

Bio 535: Syllabus

Molecular Biology Techniques

Professor: Darrel W. Stafford, PhD; dws@email.unc.edu

Objectives: To learn basic laboratory skills and techniques in molecular biology; includes experiments with bacterial phage, nucleic acid isolation and properties, recombinant DNA techniques, and DNA sequencing. Additional laboratory hours will be needed to complete assignments.

Prerequisites: BIOL 434 recommended; and permission of the instructor.

Requirements:

Attendance at every session is absolutely essential. If you know now that you will be absent from more than one lab during the semester, you may want to consider dropping the course. Absences must be excused by Dr. Stafford and may require make-up sessions to be arranged with your TA.

Schedule: This course will not fit into the listed schedule (1-4:45 pm, Thursday). In most cases the class will be over by 5 pm. However, you may need to spend extra hours to finish an experiment, and you may have to come in on days other than Thursday.

Honor Code: It shall be the responsibility of every student at The University of North Carolina to obey and to support the enforcement of the Honor Code, which prohibits lying, cheating or stealing when these actions involve academic processes or University, student or academic personnel acting in an official capacity. Please ask if you are in doubt about collaborations allowed.

Safety: No food or drink in the lab. No mouth pipetting. No open-toed shoes. Safety goggles are to be worn at all times. The TA will alert students to specific hazards. Among the most serious are ultraviolet radiation, strong acids and bases, ethidium bromide (carcinogen), acrylamide (neurotoxin), and phenol, which can dissolve one's skin. At the end of the class you must clean all your glassware and your work area. Materials must be stored on the proper shelves or in the proper drawers, not on your bench. Know where the eye wash, fire extinguishers, and fire alarms are located.

Text: No text required; handouts will be given.

Grading: Notebooks, 30%; Laboratory reports, 50%; Other considerations, 20%

Notebooks 30% (Goal: A researcher should be able to read your notes, repeat the experiment, and get the same results.)

1. Reasons for bound notebooks: patents & fraud; required by companies; protects against lost data.
2. Notes: Should be done during class and may be taken up PERIODICALLY after class. Write the Purpose and Materials & Methods ahead of time.
3. Format:
 - a. Purpose: brief; one or two sentences
 - b. Materials & methods: should look like a checklist.
 - c. Results: original data, photos, photocopies, graphs go in notebook.
 - d. Brief conclusion: 1 or 2 sentences.

Laboratory Reports 50% (with the exception of the data, are individual efforts.)

Written reports of the experiments will be **required** of each student. These reports will consist of a one page summary. Reports will include the following information: 1) the objective of the experiment; 2) the primary methods used; 3) the principal results obtained and; 4) the conclusions supported by the results; i.e., what was done and why, what did you observe, how do you explain what happened, and what is the implication of what happened?

Reports should be typewritten and double-spaced; font size 12. Show calculations supporting the numbers you report in the summary on additional pages. In addition, students will answer written questions about each experiment. Answers are not included in the one page summary. In addition to content, spelling, grammar and neatness will count in grading the lab summaries.

Lab 1 Introduction

Lab 2
Isolate Bacterial Strains
containing Plasmid

Lab 3
Prepare Plasmid DNA

Lab 4
Enzymatic Reactions

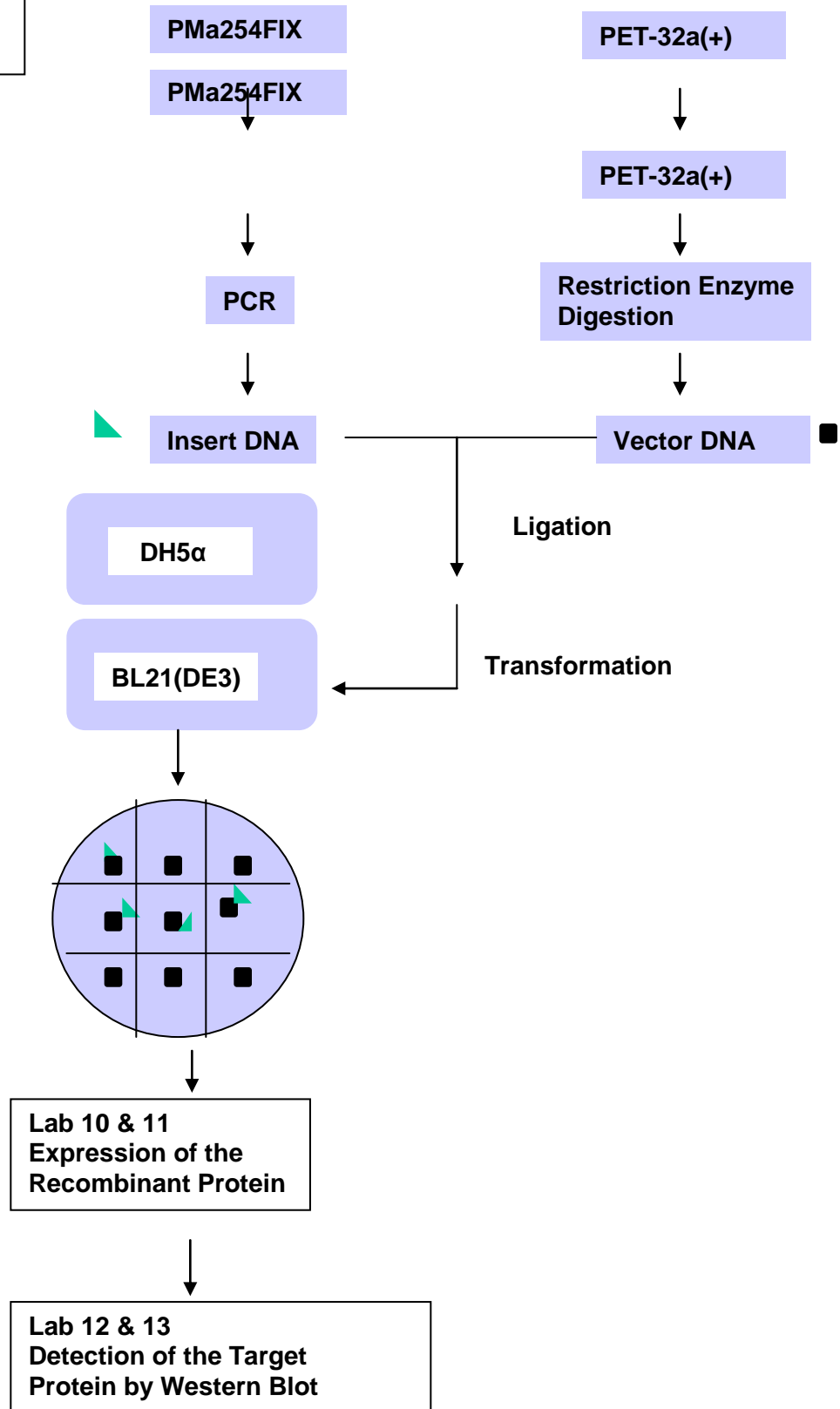
Lab 5
Gel Purification of
RE Digested DNA

Lab 6
Cloning

Lab 7
Screening by PCR

Lab 9
Mini-prep/ mapping/
Sequencing

Biology 535: Flow chart



Lab 10 & 11
Expression of the
Recombinant Protein

Lab 12 & 13
Detection of the Target
Protein by Western Blot