

# Biology 3371: Eukaryotic Genomes

## Fall 2008

### Description:

An advanced exploration of the structure and function of DNA within the eukaryotic nucleus. Lectures and discussion cover topics of chromatin and chromosome structure, control of gene transcription, RNA processing, and DNA replication and repair. The relevance of these topics to the genetic basis of human disease is discussed. Throughout, the experimental data that shapes our current understanding are emphasized. The course grade is derived from in-term exams and several papers and problem sets related to the lecture material. Students must enroll in discussion section.

**Prerequisites:** Biology 2960 and 2970; Biology 3050 and Chemistry 251 (may be taken concurrently). Credit will not be given to students who have taken (or are currently taking) Biology 548.

### Meeting Times:

Lectures: Tues/Thurs 10-11:30am; in *CupplesII, room 217*

Discussions: Tues 4-5:30pm in *Life Sciences 118*  
Wed 3-4:30pm in *Life Sciences 118*

### Instructors:

Prof. Doug Chalker (coursemaster): 935-8838; [dchalker@biology2.wustl.edu](mailto:dchalker@biology2.wustl.edu)  
Monsanto Hall 304, Hilltop (office hours Wed. 5-6pm or by appointment)

Prof. John Majors: 362-1135; [majors@biochem.wustl.edu](mailto:majors@biochem.wustl.edu)  
South Building, Room 1900, Medical School  
(office hours by appointment)

### Teaching Assistants: (office hours after discussions)

Betsy Engle: [eksargen@artsci.wustl.edu](mailto:eksargen@artsci.wustl.edu)  
Kara Powder: [kepowder@artsci.wustl.edu](mailto:kepowder@artsci.wustl.edu)  
Ryan Funk: [funkr@msnotes.wustl.edu](mailto:funkr@msnotes.wustl.edu)

### Class Website:

Lecture graphics and assigned readings can be accessed using:  
<http://www.nslc.wustl.edu/courses/bio3371/bio3371.html>

Username: bio3371  
Password: chromatin

### Discussions:

The discussion sessions will meet each week and you will be assigned a primary journal article to read and discuss. On weeks that no paper is assigned, these will serve as review sessions and office hours. Some discussions will be held in the Natural Sciences Learning Center computer room and will consist of a bioinformatics tutorial and introduction to databases used in genomic studies. These database skills will be necessary for completion work associated with the last five lectures.

## Grading:

### Exams

There will be two in-term exams (50% of the total grade). Each exam will stress material introduced since the last exam; however, the exams will be cumulative in the sense that the methods and concepts presented as the course progresses build upon earlier materials. Experience dictates that our exam policy be rigid. You are expected to be present at the exams. *No make-up exams will be given under any circumstance.* A doctor's note stating that you were seen for an illness of sufficient severity to warrant an excuse is needed - a note simply stating that you visited the health center is insufficient. In the event of a death or serious illness in the family, certification will be needed to validate your absence. If you have a legitimate excuse for an absence, your final grade will be determined by calculating the mean of the other tests and problem sets. Unexcused, missed exams will be given a grade of zero and may well necessitate withdrawal from the course. Absences for professional school interviews will not be considered... plan accordingly.

### Problem Sets and Papers

Four or five times during the semester, you will also be given take-home problems due the following week. These will consist of problem-solving questions similar to those that will be on the exams. Problem sets should be turned in at the beginning of class on the date due. They can also be handed directly to one of the instructors or TAs prior to the due date. Problem sets turned in late will be graded and returned but will be given a lower score. Short papers or concept questions to answer will be assigned related to the discussion sections. These will be due either at the discussion section or at lecture the week following the discussion, depending upon the assignment. Late submissions may be accepted, but will receive a lower grade (deductions for each day late). Problem sets and papers will count 25% toward the final grade.

### Plagiarism

Definition (from [www.Dictionary.com](http://www.Dictionary.com)): n 1: a piece of writing that has been copied from someone else and is presented as being your own work 2: the act of plagiarizing; taking someone's words or ideas as if they were your own.

Plagiarism will be taken very seriously and will be reported to the dean's office for appropriate action. In writing assignments, be careful not to simply copy reference material, but use it to help you formulate and support your own thoughts and ideas. **Always give proper reference to material used.** Long sections of text taken verbatim should always be in quotations, but try to avoid using this style in most scientific writing. Make your own conclusions, don't just rely on what you read.

**For those using the Credit/No Credit option, a grade of C- is required to receive credit.**

## Biology 3371 Syllabus; Fall 2008

<b>Date</b>	<b>Lecturer</b>	<b>Topic</b>
8/28	Chalker	Organizational issues; Course overview; DNA structure and topology
9/2	Chalker	Chromatin
9/4	Chalker	Chromatin, nuclear organization, and epigenetics I
9/9	Chalker	Chromatin, nuclear organization, and epigenetics II
9/11	Chalker	Chromosome structure -- Telomeres
9/16	Chalker	Chromosome structure -- Centromeres
9/18	Majors	Genes I: Promoters and Protein DNA interactions
9/23	Majors	Modular class II gene structure
9/25	Majors	Transcriptional Activators: Structure and Analysis
9/30	Majors	Mechanisms of Activation
10/2	Majors	RNA pol I and III
10/7		1st In-Term Exam (11 lectures: 9/2 - 10/6)
10/9	Chalker	DNA Replication
10/14	Chalker	Epigenetic phenomena: PEV & X-chromosome inactivation
10/16	Chalker	Epigenetic phenomena: Parental imprinting
10/17		Fall Break
10/21	Chalker	DNA Repair & Recombination
10/23	Chalker	DNA Repair & Recombination
10/28	Chalker	DNA Rearrangements I
10/30	Chalker	DNA Rearrangements II: Transposition
11/4	Majors	RNA structure and processing I
11/6	Majors	RNA processing II
11/11	Majors	RNA; ribozymes and self-splicing
11/13		2nd In-term exam (10 lectures: 10/14-11/16)
11/18	Chalker	Science in the era of "Genomics"
11/20	Chalker	Genomics
11/25	Chalker	Genomics
11/27		Thanksgiving Break
12/2	Chalker	Genomics
12/4	Chalker	Genomics
12/14		<i>Final exam due by 5pm</i>