

**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.

**Instructor:** Sarah Grant  
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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,  
Chi-square test: Hartwell Chapter 5 pp. 127-130,  
Complementation: Hartwell Chapter 7 pp. 225-226.

**Sept. 1/2. First lab exercise: Mendelian Genetics using Fast Plants.****Report on Mendelian Genetics due Sept 15/16.**

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**Sept. 7      Labor Day no lecture****Sept . 8/9    Pipetteman and Titration Exercise; Alleles in Yeast.**

You will need to come back on day 2 after the lab to check results.

**Report on Yeast Alleles due in lab Sept 22/23****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 Mendelian Genetics due in lab this week.**

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**Sept. 21    Yeast as a Model System: 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**

You will need to come back on day 3 after the lab to check results.

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

You will need to come back on day 3 after the lab to check results.  
**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**

You will need to come back on day 4, day 8 and day 12 after the first lab to continue experiments. This will involve one hour on one weekend day the second week. Times for all returns will be organized by the TA during the lab periods.

**Report on *C. elegans* Genetics and RNAi due Oct. 27/28.**  
**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**

You will need to come back on day 2 after the lab for about 15 minutes work and on day 3 to check results.

**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.**

**Reading:** Nakamura et al., 1988. NAR 16:9364.

**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**

