

LIFE210 - Introductory Eukaryotic Cell Biology

Lecture: Section 2: Chemistry A101, 2:00-2:50 PM MWF

Instructor: Lubna Tahtamouni

Office Hours: By appointment (phone, email, or meet after class to schedule)

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Textbook: Molecular Biology of the Cell, 6th edition 2015 or 5th edition by Alberts et al. 2008,
Or Essential Cell Biology, 4th edition by Alberts et al. 2013

Course Objectives

- Understand essential concepts and fundamental definitions in cell biology that are necessary to further grasp biochemistry, and broader biomedical issues.
- Learn major components and (bio)chemical reactions involved in the basic cellular processes. Cell biology is the molecular and chemical underpinnings of how and why life (cells and organisms) works. This course only explores the “tip of the iceberg” but will provide a springboard for anyone who wants to delve into cell biology in greater depth.
- Learn to apply the acquired knowledge to problems and questions through critical thinking and problem solving exercises.

How to Do Well

To help you best understand the course content, you will be provided with the following: (1) 8 unit outlines; (2) lecture slides to be posted to Canvas; and (3) clicker questions that were presented in class. You are expected to come to class prepared (*i.e.*, know something about what we will talk about). Typical preparation involves reading the assigned textbook pages (see below), and looking over the lecture notes for each lecture. If you do not have a good understanding of the material raised by the clicker questions, ask about them at the beginning of the next class, and/or make an appointment to go over them individually with the TA. Use the quizzes, lecture notes, outlines, and clicker questions to guide your studying for the exams. Study your notes including key terms and concepts, and then take the quiz the first time without your notes. If you do not do as well as you would like, review your notes again and take the quiz a second time with your notes and book open (you get two attempts at each quiz!). Finally, we strongly suggest that you practice diagramming some of the key biochemical/cell biological processes on a white board or note paper multiple times rather than just looking them over to study. You will find that the information is retained much more readily, and you will recognize gaps in your understanding more readily. Using this approach in a study group is even more effective.

Syllabus

<u>Date</u>	<u>Period</u>	<u>Topic</u>	<u>Text Reading (page #s)</u>	
			<u>5th edition</u>	<u>6th edition</u>
Unit 1: Chemistry of Cells – An Overview				
Aug 26	1	Introduction and course overview & Unity and diversity of cells; definition of cancer	8-14; 35-42; 1205-13; 1224-5	8-12; 31-39 1091-97; 1127-29
Aug 28	2	Chemical composition of cells	45-48	43-44
Aug 30	3	Chemical bonds, Part I	48-49; 53-54; 108-109 (panel 2-2) 106-107 (panel 2-1)	44-45 92-93 (panel 2-2) 90-91 (panel 2-1)
Quiz 1 due @ 2:00 pm Wednesday September 4				
Sep 2	Labor Day- NO Class			
Sep 4	4	Chemical Bonds, Part II	106 (panel 2-1) 110-111 (panel 2-3)	90 (panel 2-1) 94-95 (panel 2-3)
Sep 6	5	Molecules found in cells, Part I	51-53	45-46
Quiz 2 due @ 2:00 pm Monday September 9				
Sep 9	6	Molecules found in cells, Part II	55-65 112-116 (panels 2-4,5,6) 125-126,130	47-51 96-101 (panels 2-4,5,6) 109-111,114
Unit 2: Macromolecular Structure and Function: Proteins				
Sep 11	7	Amino acids, Peptide Bonds & Intermolecular interactions	125-127; 128-129 (panel 3-1)	109-11 112-13 (panel 3-1)
Sep 13	8	Protein structure and folding	130- 131; 134-135; 142-151	114-118
Quiz 3 due @ 2:00 pm Monday September 16				
Sep 16	9	Proteins as catalysts I	72-77; 158-161; 164-166	57-61; 140-41; 144-46
Sep 18	E1	EXAM 1 (covering lectures 1-9)		
Sep 20	10	Proteins as catalysts II	(same as Sept. 16)	
Unit 3: Metabolism – Flow of Matter and Energy in Cells				
Sep 23	11	Overview of cellular metabolism I	65-72; 77-83; 88-93; 96-100; 101-03	51-6; 63-8; 73-8; 81-5
Sep 25	12	Overview of cellular metabolism II	(same as Sep. 23)	
Sep 27	13	Regulation of cellular metabolism	106-08	87-8
Quiz 4 due @ 2:00 pm Monday September 30				
Sep 30	14	Metabolic changes in cancer cells	-	1098-99
Unit 4: Macromolecular Structure and Function: Lipids and Membranes				
Oct 2	15	Membrane composition and assembly	617-625; 626-629	565-72; 573-76
Oct 4	16	Membrane proteins	629-635	576-82

Quiz 5 due @ 2:00 pm Monday October 7

Oct 7	17	Solute diffusion and transport across membranes	651-55; 667-69;	597-601; 611-14
Oct 9	E2	EXAM 2 (covering lectures 10-16)		
			673-75	
Oct 11	18	Solute diffusion and transport across membranes	654-58; 659-63	600-04; 606-08
Oct 14	19	Transmembrane transport in disease	663; 665-67	609-11
Unit 5: Intracellular Compartments, Protein and Lipid Sorting				
Oct 16	20	Compartmentalization of cells	26-30; 695-704	24-28; 641-49
Oct 18	21	Protein sorting to cellular compartments I	704-20	649-66
Quiz 6 due @ 2:00 pm Monday October 21				
Oct 21	22	Protein sorting to cellular compartments II	723-45	669-91
Oct 23	23	Protein sorting to cellular compartments III	749-79	695-722
Oct 25	24	Lipid and protein sorting IV	779-809	722-50
Quiz 7 due @ 2:00 pm Monday October 28				
Unit 6: Cellular Communication				
Oct 28	25	Principles of cell signaling	879-904	813-831; 874-76
Oct 30	E3	EXAM 3 (covering lectures 17-24)		
Nov 1	26	Membrane receptors/G-proteins	904-21	832-49
Nov 4	27	Enzyme-linked receptors	921-45	850-67
Nov 6	28	Signaling through proteolysis	946-55	867-75
Unit 7: Cell Shape and Movement				
Nov 8	29	Molecular dynamics of the cytoskeleton	965-91	889-960
Quiz 8 due @ 2:00 pm Monday November 11				
Nov 11	30	Regulation of cytoskeletal dynamics I	992-97	889-960
Nov 13	31	Regulation of cytoskeletal dynamics II	997-1010	889-960
Nov 15	32	Motor proteins	1010-25	889-960
Quiz 9 due @ 2:00 pm Monday November 18				
Nov 18	33	Cytoskeleton and cellular behavior	1025-50	889-960
Nov 20	E4	EXAM 4 (covering lectures 25-31)		
Unit 8: Cellular Growth Control				
Nov 22	34	Cell cycle I: An overview	1053-60	963-967
Nov 23-29 Fall Recess/Thanksgiving Break – No Classes				
Dec 2	35	Cell cycle II: Regulation	1060-1112	967-1018
Dec 4	36	Programmed cell death	1115-28	1021-32
Dec 6	37	Cellular senescence	292-94; 505	262-265; 442-444
Quiz 10 due @ 2:00 pm Monday December 9				
Dec 9	38	Cell biology of cancer I	1205-40	1091-1141
Dec 11	39	Cell biology of cancer II	1241-65	1091-1141
Dec 17	E5	EXAM 5 (covering lectures 32-39) Tuesday 4:10-6:10 pm		

Last add/drop and W-drop days

Wednesday September 11 – last add/drop day; you will have taken 2 quizzes by then.

Monday October 21 – last course withdrawal day (with W grade); you will have taken 6 quizzes & 2 exams by then.

iClickers

You will want to purchase an iClicker remote for in-class participation. iClicker is a response system that allows you to respond to questions we pose during class; you will receive extra credit points (**the maximum is 20 points**) for that feedback and/or participation. In order to receive this credit, you will need to register your iClicker remote by the first Friday of the semester (August 30, 2019).

For Web Registration:

To register your iClicker, go to <https://wsnet.colostate.edu/cwis262/clicker/registration.aspx> (NOT iClicker.com). Login with your elidentity eName and password. In the iClicker ID field, enter your remote ID number and select the "Register" button. The remote ID is the number found on the back of your iClicker remote. iClickers will be used every day in class, and you are responsible for bringing your remote daily.

Quizzes and Exams

1. 10 Quizzes – 50 points total

There will be 10 quizzes each worth 5 points. They will all be administered Friday on Canvas (see course schedule above), and will be due on the Monday before class time (2:00 pm; except for Quiz 1, which is due on Wednesday September 4 due to Labor Day). You will be given two attempts on each quiz.

2. Exams – 500 points total

There will be five exams each worth 100 points. With the exception of the final exam, the exams will be administered during the regular class time, and in the regular classroom. They will consist of a combination of multiple choice and essay questions. The exams will cover what is discussed in class and what is emphasized in the outlines (see canvas), clicker questions and quizzes.

Grading

There are a total of 500 points from Exams, and 50 points from Quizzes. Each of the 5 exams in LIFE 210 will be worth 100 points (500 total), and the 10 weekly quizzes on Canvas are worth 5 points each (50 total), for a cumulative total of 550 points possible. This does not include any bonus points acquired from answering in-class iClicker questions (see below). If you achieve the following point totals for LIFE 210 you will be assured the **minimum** letter grade shown:

- | | |
|----------------------------|---|
| 1. 495-550 ($\geq 90\%$) | A |
| 2. 440-494 (80-90%) | B |
| 3. 385-439 (70-80%) | C |
| 4. 330-384 (60-70%) | D |
| 5. <330 (<60%) | F |

Each exam or quiz will not be curved individually, but the final total points required for a course grade might be curved depending on the averages and distribution of points. In addition, your grade for LIFE 210 will be determined based on the total 550 points (combined). Students in LIFE 210 have averaged around 80% of the total points possible over the past several years. As a result, there is usually no grading curve.

In-class iClicker questions will be worth 1 point for answering irrespective of correctness. These points will be weighted to be worth a maximum total of 20 extra credit points (in addition to the 550 total possible points) at the end of the semester.

Make-up Exams and Exam Regrading

There will be no make-up exams offered. Unexcused absences from an exam or quiz will be given a zero. If you have an excused absence (based on written or other verifiable evidence) from an exam or quiz, your final grade will be based on a percentage of the total possible points for the exams and quizzes you did take. **Alternatively, students can schedule to take the exam early with the instructor if they know they cannot take the exam at the regularly scheduled date and time.** If you have questions concerning the grading of any of your exams or quizzes, the questions you want re-graded should be circled and the exam or quiz should

be turned in to the instructor within a week of the date of its return to the class after grading. You must also provide a **written** explanation as to why you feel the question should be re-graded. Exams **will not be accepted for re-grading after this one-week period**, so go over your exam carefully soon after it has been returned to you.

CSU Academic Integrity Policy and LIFE 210

By registering for this class you enter into a contract between each student (you) and the instructors (us) constituting an agreement on our respective roles in gaining the knowledge and understanding of cell biology and earning the grade that you desire. As the instructors, our role is to organize and present the material and stimulate, facilitate and guide you through learning and understanding the core concepts in eukaryotic cell biology. As the student, your role is to attend class, **not to talk during class** unless you are asked to or are asking the instructor a question and to participate in class discussions and in answering iClicker questions. If you wish to do well in this course (earn an A or B), we strongly suggest that you attend every class and listen (not text or surf the Internet or watch movies, etc.), use the outlines, clicker questions and lecture notes, form study groups, attend review sessions, schedule office hours with the instructors and/or the GTA to clarify concepts, and study by *practicing* rather than merely looking over your notes (please ask us if you do not know what this means).

More specifically, in LIFE 210 the students and the instructors will abide by the Academic Integrity Policy of CSU as defined in the General Catalog (<http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/#academic-integrity>) and the Student Conduct Code (<https://resolutioncenter.colostate.edu/conduct-services/academic-integrity/>). While taking an exam, the use of any written material, phones (or similar electronic devices), or the assistance of others by looking at their exam or communicating verbally or by text, email, etc. is strictly prohibited. Studying in groups is encouraged. We do suggest that you attempt to complete the quizzes and clicker questions (when provided) individually first (before meeting in groups) to get the maximum benefit in your exam preparation. For answering the iClicker questions during class, discussing the possible answers is strongly encouraged (after attempting to answer them on your own the first time). However, answering these questions for other students that did not decide to attend class (using multiple iClickers) is not permitted, and is against the student conduct code.

Maintaining academic integrity is important in LIFE 210 not just to get the most out of the class, but also because conducting yourself with integrity is core to everyone's self-worth and societal worth. If you let the small stuff slide, the next step is justification of doing a poor job, then plagiarism, then cheating on exams, your homework assignments, your taxes, etc. Even if you are not caught, conducting yourself without integrity eats at your self-esteem. To learn more visit the Practicing Academic Integrity on the Learning@CSU Website (<http://learning.colostate.edu/integrity/index.cfm>).