Title: Eukaryotic Molecular Biology, Pharmacology 620/Biochemistry 620
MWF 11:00-11:50 in Microbial Sciences, Room 1420

Professors:
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Course description: This course focuses on the basic molecular mechanisms that regulate DNA, RNA, and protein metabolism in eukaryotic organisms. The course is intended for advanced undergraduates and first years graduate students with a firm knowledge of basic biochemistry.

Prerequisites: Biochemistry 508 or equivalent

Date	Topic	Highlighted paper	Instructor
(W) Jan 19	Orientation-The Central Dogma	-	W & A
(F) Jan 21	RNA pol I transcription	*Genes Dev.* 20, 2030 (2006)	Wassarman
(M) Jan 24	RNA pol I & III transcription	To be determined (TBD)	Wassarman
(W) Jan 26	RNA pol III transcription & proposal	Proposal instructions	Wassarman
(F) Jan 28	Discussion-1		Wassarman
(M) Jan 31	RNA pol II-transcription-I	TBD	Ansari
(W) Feb 2	RNA pol II transcription-II	TBD	Ansari
(F) Feb 4	RNA pol II transcription-III	TBD	Ansari
(M) Feb 7	RNA pol II transcription-IV	TBD	Ansari
(W) Feb 9	Discussion-2		Wassarman
(F) Feb 11	Chromatin & epigenetics overview	TBD	Wassarman
(M) Feb 14	Chromatin-histone modification	TBD	Wassarman
(W) Feb 16	Chromatin-remodeling	TBD	Wassarman
(F) Feb 18	Discussion-3		Wassarman
(M) Feb 21	Chromatin-histone variants	TBD	Wassarman
(W) Feb 23	Chromatin-dosage compensation	TBD	Wassarman
(F) Feb 25	**Exam 1**		W & A
(M) Feb 28	Pre-mRNA splicing-I	TBD	Wassarman
(W) March 2	Pre-mRNA splicing-II	TBD	Wassarman
(F) March 4	Discussion-4		Wassarman
(M) March 7	Alternative splicing	TBD	Wassarman
(W) March 9	Capping and polyadenylation	TBD	Wassarman
(F) March 11	Discussion-5	**Paper-part 1 due**	Wassarman
(M) March 14	Spring break		
(W) March 16	Spring break		
(F) March 18	Spring break		
(M) March 21	mRNA decay		Wassarman
(W) March 23	siRNAs-RNAi	TBD	Wassarman
(F) March 25	miRNAs and RNA editing	TBD	Wassarman
(M) March 28	Discussion-6		Wassarman
(W) March 30	tRNA and rRNA processing	TBD	Wassarman
(F) April 1	Other ncRNAs	TBD	Wassarman

(M) April 4	Discussion-7	TBD	Wassarman
(W) April 6	**Exam 2**		Wassarman
(F) April 8	Translation initiation	TBD	Ansari
(M) April 11	Translation elongation	TBD	Ansari
(W) April 13	Translation termination	TBD	Ansari
(F) April 15	Discussion-8		Wassarman
(M) April 18	Translation regulation	TBD	Ansari
(W) April 20	Protein chaperones	TBD	Ansari
(F) April 22	Discussion-9	**Paper-part 2 due**	Wassarman
(M) April 25	DNA replication-I	TBD	Ansari
(W) April 27	DNA replication-II	TBD	Ansari
(F) April 29	Discussion-10		Wassarman
(M) May 2	DNA repair and ageing	TBD	Ansari
(W) May 4	Genomics	TBD	Ansari
(F) May 6	Proteomics	TBD	Ansari
(Sun) May 8	**Exam 3**		Ansari

Class format: The class will meet MWF for 50 minutes. Information will be presented in two formats. For two-thirds of the meetings, faculty will present lectures on topics central to the discipline of eukaryotic molecular biology. For one-third of the meetings (listed as "Discussion" in the syllabus), students and faculty will discuss the design and interpretation of experiments in eukaryotic molecular biology. The goals of both types of meetings are to instruct students how to critically analyze molecular biology data, how to identify open questions in the field of molecular biology, and how to design experiments that address the open questions.

Reading: Highlighted papers should be read prior to the class session. These papers serve multiple purposes; introduction sections provide a review of a specific topic, results sections provide key advances in a specific topic, methods sections provide details of experimental approaches, discussion sections provide critical analyses of the data, and references provide pathways to additional information on a specific topic.

Writing: The assignment is to choose one eukaryotic gene of unknown function and write a 4-page research paper that proposes molecular biology approaches to determine the function of the gene (i.e., the encoded RNA or protein). The purpose of this assignment is to enhance literature research, experimental design, and critical analysis skills.

Grades: Grades will be assigned based on total points earned, with a maximum of 400. Each exam is worth 100 points. Exams will follow completion of the major sections of the course; exam 1-transcription, exam 2-RNA processing, exam 3-translation and DNA metabolism (see syllabus). The paper is worth 100 points.

Web site: The course web site at Learn@UW contains the syllabus, instructions for the research paper, PowerPoint lecture notes, sample exams from past years, and pdf files of highlighted papers. Research papers will be turned in through the "dropbox".