit for that assignment. After in-class discussion the student has the option to resubmit answers, and the assignment will then be graded for the other 50% credit.

Exams

Exams will be in-class and open-book. Students are not to communicate with other students or anyone else during the exam. **If you have a conflict for one of the exam dates/times, you must inform the instructor within the first week of class.**

Disability Accommodations

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or e-mail a message to disability@illinois.edu.

Spring 2023 schedule

Dates of assignments and exams are unlikely to change.

Topics are tentative (detailed lecture schedule will be available mid-semester):

Introduction and overview, RTK, modular domains, Ras, MAPK, protein phosphorylation, signaling dynamics, experimental design, kinase regulation, phosphatase regulation, kinase as drug targets, cytokine receptor signaling, TGF β receptor signaling, TCR signaling, common downstream signaling pathways, cancer immunotherapy, methodologies, GPCR signaling, signaling into the nucleus, signaling in cell proliferation, signaling in cell death and survival.

January 17	Lecture
January 19	Lecture
January 24	Lecture
January 26	Lecture
January 31	Lecture
February 2	Lecture
February 7	Lecture
February 8	Assignment #1 distributed by 9:00 am (Wednesday)
February 9	Lecture
February 11	Assignment #1 due at 11:59 pm (Saturday)
February 14	In-class discussion of Assignment #1 Zoom: https://illinois.zoom.us/j/86066593666?pwd=VnFYUGE1UEtOS0xLLytzeE5TVVWVjQT09
February 15	Assignment #1 revision due at 11:59 pm (Wednesday)
February 16	Lecture
February 21	Lecture
February 23	Lecture
February 28	Office hours during lecture time; Exam 1, 7:00 - 9:30 pm
March 2	Lecture
March 7	Lecture
March 9	Lecture
<i>March 11-19</i>	<i>SPRING BREAK</i>
March 21	Lecture
March 22	Assignment #2 distributed by 9:00 am (Wednesday)
March 23	Lecture
March 25	Assignment #2 due at 11:59 pm (Saturday)
March 28	In-class discussion of Assignment #2 Zoom: https://illinois.zoom.us/j/86066593666?pwd=VnFYUGE1UEtOS0xLLytzeE5TVVWVjQT09
March 29	Assignment #2 revision due at 11:59 pm (Wednesday)
March 30	Lecture
April 4	Lecture
April 6	Lecture
April 11	Lecture
April 13	Lecture
April 18	Lecture
April 19	Assignment #3 distributed by 9:00 am (Wednesday)
April 20	Lecture
April 22	Assignment #3 due at 11:59 pm (Saturday)
April 25	In-class discussion of Assignment #3 Zoom: https://illinois.zoom.us/j/86066593666?pwd=VnFYUGE1UEtOS0xLLytzeE5TVVWVjQT09
April 26	Assignment #3 revision due at 11:59 pm (Wednesday)
April 27	Lecture
May 2	Office hours during lecture time; Exam 2, 7:00 – 9:30 pm