

BIOLOGICAL SCIENCES 435 (ADVANCED BIOCHEMISTRY)
SPRING SEMESTER 2020

Lecture: Tu Th 9.30-10:50 am, ZOOM (Remote), Discussion: Th 4:00-5:50 pm, ZOOM (Remote)

Professors: Myron F. Goodman, RRI 119C (213-740-5190, mgoodman@usc.edu)

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Text: Berg, Tymoczko & Stryer, Biochemistry 8th ed, 2015 (or 7th ed, 2012)

Online resources (syllabus, lecture notes, etc): Blackboard <http://blackboard.usc.edu>

Week	Date	Lecturer	Lecture Topics	Text Chapter
Week 1	Jan 19	MFG	DNA Polymerases & Mutations	28
	Jan 21	MFG	Base Substitution Mutations & Pol Fidelity	28
Week 2	Jan 26	MFG	Thinking about Kinetics & Pol Fidelity Models Mutation Pathways, T4 & Proofreading	
	Jan 28	MFG	Correcting Spontaneous Errors – Proofreading & MMR	
Week 3	Feb 2	MFG	Correcting Induced Errors – BER	28
	Feb 4	MFG	Okazaki Fragments – “Ancient” History Breathing can be Bad for Your Health	28
Week 4	Feb 9	MFG	Correcting UV Damage – NER	28
	Feb 11	FP	Restriction Enzymes, Biotech Applications, Molecular Specificity, Biophysical Methods	5.0 – 5.2; 8.6 9.3
Week 5	Feb 16	FP	DNA Scanning and Target Search	Assigned Paper
	Feb 18	MFG	AID-DNA Scanning – Human Hypermutation Human Adaptive Immunity	34
Week 6	Feb 23	MFG	Sloppier Copier Pols – Bacterial Hypermutation	
	Feb 25	MFG	Pathogenic Bacteria – A bacterial pandemic	
Week 7	Mar 2	MFG	Bacterial Restriction-Modification – Kill or be Killed	
	Mar 4	MFG	CRISPR-Cas Bacterial Adaptive Immunity	
Week 8	Mar 9	MFG	Mutations & Human Disease & Gene Therapy	
	Mar 11	MFG	3R Overview	
Week 9	Mar 16	EXAM 1	MIDTERM	
	Mar 18	FP	Control of gene expression in eukaryote by DNA packaging	32-32.3 + assigned paper
Week 10	Mar 23	Wellness day		
	Mar 25	FP	Control of gene expression in eukaryote by specific DNA recognition	29 (intro), 29.1 (861-864), 29.2 +assigned paper
Week 11	Mar 30	FP	Eukaryotic transcription machinery: RNA pol II, initiation, elongation	29 (intro), 29.1 (861-864), 29.2 +assigned paper
	Apr 1	FP	Transcription in Eukaryotes: termination, mRNA processing, splicing and export	29.3 + assigned paper
Week 12	Apr 6	FP	Protein Synthesis: Ribosomes, translation initiation and elongation	30-30.3 + assigned paper
	Apr 8	FP	Protein Synthesis: Translation termination & inhibition. Secretory and membrane proteins	30.3, 30.5-30.6
Week 13	Apr 13	FP	Biophysics of cell membrane: Lipid interactions and phase diagrams	Review 12 + assigned paper
	Apr 15	FP	Biophysics of cell membrane: Lipid microdomains	assigned paper
Week 14	Apr 20	FP	Molecular motors: Myosin V structure and functions	9.4, 35-35.2 + assigned paper
	Apr 22	Wellness day		

Week 15	Apr 27	FP	Molecular motors: Power stroke, processivity, ATP cycle during muscle work	9.4, 35-35.2 + assigned paper
	Apr 29	FP	Review session	
Week 16	May 4	Study days		
	May 6	EXAM 2	FINAL	

Discussion Sessions: You need to examine current respected research journals* in Biochemistry and Molecular Biology found in Seaver Library, or online and select a recently published (2014 – 2021) research article on an interesting, well-described topic for a 15-20 min oral presentation and 5-10 min discussion of selected data presented on one sheet (2-page) printed handout. Your active participation (attendance, alertness, and interest in other presentations) indicated by the questions you ask, will be counted toward your discussion grade, in addition to your own oral presentation and printed handout. More information will be provided by Drs. Goodman and Pinaud, at the first class meeting and discussion session.

* Recommended journals whose research articles are refereed before publication:

Journal of Biological Chemistry, Biochemistry, Proceedings of the National Academy of Sciences (USA), Science, Nature, Cell, Journal of Molecular Biology, PLOS Genetics, Nucleic Acids Research.

Grading:

Exam 1 100 pts
Exam 2 100 pts
Discussion (your Oral Presentation and Questions) 100 pts
TOTAL = 300 pts

Letter grades are determined by a curve based upon total points. However, with the Covid pandemic, a pass/fail option is available at the student's discretion.

Other Policies:

1. Exam dates are firm. Exams will be taken remotely (on-line)

If a student misses an exam due to a true emergency (with an acceptable written excuse; written information concerning a death in the family must be provided). At the Professors' discretion, use of the average of other exams and Discussion may suffice in determining the course grade.

2. Regrading of exams will be done only by the professor(s) who wrote the question(s) and only within one week of the day the exam is returned to class.

3. No special assignments for extra credit are given.

4. Academic integrity policies of the university will be strictly followed. Infractions can result in severe penalties. See SCampus for these policies.

5. It may be necessary to make some adjustments in the syllabus during semester.

6. Disability: Students requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP when adequate documentation is filed. Please be sure the letter is delivered to one of the professors as early in the semester as possible. DSP is open Mon-Fri, 8:30 am-5:00 pm. in Room 120. Grace Ford Salvatori Hall, 2601 Watt Way; phone number (213)740-0776; FAX (213)740-8216; Email <ability@usc.edu>

Support Systems:

Student Health Counseling Services - (213) 740-9355 – 24/7 on call: <https://studenthealth.usc.edu/counseling/>.

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call: suicidepreventionlifeline.org . Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services - (213) 740-9355(WELL), press “0” after hours – 24/7 on call: studenthealth.usc.edu/sexual-assault.

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) (213) 740-5086 | Title IX – (213) 821-8298: equity.usc.edu, titleix.usc.edu.

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298: usc-advocate.symplicity.com/care_report.

Avenue to report incidents of bias, hate crimes, and micro-aggressions for appropriate investigation and response.

The Office of Disability Services and Programs - (213) 740-0776: dsp.usc.edu.

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support & Intervention - (213) 821-4710: campussupport.usc.edu.

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101: diversity.usc.edu

Information on events, programs and training, the Provost’s Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call: dps.usc.edu, emergency.usc.edu.

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call: dps.usc.edu.

Non-emergency assistance or information.