

Eukaryotic Molecular Biology, Biochemistry/CRB 620

Time and place: MWF 11:00-11:50, Biochemical Sciences Building (BSB), Room 1211

Instructors:

Dr. David Wassarman, Department of Medical Genetics, 4262 Genetics/Biotech, dawassarman@wisc.edu
 Dr. Aseem Ansari, Department of Biochemistry and the Genome Center, 315C Biochemistry Addition, ansari@biochem.wisc.edu

Teaching Assistant:

Kim Krautkramer, Integrated Program in Biochemistry, kkrautkramer@wisc.edu

Course description: This course focuses on solving problems related to 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	Assignments	Instructor
(W) Jan 20	1	Orientation		Wassarman
(F) Jan 22	2	RNA pol I transcription		Wassarman
(M) Jan 25	3	RNA pol I and Research proposal		Wassarman
(W) Jan 27	4	RNA pol II transcription		Wassarman
(F) Jan 29	5	RNA pol II transcription	Discussion 1	Wassarman
(M) Feb 1	6	Discussion 1		Wassarman
(W) Feb 3	7	RNA pol II transcription		Wassarman
(F) Feb 5	8	RNA pol II transcription		Wassarman
(M) Feb 8	9	RNA pol III transcription	Discussion 2	Wassarman
(W) Feb 10	10	Discussion 2		Wassarman
(F) Feb 12	11	RNA pol III transcription		Wassarman
(M) Feb 15	12	Chromatin		Wassarman
(W) Feb 17	13	Chromatin		Wassarman
(F) Feb 19	14	Chromatin	Discussion 3	Wassarman
(M) Feb 22	15	Discussion 3		Wassarman
(W) Feb 24	16	Chromatin		Wassarman
(F) Feb 26	17	Exam 1		Wassarman
(M) Feb 29	18	Pre-mRNA splicing		Wassarman
(W) March 2	19	Pre-mRNA splicing		Wassarman
(F) March 4	20	Pre-mRNA splicing	Discussion 4	Wassarman
(M) March 7	21	Discussion 4		Wassarman
(W) March 9	22	Capping and polyadenylation		Wassarman
(F) March 11	23	Polyadenylation	Research proposal-part 1	Wassarman
(M) March 14	24	RNA decay	Discussion 5	Wassarman
(W) March 16	25	Discussion 5		Wassarman
(F) March 18	26	RNA decay		Wassarman
(M) March 21		Spring break		
(W) March 23		Spring break		
(F) March 25		Spring break		
(M) March 28	27	RNA decay		Wassarman

(W) March 30	28	siRNAs	Discussion 6	Wassarman
(F) April 1	29	Discussion 6		Wassarman
(M) April 4	30	miRNAs		Wassarman
(W) April 6	31	Other RNA-related events		Wassarman
(F) April 8	32	Exam 2		Wassarman
(M) April 11	33	Translation		Ansari
(W) April 13	34	Translation		Ansari
(F) April 15	35	Translation		Ansari
(M) April 18	36	Translation	Discussion 7	Ansari
(W) April 20	37	Discussion 7		Ansari
(F) April 22	38	DNA replication		Ansari
(M) April 25	39	DNA replication	Research proposal-part 2	Ansari
(W) April 27	40	DNA damage and repair		Ansari
(F) April 29	41	DNA repair		Ansari
(M) May 2	42	Genomes and genomics	Discussion 8	Ansari
(W) May 4	43	Discussion 8		Ansari
(F) May 6	44	Genome engineering		Ansari
(F) May 13	45	Exam 3	2:45-4:45, room pending	Ansari

Learning objective: The primary goal of the class is for students to develop the problem solving skills necessary to make research discoveries in the field of eukaryotic molecular biology.

Class format: The class will meet MWF for 50 minutes. Information will be presented in two formats. In 34 sessions, faculty will present lectures on topics central to the discipline of eukaryotic molecular biology. In 8 sessions (listed as "Discussion" in the syllabus), students and faculty will discuss assignments aimed at developing problem solving skills in eukaryotic molecular biology. The final 3 sessions will be exams.

Discussion assignments: Students should turn in the Discussion assignments at the beginning of the class prior to the Discussion. Answers should be less than 1 page.

Research proposal assignment: The assignment is to choose one eukaryotic gene of unknown function and write a 4-page paper that proposes molecular biology approaches to determine the function of the gene (*i.e.*, the encoded RNA or protein). Details will be provided in the third class session.

Exams: Exams will follow completion of the major sections of the course: exam 1-transcription, exam 2-post-transcriptional events, exam 3-translation, genomics, and proteomics (see syllabus). Students can use notes on one 8.5 x 11 inch page (both sides) during the exams. The format of the exams will be the same as the Discussion assignments. A review session led by the Teaching Assistant will be held a few days prior to each exam.

Grades: Grades will be assigned based on total points earned, with a maximum of 480. Each exam is 100 points. The research proposal is 100 points. Each Discussion assignment is 10 points.

Web site: The course web site at Learn@UW contains the syllabus, instructions for the research proposal, PowerPoint lecture notes, Discussion assignments, sample exams from last year, and sample research proposals from past students.

Resources for additional information: Textbooks are a great resource for basic information. Primary research articles, review articles, and the internet can provide more specific and current information.