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Office: SCRM 2005
Office Hours: M 11am-12pm (PFBH191), W 11am-12pm (PFBH191), and by appointment (SCRM 2005)
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Text: Molecular Biology of the Cell (Alberts et al), 6th edition (a.k.a. MBoC)

Course Objectives

BENG230B is an intermediate level graduate course designed to introduce students to the molecular components and physiological mechanisms that underlie the structure and function of cells. The course is designed to be an in-depth survey covering general concepts in cell biology and to emphasize these concepts within the context of current research questions and technical applications. Lectures will focus on: (i) basic biochemistry in cell biology, (ii) cellular and molecular biology techniques, (iii) structure-function relationships within and outside the cell, and (iv) specialized cell types. However, the format and content of the course overall will convey both the details of what is known in cell biology as well as how to apply it to fundamental and still unanswered questions.

Background Preparation

If the life sciences, even when taught from a quantitative perspective, seems daunting to you, I would suggest some of the following resources to help in your preparation. First, our textbook MBoC comes in a lite version called “Essential Cell Biology.” This is still a somewhat comprehensive, graduate level textbook but is much more accessible to an introductory audience. Should not be an appropriate entry point to this material, I would further suggest the “AP[®] Biology” course at the Khan Academy, which is an online, free tutorial/instructional website. Please avoid sections on the history of biology and plant biology; those are not relevant for this course. Since this site has broken down the background material into digestible section, it is also a great tool as a targeted refresher should you feel that you need it.

TA Office Hours

A portion of this course is dedicated to understanding and evaluating literature in cell biology, especially the engineering tools used to solve problems within biology. A recently published paper in cell biology will be suggested for students to read, and a corresponding weekly discussion will be held that will be led by the TAs. This discussion is not intended to be additional lecture time and is completely optional. However, it should provide an opportunity to apply course concepts, design experiments, and propose engineering approaches to cell biology. If you are unable to attend, all content is accessible online and virtual discussion sections are available via CANVAS.

Biology and Biochemistry Basics Quiz

Working knowledge of the common language in biochemistry is essential for cell biology. To ensure that everyone has the vocabulary for cell and molecular biology, a closed book/notes quiz on relevant molbio and biochemistry terminology will be administered on the Wednesday of week two of the course (1/15/20). Content will come from MBoC chapters 2 and 3.

Course Evaluation

10% Biochemistry Basics Quiz, 45% Midterm, and 45% Final. Midterm and final exams are “open book and notes.” Use of previous exams and answer keys as your “notes” is prohibited. Use of the internet is prohibited.

Homework

Homework will be posted on CANVAS several times throughout the quarter and can be turned into TAs by the due date listed for comment on your answers. However, it will not be graded and should be used as practice for exams. Solutions will also be posted on CANVAS after the homework due date. No late homework will be accepted for comment.

Lecture Audio

To facilitate learning, all slides and lecture audio will be posted on CANVAS. Slides will be available at least 24 hours in advance and lecture audio posted shortly after class. Please note that this do NOT replace class attendance.

“Regrade,” Exam, and Academic Misconduct Policies

Students are encouraged to write all final answers in pen. If there is a grade discrepancy, submit the original exam written in pen along with a written re-grade request to a TA within ONE WEEK of the date that the assignment was returned. Except for simple errors in adding points together for a final exam score, the entire assignment is subject to re-grading. Exams may

not be missed without prior approval from the instructor. Academic dishonesty will not be tolerated. Any suspected incident will be dealt with in accordance with UCSD policy, which includes reporting the misconduct.

Date	Topic	Chapters
1/06/20	Introduction	
1/08/20	Techniques (I)	8-9
<i>1/10/20</i>	<i>Office Hours: Biochem Refresher</i>	
1/13/20	Techniques (II)	8-9
1/15/20	Techniques (III); Biochem Quiz (9am start time)	8-9
<i>1/17/20</i>	<i>Office Hours: MACS Technique Paper</i>	
1/20/20*	Techniques (IV)	8-9
1/22/20	Structure-Function: Membranes (I)	10
<i>1/24/20</i>	<i>Office Hours: Bio-AFM Paper</i>	
1/27/20	Structure-Function: Membranes (II)	10
1/29/20	Structure-Function: Organelles (I)	12, 14
<i>1/31/20</i>	<i>Office Hours: Mitochondria Paper; Lipid Raft Paper</i>	
2/03/20	Structure-Function: Organelles (II)	12
2/05/20	Structure-Function: Organelles (III)	13, 15
<i>2/07/20</i>	<i>Office Hours: Exam Review</i>	
2/10/20	Structure-Function: Organelles (IV)	13
2/12/20	MIDTERM EXAM	
<i>2/14/20</i>	<i>Office Hours: Exam Answers</i>	
<i>2/17/20</i>	No Class – University Holiday	
2/19/20	Structure-Function: Nucleus	4, 12
<i>2/21/20</i>	<i>Office Hours: Actin “Comets” Paper; Nucleus Paper</i>	
2/24/20	Structure-Function: Cytoskeleton (I)	16
2/26/20	Structure-Function: Cytoskeleton (II)	16
<i>2/28/20</i>	<i>Office Hours: Dynein Paper</i>	
3/02/20	Structure-Function: Cytoskeleton (III)	16
3/04/20	Structure-Function: Cytoskeleton (IV)	16
<i>3/06/20</i>	<i>Office Hours: Tensegrity Paper; Durotaxis Paper</i>	
3/09/20	Structure-Function: Cell-ECM (I)	19
3/11/20	Structure-Function: Cell-ECM (II)	19
<i>3/13/20</i>	<i>Office Hours: Exam Review</i>	
3/18/20**	FINAL EXAM	

TA Office Hours are in *ITALICS*

**Final Exam: 3/18/19 from 8:00-11:00am in Fung Auditorium