Recombinant DNA Techniques

Class	Biology 427
Instructor	Dr. Dennis Revie
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Web site	http://public.clunet.edu/~revie/recombinant.htm
Office hours	MWF 10:00-11:00 AM or by appointment
Lecture hours	Thursdays from 9:00 to 1:00 PM in SC 214
Lab hours	Thursdays from 9:00 to 1:00 PM in SC 214
Text	None. However handouts on various topics will be used, including reviews and scientific papers.

Course description

This class is designed to introduce you to commonly used techniques in recombinant DNA and genomics by performing two research projects. The emphasis in this class is not upon obtaining the "correct" result(s), but instead is on a thorough understanding of what you are doing and why you are doing it. By understanding what an experiment can and cannot do, you can then understand not only original papers in molecular biology and related fields, but you can also get a better feeling for the types of problems that are encountered (and can be solved) in research. My basic philosophy towards the class is that it is important to know *what* you are doing when working in a laboratory. This means that you must be able to apply what you have learned to new situations.

We are doing two research projects. First, we "finish" part of a dot chromosome of *Drosophila*. To do this, we will obtain sequences, determine how to improve the sequences, and direct a sequencing lab on what to sequence to improve the sequence for the chromosome. This will let you understand the types of work that are used in sequencing and analyzing a genome of an organism. Second, we will use microarrays to analyze transcription in human cells that have been infected with a virus. We will be comparing mRNA from uninfected and infected cells.

Student outcomes

Through the presentations and written assignments, you will develop written and oral communication skills. The computer analyses will help you develop information literacy. The reports and presentations also help develop critical thinking skills. By working in pairs, you will be developing your teamwork skills.

Grading

- There are two written lab reports, one for each project. These reports will be graded. **35%** of your grade comes from **each** report. Attendance is required, so any labs missed will result in significant points being deducted from the grade for that report.
- There will be two oral presentations, one for each report. The oral presentation on the genomics project will be worth **14%** of your grade. The last presentation is for your results on the microarray experiment, which will be more detailed and be worth **14%** of your grade.
- **2**% of the grade will be awarded for filling out the pre- and post-test questionnaires.
- 1% of the total points can be earned as extra credit for each approved seminar.

Labs

Preparation for the labs is important. Reading the labs over *before* class will not only reduce mistakes in the lab, but it will also help you work more quickly. Since exact results in the labs are not important, do not alter your data to make them look better. In general, try to understand the types of uses for each technique, the range of sensitivity for each technique, and the advantages and disadvantages of similar techniques. Try to think of other uses of the experiments and techniques. We only have enough time to use a technique one way, but most of them can be used a variety of ways and in many types of experiments.

For the microarray experiments in this class you will work *in pairs*. For the finishing project, you will work on your own. Points are deducted when you miss class.

Information about the written lab reports will be passed out later this semester.

Lab schedule

Week	Topics	Experiment(s)
1	Introduction to the experiments	Both
2	Fill out pre-course surveys	Both
	Finishing introduction	Genomics
3	No class	-
4	Finishing introduction, part 2	Genomics
	Introduction to microarrays	Microarray
5	First round of finishing	Genomics
6	cDNA preparation	Microarray
7	Second round of finishing	Genomics
8	First hybridization	Microarray
9	Third round of finishing	Genomics
10	Second hybridization	Microarray
11	Microarray analysis intro	Microarray
	Finishing presentations	Genomics
12	Microarray analysis	Microarray
13	**Thanksgiving!**	Eat genomes
14	Microarray analysis	Microarray
15	Microarray presentations	Microarray

We obtain our microarrays through GCAT (Genome Consortium for Active Teaching). Therefore, we must fill out pre- and post-test questionnaires. To fill out the questionaire, go to http://www.bio.davidson.edu/projects/GCAT/assessment/assess.html and click on pre-survey. At the end of the semester, the post-survey will be taken.

We obtain the sequences through GEP (Genomics Education Partnership). Therefore, we must fill out pre- and post-test questionnaires. To fill out the questionaire, go to http://gep.wustl.edu/ and click on Assessment and then pre-course survey. At the end of the semester, the post-survey will be taken.