

**Biology 423L Syllabus 2009****Laboratory Experiments in Genetics**

**Lecture:** Monday at 11:00 am in Wilson Hall 128

**Laboratories:** **Section 001:** Tuesday at 2:00 p.m. in Wilson room 242  
**Section 002:** Wednesday at 2:00 p.m. in Wilson room 242

**Web site:** <http://www.bio.unc.edu/courses/2009Fall/Biol423L>

**Text book:** Hartwell et al ed. 3. I strongly recommend buying the text but one copy will be on reserve for 2 hours at a time in the Undergraduate library.

**There is no course pack.** All lab protocols, reading lists and most reading materials will be available from the web site. A new version of the protocol will be available one week before each lab. Print out the protocol, read it carefully and bring it to class.

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**Reports:** Due in laboratory period 2 weeks after exercise finished. Penalty for handing in late: 50% off if handed in by 5:00 Wednesday for Section 001 and Thursday for section 002. Otherwise your report will not be graded and your grade will be recorded as 0 points. Exceptions can be made in unusual circumstances by arrangement (email to TA or instructor **before** due date)

Reports will be handed back one week after being turned in. Lab reports will make up 50% of the final grade. They will be graded out of 25 points: 5 for participation, 5 for abstract and introduction, 10 for methods and results and 5 for discussion.

See Course Information on web site for instructions on how to prepare lab reports.

**Exams etc:** 1 midterm for 15% of final grade.  
1 research paper: 10% of final grade  
Final exam 25% of final grade

**Syllabus**

Date      Topic

**August 25/26: No labs - classes and labs will start next week**

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**August 31 First Lecture: Mendelian Genetics**

**Readings for class:** Genes, and alleles: Hartwell Chapter 2 pp. 13-27,  
Complementation: Hartwell Chapter 7 pp. 225-226.

**Sept. 1/2. First lab exercise: Mendelian Genetics using Fast Plants.**

**Report on Mendelian genetics due Sept 8/9.**

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**Sept. 7 Labor Day no lecture**

**Sept . 8/9 Pipetteman and Titration Exercise; Alleles in Yeast.**

**Report on Yeast Alleles due in lab Sept 15/16**

**Report on Mendelian Genetics using Fast Plants due in lab this week.**

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**Sept. 14. Mouse Models and Epistasis**

**Readings for class:** Hartwell Chapter 3 pp. 56-71.

**For discussion in class:** Bowman et al 1991 Development 112:1-20.  
PDF available on web site.

**Sept. 15/16 Epistasis using Mice**

**Report on Epistasis in Mice due Sept 29/30 in lab period.**

**Report on Yeast Alleles due in lab this week.**

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**Sept. 21 Yeast as a Model sSystem: guest lecture Dr. Elaine Yeh**

**Reading:** Mutagenesis: Hartwell Chapter 7 pp.208-224,  
PDFs on web site:

The Response of Yeast to Radiation

A Closer Look at Biological Consequences of UV exposure

A Closer Look at Repair of DNA

**Sept. 22/23 Mutation in Yeast**

**Report on Mutation in Yeast due Oct. 6/7 in lab period.**

**Report on Epistasis in Mice due in lab this week.**

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**Sept. 28 Bacterial Genetics: Class**

**Readings for class:** Bacterial Genetics: Hartwell Chapter 15 pp. 543-562,

**For discussion in class:** Lederberg and Tatum 1946 J. Bact. 53: 673-  
684. PDF available on web site

**Sept. 29/30 Conjugation Lab**

**Report on Conjugation Lab due Oct. 13/14.**

**Report on Epistasis in Mice due this week.**

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**Oct. 5      *C. elegans* as a Model System and Epigenetics**

**Readings for class:** *C. elegans*: Hartwell Chapter 8 pp. 255-256,  
Epigenetics: Hartwell Chapter 18 pp. 665-668, 726-728,  
Tabara et al., 1999 Cell 99:123-132,  
Verdel et al., 2009 Int. J. Dev. Biol. 53: 245-257,  
Eymery et al., 2009 Int. J. Dev. Biol. 53: 259-268.

**Oct. 6/7 and 13/14 *C. elegans* Genetics and RNAi**

**Report on *C. elegans* Genetics and RNAi due Oct. 20/21.**  
**Report on Mutation in Yeast due this week.**

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**Oct. 12      University Day- class cancelled****Oct. 13/14    Continue *C. elegans* Genetics and RNAi lab**

**Research paper topics due Oct. 14, send email to Dr Grant by 5 pm Oct. 14**

**Report on *C. elegans* Lab due Oct. 27/28**  
**Report on Conjugation Lab due this week.**

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**Oct. 19      Three point cross and mapping in humans**

**Readings for class:** *Drosophila*: Hartwell Chapter 20 pp.732-749,  
, Sex-linked inheritance: Hartwell Chapter 4 pp. 105-112,  
Three point cross: Hartwell Chapter 5 pp. 123-141.

**Map based cloning of the gene for Cystic Fibrosis**

**Readings for class:** Cystic fibrosis: Hartwell Chapter 5 pp. 142-143,  
Map based cloning in humans: Hartwell Chapter 11 pp. 408-419.  
**For discussion in class:** Pearson 2009 Nature 460; 165-169.

**Oct. 20/21, Nov. 3/4, Nov. 17/18 *Drosophila* three-point cross.**

**Report on *Drosophila* three-point cross due Dec. 1/2.**

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**Oct. 26      Midterm****Oct. 27/28    DNA Cloning lab. Run gels, set up ligations and transformations**

**Readings:** Hartwell Chapter 9 pp. 303-326

**Report on DNA Cloning Lab due Nov. 10/11.**  
**Report on *C. elegans* Lab due in lab this week.**

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**Nov. 2      *Drosophila* as a Model System Guest lecturer: Dr. Bob Duronio**

**Nov. 3/4      *Drosophila* Test Cross. Score for sex-linkage or autosomal markers, continue 3-point cross,**

**1-2 page outlines for research papers due November 6, email to Dr. Grant by 5 pm.**

**Nov. 9 DNA Markers and Forensics**

**Readings for class:** PCR and forensics: Hartwell Chapter 9 pp. 327-330.

**For discussion in class:**

Lander, E.S, and J.J. Ellis. 1998. Nature 396:13-14,  
Forster et al., 1998 1998. Nature 396:13-14.

**Nov 10/11. DNA Markers and Forensics lab.**

**Report on DNA Cloning lab due this week.**

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**Nov. 16. Map Based Cloning in Model Organisms**

**Readings for class:** Physical Mapping of genes: Hartwell Chapter 10 pp.

354-365,

Lukowitz et al., 2000 Plant Physiol. 123;795-805.

**Nov. 17/18 Score 3 pt Cross**

**Report on Drosophila and 3 pt Cross due Dec 1/2.**

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**Nov. 23. Association mapping for human diseases**

**Reading for class:** Hartwell Chapter 11 pp. 423-425,

**Research papers due in class Monday Nov. 23.**

**No lab this week Thanksgiving**

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**Nov. 30 Map Based Cloning continues**

**Dec. 1/2 Map Based Cloning lab.**

**Report on Drosophila lab due this week Dec. 2/3.**

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**Dec. 7 Results of Map Based Cloning  
Review**

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**Dec 14 exam 12:00 noon to 3:00 pm. Final Exam**  
128 Wilson Hall