

## MCB 210 – SPRING 2014 - Schedule &amp; Lecture Topics Outline

## PART 1

Lecture	Date	Day	Topic
1	Jan. 21	TU	D. Rio - Nucleic acid (DNA and RNA) structure, RNA folding, protein-DNA and protein-RNA recognition; assays for detection
2	Jan. 22	TH	D. Rio – DNA polymerase mechanisms and fidelity, functional diversity, biochemical specialization, accessory factors; applications, high-throughput DNA sequencing methodologies
	Jan. 24	F	Discussion 1
3	Jan. 28	TU	G. Karpen - Chromosome structure, nucleosomes, chromatin, epigenomics
4	Jan. 30	TH	G. Karpen - Chromosome segregation, centromeres, and nuclear architecture
	Jan. 31	F	Discussion 2
5	Feb. 4	TU	S. Tsutakawa (LBNL) - Types and sources of DNA damage; base excision repair
6	Feb. 6	TH	J. Fuss (LBNL) - Other DNA damage repair pathways; cross-talk to other cellular processes
	Feb. 7	F	Discussion 3
7	Feb. 11	TU	J. Cate - Translation I: structural biology of the ribosome and translation factors
8	Feb. 13	TH	J. Cate - Translation II: RNA-mediated controls (Shine-Delgarno, RRM, and eIF4G, polyA tails and PABP, uORFs, IRES elements, etc.)
	Feb. 14	F	Discussion 4
9	Feb. 18	TU	J. Thorner - Protein folding and acquisition of protein function <i>in vivo</i> ; protein precursor processing, zymogen activation, intein splicing
10	Feb. 20	TH	J. Thorner - Protein degradation and other functions of the ubiquitin-proteasome system,; SUMO and other ubiquitin-like proteins; autophagy
	Feb. 21	F	Discussion 5
<b>EXAM 1</b>	<b>Feb. 24</b>	<b>MON</b>	<b>6:30 - 9:00 PM, 2060 VLSB</b>

## PART 2

Lecture	Date	Day	Topic
11	Feb. 25	TU	D. Rio - General and site-specific recombination
12	Feb. 27	TH	D. Rio - Transposition, retrovirus integration, V(D)J recombination, other DNA rearrangements, genome organization
	Feb. 28	F	Discussion 6
13	Mar. 4	TU	D. Rio - Prokaryotic mechanisms of transcription, RNA polymerase and its regulation
14	Mar. 6	TH	D. Rio - The eukaryotic transcriptional machinery and chromatin in gene regulation
	Mar. 7	F	Discussion 7
15	Mar. 11	TU	D. Rio - Enhancers, activators, repression, and regulatory motifs

16	Mar. 13	TH	D. Rio - pre-mRNA splicing I: discovery, mechanism, fidelity and specificity
	Mar. 14	F	Discussion 8
17	Mar. 18	TU	D. Rio - pre-mRNA splicing II: alternative splicing, RNA-binding proteins and the regulation of splice site selection, genome-wide approaches
18	Mar. 20	TH	D. Rio - Other RNA processing reactions: capping, polyadenylation, RNA editing, RNA degradation, NMD (nonsense-mediated decay)
	Mar. 21	F	Discussion 9
			SPRING BREAK WEEK March 24-28
19	Apr. 1	TU	D. Rio - Catalytic RNA, ribozymes, aptamers; riboswitches
20	Apr. 3	TH	D. Rio - More on RNA interference (RNAi): microRNAs, piRNAs, and siRNAs
	Apr. 4	F	Discussion 10
<b>EXAM 2</b>	<b>Apr. 7</b>	<b>MON</b>	<b>6:30 - 9:00 PM, 159 Mulford Hall</b>

### PART 3

Lecture	Date	Day	Topic
21	Apr. 8	TU	J. Thorner - Biochemical basis of nucleocytoplasmic trafficking and its control
22	Apr. 10	TH	J. Thorner - The TORC complexes: essential and universal regulators of cell metabolism, growth and proliferation
	Apr. 11	F	Discussion 11
23	Apr. 15	TU	J. Thorner - Signal transduction mechanisms: receptors, scaffolds, adaptors, anchoring proteins; second messengers
24	Apr. 17	TH	J. Thorner - G-proteins: diversity, structure, mechanism, function and regulation
	Apr. 18	F	Discussion 12
25	Apr. 22	TU	J. Thorner - Protein kinases: diversity, structure, mechanism, function and regulation
26	Apr. 24	TH	J. Thorner - Phosphoprotein phosphatases: diversity, structure, mechanism, function and regulation
	Apr. 25	F	Discussion 13
27	Apr. 29	TU	J. Thorner - Modulation of transcription by extracellular and intracellular signaling pathways
28	May 1	TH	J. Thorner - The eukaryotic cell cycle, control of proliferation, checkpoints, cancer and apoptosis
	May 2	F	Discussion 14
29	May 6	TU	RRR week
30	May 8	TH	RRR week
	May 9	F	RRR week
<b>EXAM 3</b>	<b>May 15</b>	<b>THURS</b>	<b>3:00-6:00 PM, Room TBA (Exam Grp. #15)</b>