

MCB 210 – SPRING 2017 - Schedule & Lecture Topics Outline - DRAFT

PART 1

Lecture	Date	Day	
1	Jan. 17	TU	N. Ingolia - Structures of DNA and RNA; nucleotide synthesis; ribonucleotide reductase; properties of bases and nucleotides; base-pairing (W-C vss Hoogstein vs Z DNA/cruciforms); RNA structural motifs
2	Jan. 19	TH	N. Ingolia - Modes of protein-DNA and protein-RNA recognition; assessing protein-nucleic acid binding; proteins for genome editing.
	Jan. 20	F	Discussion Sections 1 (N. Ingolia)
3	Jan. 24	TU	K. Collins - DNA Replication; DNA Primases; DNA polymerases; accessory factors in replication, including helicases and topoisomerases.
4	Jan. 26	TH	K. Collins - Initiation of DNA replication; replication origins and origin-binding proteins; termination of DNA replication; telomeres and telomerases.
	Jan. 27	F	Discussion Sections 2 (K. Collins)
5	Jan. 31	TU	E. Ünal - Chromosome organization and architecture; analysis of long-range interactions (3C, etc.); nucleosomes and chromatin remodeling; integration with the cell cycle.
6	Feb. 2	TH	E. Ünal - Euchromatin and heterochromatin; epigenetics; histone modifications; gene silencing; imprinting; etc.
	Feb. 3	F	Discussion Sections 3 (E. Ünal)
7	Feb. 7	TU	S. Tsutakawa (LBNL) - DNA repair I: Types and sources of DNA damage; mismatch repair and base excision repair.
8	Feb. 9	TH	J. Fuss (LBNL) - DNA repair II: Nucleotide excision repair, double strand break repair, crosslink repair; crosstalk to other cellular pathways
	Feb. 10	F	Discussion Sections 4 (jointly led by J. Fuss & S. Tsutakawa)
EXAM 1	???	???	??? PM, Location ???

PART 2

Lecture	Date	Day	Topic
9	Feb. 14	TU	D. Rio - General and site-specific recombination
10	Feb. 16	TH	D. Rio - Transposition, retrovirus integration, V(D)J recombination, other DNA rearrangements, genome organization
	Feb. 17	F	Discussion Sections 5 (D. Rio)
11	Feb. 21	TU	D. Rio - Prokaryotic mechanisms of transcription, RNA polymerase and its regulation
12	Feb. 23	TH	D. Rio - The eukaryotic transcriptional machinery and chromatin in gene regulation
	Feb. 24	F	Discussion Sections 6 (D. Rio)
13	Feb. 28	TU	D. Rio - Enhancers, activators, repression, and regulatory motifs

14	Mar. 2	TH	D. Rio - pre-mRNA splicing I: discovery, mechanism, fidelity and specificity
	Mar. 3	F	Discussion Sections 7 (D. Rio)
15	Mar. 7	TU	J. Thorner - Biochemical basis of nucleocytoplasmic trafficking and its control
16	Mar. 9	TH	J. Thorner - Regulation of cell growth and metabolism by the TORC complexes
	Mar. 10	F	Discussion Sections 8 (J. Thorner)
17	Mar. 14	TU	J. Thorner - Protein folding and acquisition of protein function <i>in vivo</i> ; protein precursor processing, zymogen activation, intein splicing
18	Mar. 16	TH	J. Thorner - Protein degradation and other functions of the ubiquitin-proteasome system; SUMO and other ubiquitin-like proteins; autophagy
	Mar. 17	F	Discussion Sections 9 (J. Thorner)
EXAM 2	???	???	??? PM, Location ???

PART 3

Lecture	Date	Day	Topic
19	Mar. 21	TU	D. Rio - pre-mRNA splicing II: alternative splicing, RNA-binding proteins and the regulation of splice site selection, genome-wide approaches
20	Mar. 23	TH	D. Rio - Other RNA processing reactions: capping, polyadenylation, RNA editing, RNA degradation pathways, NMD (nonsense-mediated decay)
	Mar. 24	F	Discussion Sections 10 (D. Rio)
			SPRING BREAK WEEK 27-31 March
21	Apr. 4	TU	D. Rio - Catalytic RNA, ribozymes, aptamers; riboswitches – RNA-ligand interactions
22	Apr. 6	TH	D. Rio - RNA interference (RNAi), small RNA pathways, microRNAs, piRNAs, and siRNAs
	Apr. 7	F	Discussion Sections 11 (D. Rio)
23	Apr. 11	TU	J. Thorner - Signal transduction mechanisms: receptors, scaffolds, adaptors, anchoring proteins; second messengers
24	Apr. 13	TH	J. Thorner - G-proteins: diversity, structure, mechanism, function and regulation
	Apr. 14	F	Discussion Sections 12 (J. Thorner)
25	Apr. 18	TU	J. Thorner - Protein kinases: diversity, structure, mechanism, function and regulation
26	Apr. 20	TH	J. Thorner - Phosphoprotein phosphatases: diversity, structure, mechanism, function and regulation
	Apr. 21	F	Discussion Sections 13 (J. Thorner)
27	Apr. 25	TU	J. Thorner - Modulation of transcription by extracellular and intracellular signaling pathways
28	Apr. 27	TH	J. Thorner - Control of cell proliferation, molecular basis of cancers, apoptosis
	Apr. 28	F	Discussion Sections 14 (J. Thorner)
			RRR WEEK 1-5 May
EXAM 3	May 11	TH	3:00-6:00 PM, Location TBA