

MMBB 487/587

EUCARYOTIC MOLECULAR GENETICS

**FUNDAMENTAL MOLECULAR MECHANISMS THAT DEFINE THE BIOLOGY
AND GENETICS OF EUCARYOTIC ORGANISMS**

FALL SEMESTER 2008

MMBB 487/587

Tuesday and Thursday: 9:30-10:45AM

Life Sciences 163

B.L. Miller

Office: 133 Life Sciences Bldg.

Office Hours: by appointment

PREREQUISITES:

MMBB 541 & MMBB 585

or

MMBB 480, Biol. 210/Genet 314, MMBB 488

MMBB 485 (recommended)

REQUIRED TEXT/READING MATERIAL:

1. **GENES IX** (2008) Benjamin Lewin; Jones & Bartlett, MA
2. Assigned Articles from the Literature: Recent literature available as PDFs. Copies of older papers and examples of previous exams in top drawer of file cabinet in the MMBB Mail room.

EXAMS (TENTATIVE SCHEDULE)

Exam I	Thur.	25	Sept. '08	lectures 1-9	150 pts
Exam II	Thur.	30	Oct. '08	lectures 10-18	150 pts
Exam III	Thur.	04	Dec. '08	lectures 19-27	150 pts
Total					450 pts

Exams are normally held in the evenings (6-9 PM) with a maximum of 3 hrs. allotted time. There is no cumulative final exam. However, each Exam builds upon knowledge covered in prior exams. All exams are graded on a curve that is based upon the mean and standard deviation. Plan in advance for the exam

days. Last minute, individual requests for exam day changes will not be allowed. Excused exams and assignments will be granted only as defined by the University of Idaho General Catalog. Refer to General Requirements and Academic Procedures, section M. Unexcused or missed exams will receive a grade of F.

ADDITIONAL LECTURES WILL BE HELD DURING DEAD WEEK

ADVISORY

Academic Dishonesty: Acts of cheating or plagiarism in MMBB 487/587 will result in an automatic zero for that exam or assignment. A zero on any one exam or assignment will result in an F as a final course grade. Please be aware that all parties involved in an act of cheating or plagiarism will be penalized. Cheating refers to the acquisition of answers to test questions or assigned materials in a dishonest fashion. Plagiarism is defined as 1) the use of another person's writing as your own and/or 2) the use of writing from published sources without citation. Plagiarism includes copying or paraphrasing another's writing with slight changes in wording.

EUCARYOTIC MOLECULAR GENETICS

FALL SEMESTER 2008

(tentative schedule)

GENOME ORGANIZATION

Chapt. 3, 4, 5, 6

Nuclear genome organization

Plastid Genomes: Mitochondria

Plastid Genomes: Chloroplast

Chapt. 28, 29, 30, 31

Chromatin and Chromosome Structure (nucleosomes, centromeres, telomeres)

Transcriptionally Inactive vs. Active Chromatin and Regulated Gene Expression

Chromatin Remodeling

The Histone Code and Epigenetic Regulation of Gene Expression

Chapt. 15, 18, 19, 20

DNA and Chromatin Replication/ Potential Roles in Gene Regulation

Origins of Replication

.....

GENE STRUCTURE AND EXPRESSION

Chapt. 11, 12 (review of procaryotes) 24, 25, 30, 31

Regulation of Gene Expression I: promoter structure and expression of Pol I & Pol III genes

Regulation of Gene Expression II: promoter structure and expression of Pol II genes,
enhancers, silencers, UAS/URS response elements

Regulation of Gene Expression III: organization and formation of transcriptional apparatus,

factors, DNA-
structure/function analysis of transcriptional
binding proteins, co-activators, adapters, chromatin
remodelling, etc.

Regulation of Gene Expression IV: the role of small RNAs & microRNAs in gene regulation

Chapt. 7, 26, 27

RNA Processing I: tRNA, rRNA mechanisms, type I and type II introns etc.

RNA Processing II: hnRNA processing: capping, polyadenylation, intron structure, spliceosomes

RNA Processing III: trans-splicing, RNA editing

Chapt. 7, 8

Translation I: general mechanisms, comparison of prokaryotic and eukaryotic translation

Translation II: post transcriptional and translational regulation mechanisms; role of 5' and 3' UTRs

DEVELOPMENTAL GENETICS (putting it all together)

Signal Transduction

Cell Cycle and the Nature of Cellular Differentiation

Model Systems