

**BIOLOGICAL SCIENCES 435 (ADVANCED BIOCHEMISTRY)
SPRING SEMESTER 2016**

Lecture: TTh 9.30-10:50, KAP 158, **Discussion:** T 2:00-3:50, KAP 145

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Text: Berg, Tymoczko & Stryer, *Biochemistry* (7th ed, 2012)

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

Week	Date	Lecturer	Lecture Topics	Text Chapter
Week 1	Jan 12	JP	DNA, RNA Structures and Associated Activities	1, 4
	Jan 14	JP	Protein Structures & Their Interactions with DNA	2
Week 2	Jan 19	JP	Structural Features Involved in Sequence-Specific DNA-Protein Interactions	28–28.2
	Jan 21	JP	DNA Sequence Recognition by Restriction/ Modification Enzymes in Prokaryotes	5–5.1, 9.3
Week 3	Jan 26	JP	DNA Modification Enzymes in Mutagenesis & Epigenetics	6, 7.4, 24.2–3 32–32.1
	Jan 28	JP	DNA Sequence Recognition by Prokaryotic Transcription Factors	29–29.2 31–31.3
Week 4	Feb 2	JP	DNA Sequence Recognition by Eukaryotic Transcription Factors	32.1–32.3
	Feb 4	JP	General and Cell-Specific Transcription Factors in Eukaryotes	29.2 32.2 – 32.4
	Feb 9	JP	MIDTERM 1	
	Feb 11	MFG	DNA Polymerases	28 – 28.2
Week 6	Feb 16	MFG	Biochemistry of Leading & Lagging Strand Replication	28.3
	Feb 18	MFG	Biochemical Basis of Spontaneous Mutation	28.4
Week 7	Feb 23	MFG	Mismatch & Base Excision Repair	28.4 – 28.5
	Feb 25	MFG	Enzymatic Targeting of Oxidative DNA Damage	28.4 – 28.5
Week 8	Mar 1	MFG	Biological Consequences of DNA Damage; Nucleotide Excision Repair	28.4 – 28.5
	Mar 3	MFG	Specialized, Sloppier Copier	28.4 – 28.5

			DNA polymerases; Polymerase Exchange	
Week 9	Mar 8	MFG	SOS Error-prone Repair, Fitness & Evolution	6, 34
	Mar 10	MFG	Generating Immunological Diversity – Good Mutations	34
	Mar 14-18		SPRING BREAK	
Week 10	Mar 22	JP	Eukaryotic RNA Modifications: Capping, Splicing and PolyA Tail Addition	29.3 – 29.4
	Mar 24	JP	RNA Interference (RNAi) as a Biochemical Process in Specific Gene Silencing	4.4, 5.4, 32.4
Week 11	Mar 29	JP, MFG	MIDTERM 2	
	Mar 31	XC	X-Ray Crystallographic and NMR Solution Analysis	3, 6
Week 12	Apr 5	XC	Relating Structure & Function	2 + Appendix
	Apr 7	XC	DNA Replication Fork Motion – Topology and Energetics	28.1 – 28.3
Week 13	Apr 12	XC	Structure and Function of Helicases	28.2 – 28.4
	Apr 14	XC	Structure and Function of Kinesins	35.1 – 35.3
Week 14	Apr 19	XC	How Does ATP Hydrolysis Produce Movement?	35.3 – 35.4
	Apr 21	XC	Structural Aspects of APOBEC Family of DNA C Deaminases	28.4, 29.3
Week 15	Apr 26	XC	Uracil Glycosylase Search and Destroy Mechanism	28.4
	Apr 28	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 (2011-2016) research article on an interesting, well-described topic for a 15-20 min oral presentation and 5-10 min discussion. Participation (attendance, alertness, and interest in other presentations indicated by asking questions) will be counted toward your grade, in addition to your oral presentation and discussion 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. The office is in Student Union 301; phone number is 740-0776.