

**BIOLOGICAL SCIENCES 435 (ADVANCED BIOCHEMISTRY)
SPRING SEMESTER 2018**

Lecture: TTh 9.30-10:50, ZHS 163, **Discussion:** T 2:00-3:50, VPD 116

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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 9	MFG	DNA Polymerases	28 – 28.2
	Jan 11	MFG	Biochemistry of Leading & Lagging Strand Replication	28.3
Week 2	Jan 16	MFG	Biochemical Basis of Spontaneous Mutations	28.4
	Jan 18	MFG	Mismatch & Base Excision Repair	28.4 – 28.5
Week 3	Jan 23	MFG	Enzymatic Targeting of Oxidative DNA Damage DNA	28.4 – 28.5
	Jan 25	MFG	Biological Consequences of DNA Damage; Nucleotide Excision Repair	28.4– 28.5
Week 4	Jan 30	MFG	Specialized, Sloppier Copier DNA Polymerases; Polymerase Exchange	28.4 – 28.5
Week 5	Feb 1	MFG	SOS Error-prone Repair; Fitness and Evolution	6, 34
	Feb 6	MFG	Generating Immunological Diversity – Good Mutations	34
	Feb 8	JP	DNA, RNA Structures and Associated Activities	1, 4
Week 6	Feb 13	MFG	MIDTERM I	
	Feb 15	JP	Protein Structures & Their Interactions with DNA	2
Week 7	Feb 20	JP	Structural Features Involved in Sequence-Specific DNA-Protein Interactions	28 – 28.2
	Feb 22	JP	DNA Sequence Recognition by Restriction/ Modification Enzymes in Prokaryotes	5 – 5.1, 9.3
Week 8	Feb 27	JP	Modification Enzymes in Mutagenesis & Epigenetics	6, 7.4, 24.2 – 32 – 32.1
	Mar 1	JP	DNA Sequence Recognition by Prokaryotic Transcription Factors	29 – 29.2 31 – 31.3
Week 9	Mar 6	JP	DNA Sequence Recognition by Eukaryotic Transcription Factors	32.1 – 32.3
	Mar 8	JP	General & Cell-Specific Transcription Factors in Eukaryotes	34
	Mar 12-17		SPRING BREAK	

Week 10	Mar 20	JP	Eukaryotic RNA Modifications: Capping, Intron Removal and PolyA Tail Addition	29.3 – 29.4
	Mar 22	JP	RNA Interference (RNAi). CRISPR Cas9 as Biochemical Toolx in Specific Gene Silencing	4.4, 5.4, 32.4
Week 11	Mar 27	JP	MIDTERM II	
	Mar 29	XC	X-Ray Crystallographic and NMR Solution Analysis	3, 6
Week 12	Apr 4	XC	Relating Structure & Function	2 + Appendix
	Apr 6	XC	DNA Replication Fork Motion – Topology and Energetics	28.1 – 28.3
Week 13	Apr 11	XC	Structure and Function of Helicases	28.2 – 28.4
	Apr 13	XC	Structure and Function of Kinesins	35.1 – 35.3
Week 14	Apr 18	XC	How Does ATP Hydrolysis Produce Movement?	35.3 – 35.4
	Apr 20	XC	Structural Aspects of APOBEC Family of DNA C Deaminases	28.4, 29.3
Week 15	Apr 25	XC	Uracil Glycosylase Search and Destroy Mechanism	28.4
	Apr 27	XC	FAPY Glycosylase Search and Destroy Mechanism	28.4
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Discussion Sessions: You will examine current respected research journals* in Biochemistry and Molecular Biology (e.g. in Seaver Library, or online) and select a recently published (2012 – 2018) research article on an interesting, well-described topic for a 15-20 min oral presentation and 5-10 min discussion. Participation (your attendance, alertness, and interest in other presentations indicated by asking questions) will be counted toward your grade, in addition to your own oral presentation performance. More information will be provided by Dr. Petruska 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.

Grading:

Midterm 1 100 pts
 Midterm 2 100 pts
 Final 100 pts
 Discussion (Including Oral Presentations & Questions) 100 pts
 TOTAL = 400 pts

Letter grades are determined by a curve based upon total points.

Other Policies:

1. **Exam dates are firm.** 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), Dr. Petruska MAY schedule a make-up exam, or at his discretion MAY permit use of the average of other exams in determining course grade. **No one will be admitted to an exam after the first student has left the exam.**

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. No exams written in pencil will be regraded.

3. No special assignments for extra credit are given.

4. Final exams will be kept in Dr. Petruska's office for the required period.

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

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

7. 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 Dr. Petruska as early in the semester as possible. DSP is open Mon-Fri, 8:30-5:00. in Room 120. Grace Ford Salvatori Hall, 2601 Watt Way; phone number (213)740-0776; FAX (213)740-8216; Email <ability@usc.edu>