

01:146:470 Advanced Cell Biology & 01:148:514 Molecular Biology of Cells

(Fall Semester 2021)

<https://canvas.rutgers.edu>

Meeting schedule: Classes are scheduled to meet twice per week in person on Tuesdays and Thursdays, Period 5 (3:00 PM – 4:20 PM) in [room 2225 of the Rutgers Academic Building](#) on College Ave Campus.

Section Coordinator: Prof. Ronald Hart (rhart@rutgers.edu)

Additional Teaching Faculty: Prof. Kelvin Kwan (kwan@dls.rutgers.edu); and Prof. Wei Dai (dai@dls.rutgers.edu)

Office Hours: By arrangement with individual instructors. Please email and set an appointment for an in-person meeting or a videoconference. There will be scheduled review sessions throughout the semester and prior to exams—these will be announced in class and on Canvas.

Learning Goals:

1. Master factual and conceptual knowledge in cell biology that will provide a solid foundation for success in advanced training and professional careers.
2. Develop an ability to summarize, integrate and organize information.
3. Use scientific reasoning to evaluate the potential for current research and new discoveries to improve our understanding of cell biology and its relevance to human health and to our society.

These goals are consistent with those set by the Department of Cell Biology and Neuroscience, as well as the Division of Life Sciences at Rutgers University.

Course Description:

This course addresses advanced concepts of cell biology, focusing on the molecular organization of cells, including internal membranes and synthesis of macromolecules, the cell nucleus, genomics, chromatin function, the cell cycle, cytoskeleton, cell-cell adhesion and the extra-cellular matrix, and signal transduction.

Course Organization and Requirements

- The course will meet in the scheduled classroom.
- In case you miss class due to illness, lost Internet connection, or any other reason, lectures will be recorded and available within Canvas.
- Each student will need a high-speed Internet connection and a web browser to access the Canvas site, lecture materials, and to take exams. A webcam and microphone are recommended to ask questions during class or in discussion meetings. Alternatively, questions may be typed into a chat window.
- The course pre-requisite is:
 - Fundamentals of Cell Biology (146:270).

Course Materials

- Required Text (2021): MOLECULAR CELL BIOLOGY, by Lodish, Berk, Kaiser, Krieger, Bretscher, Ploegh, Martin, Yaffe and Amon 9th Edition, WH Freeman. ISBN-13:978-1-319-20852-3
- Each student is expected to review assigned textbook reading prior to each class.
- All materials assigned by the instructors will be posted in Canvas
- All course materials are copyrighted by the university and the individual instructors. Unauthorized distribution of these materials could violate the University Academic Integrity Policy and may subject you to disciplinary action.

Exams and Grading Policy:

- All exams will be given during class periods.
- There will be two module exams scheduled during the semester and one during the final exam period. These will be mostly multiple choice but may include short-answer questions.
- Quizzes will be given using the online Canvas portal. These are assigned occasionally by individual instructors. These can be taken asynchronously anytime after assignment but before the announced due date and time.

- Three 80-minute module exams will count for 90% of the undergraduate grade (30% each exam). Quizzes will count for 10% of the final grade.
- Graduate students (all students registered for 148:514) will be given an additional section with essay question(s) on the third module exam, worth 10% of the final grade. The remaining exams and quizzes, as calculated for undergraduates, will compose 90% of the final grade.
- Scaling or curving of exam grades will only be applied if class performance on individual exams varies substantially. Otherwise, the standard Rutgers grading scheme will apply, with no rounding of the class averages: A is 90 or above, B+ is 85 to less than 90, B is 80 to less than 85, C+ is 75 to less than 80, C is 70 to less than 75, D is 60 to less than 70, and F is below 60.

Self-Reporting Absence Application

Students are expected to attend all classes; if you expect to miss one or more classes, please use the University absence reporting website <https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. An email is automatically sent to the course director.

Academic Integrity Policy:

<http://academicintegrity.rutgers.edu/academic-integrity-policy/>

Violations include: cheating, fabrication, plagiarism, denying others access to information or material, and facilitating violations of academic integrity.

Students are required to take the *Honor Pledge*:

"On my honor, I pledge that I have neither given nor received any unauthorized aid on this (exam, test, paper)."

Student-Wellness Services:

Just In Case Web App <http://codu.co/cee05e>

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ www.rhscaps.rutgers.edu/

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

Scarlet Listeners

(732) 247-5555 / <http://www.scarletlisteners.com/>

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.

Advanced Cell Biology – Fall 2021 - Class Schedule

Class	Date	Day	Lecturer	Topic	Assignment
1	9/2/2021	Thu		Intro	
2	9/7/2021	Tue	Dai	Cell Junctions and Cell Adhesion	
3	9/9/2021	Thu	Dai	Biomembranes	
4	9/14/2021	Tue	Dai	Transmembrane Transport I - Transporters and Pumps	
5	9/16/2021	Thu	Dai	Transmembrane Transport II - Ion Channels, Cotransport and Transcellular Transport	
6	9/21/2021	Tue	Dai	Receptor-Mediated Endocytosis and The Endocytic Pathway	
7	9/23/2021	Thu	Dai	Molecular Mechanisms of Vesicle Budding and Fusion	
8	9/28/2021	Tue	Dai	Drug Design Targeting Membrane Proteins	
9	9/30/2021	Thu	Dai	Module Review	
10	10/5/2021	Tue	Dai	Exam 1	
11	10/7/2021	Thu	Hart	DNA Polymerase and PCR: Detection of Zika RNA	Ch 5.1,5.2,6.2
12	10/12/2021	Tue	Hart	DNA Sequencing & Single-cell RNAseq	Ch 6.2
13	10/14/2021	Thu	Hart	Genomics, Genetics of Disease & Diagnostics	Ch 7.1,6.3-6.4
14	10/19/2021	Tue	Hart	Chromosome Structure & Epigenetics	Ch 7.2,7.4,7.5,8.6
15	10/21/2021	Thu	Hart	Epigenetics in Drug and Alcohol Abuse	Ch 8
16	10/26/2021	Tue	Hart	DNA Repair & CRISPR Genome Editing	Ch 5.3,6.6
17	10/28/2021	Thu	Hart	Genome Editing & Gene Therapy	Ch 6.6,22.2 (pp. 1009-1013), 9.2 (pp. 405-406)
18	11/2/2021	Tue	Hart	Module Review	
19	11/4/2021	Thu	Hart	Exam 2	
20	11/9/2021	Tue	Kwan	Locating and Identifying Human Disease Genes	
21	11/11/2021	Thu	Kwan	Model Organisms for Studying Human Development	
22	11/16/2021	Tue	Kwan	Disease Modeling with Animals	
23	11/18/2021	Thu	Kwan	Stem Cell Derived Organoids	
24	11/23/2021	Tue	Kwan	Induced Pluripotent Stem Cells for Regenerative Medicine	
	11/25/2021	Thu		Thanksgiving	
25	11/30/2021	Tue	Kwan	Cell Fate Decisions in Development	
26	12/2/2021	Thu	Kwan	Eukaryotic Cell Cycle and Cancer	
27	12/7/2021	Tue	Kwan	Cancer	
28	12/9/2021	Thu	Kwan	Module Review	

Exam 3 will be during final exam period, with assigned time and date announced during the semester.