

Biochemistry Lab II
Chem 415 - Spring 2009

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Description of content:

This semester will consist of a research style project. Unlike Chem 405, you will be designing most of your experiments with guidance from the instructor. The semester will focus on analysis of the structure and function of malate Dehydrogenase. You will be using protein and DNA databases and structural rendering programs, analyzing mutations in the MDH gene, expression and purification of the fusion protein and determining the kinetic effects of both the wild type and mutant enzyme. In groups of one to three, you will make your protocols, express protein, conduct experiments and interpret your data. This is meant to give each student a feel for what a realistic project might be in a research or in an industrial / Biochemistry/ Pharmaceutical laboratory.

Safety:

Safety regulations require that all students working in laboratory receive training in the safe handling of any potentially dangerous chemicals or biohazards. The first day in lab will cover refresher training in the safe handling of these materials. For the most part this laboratory poses very little risk, however we will be using several chemicals that are potentially dangerous. Each experiment / lab will have potential hazards risks, and the appropriate safety precautions given in class or in the handout. Using safe laboratory techniques, any hazards will be reduced to a minimum.

Grades:

Your grade will depend on successful completion of the work for each of the main blocks plus homework assignments. As you develop your hypothesis, you will be given a list of expectations for the semester. A significant portion of your grade is based on how well you meet these expectations. The ability to work in the lab and your ability to interpret the biochemical literature will also be assessed. This will be determined by visits with your instructor. At the end of each block indicated below, you will turn your lab book. At the end of the semester each group will present the project using a power point presentation. The presentation will be worth 100 points. Student peer evaluation will be worth 10 points. Lab notebooks and assignments will be turned into the basket in the Chemistry Office.

- Bioinformatic, Structural Rendering and MDH Background Homework (100 pts) **Due 6 Feb**
- Hypothesis Design Assignment (25 pts) **Due 10 Feb**
- Mini Presentation (50 pts) **Due 17 Feb**
- Completion of Experimental Expectations (500 pts) **Due end of semester**
- Individual bench acumen and interpretation of biochemical literature (100 pts) **On-going**
- Lab Book Check (50 pts each) **Due 13 March**
- Final Presentation (100 pts) **Due 5 May**

Lab Schedule

Phase Dates	Title	Assignment Due
13 Jan to 3 Feb	Phase I Bioinformatics, Structure & MDH Background	Work individually on Tutorial. See web (Safari guide and web links) for instructions and link to phase I assignments– Required In-Class Each Day.
10 Feb	Phase II Hypothesis & Experimental Design	Each group will meet with instructor to work on your hypothesis and experimental design. Required In-Class Day
17 Feb	Phase II Mini Presentation – plan and proposal of work	In class presentation and student evaluation of hypothesis, reasoning and experimental design. Required In-Class Day
24 Feb – 10 March	Phase III Expression and Purification of MDH	Turn in lab book with results of purification and assay results. 13 March
24 March – 28 April	Phase III Enzymatic & Structural Analysis	Work on experiment testing your MDH hypothesis.
5 May 12:00	Presentations	Project Final Presentation

- The final presentations are a powerpoint, group presentation.
- Check out and clean up will be done during finals week. No clean up, no grade.
- Turn in lab books with the progress reports, and at the end of the semester.

Laboratory Notebooks:

For this lab you will need to have a NEW **bound** ruled notebook. A spiral bound book will NOT suffice. The pages must be numbered, no pages can be removed and the book will be dedicated ONLY for the lab book. Laboratory notebooks are not to be works of art but they must be neat enough to be legible. Use Pen only, Pencil tends to fade with time and many entries can be lost when small spills smear notes taken with pencil or water soluble marker pens. The first two pages would be left for the table of contents. The lab book should have the same organization as last semester.

All data will be included in the notebook. The best way to keep up with the lab book is to take the time before to write the purpose of each day and the procedure. Then enter your calculations as you go. Include the observations and data on the fly. DO NOT WAIT TO ENTER IT IN LATER. Later comes at the end of the semester and is never what it should be.

MAIN POINT FOR THE LAB BOOK: I want to be able to read this and repeat what you did! No guessing. That is the true measure of a lab book. These should have sufficient information as to what you are doing and why. Including the preparation steps.