

CHEMISTRY 49I: Special Topics in Biochemistry

Protein Structure and Function with Introduction to Computational Biochemistry

Term: Spring, 2008
Prerequisites: CHEM 351 (or equivalent)
Class time: 9:00 a.m. to 10:15 a.m. Tuesdays and Thursdays
Class location: UNIV 271
Instructor: S. Jayasinghe (Jay), Ph.D.
Inst. Office: Sci II, 229
Inst. Office hours:
Inst. Phone: (760) 750-8075
Inst. E-mail: sjayasin@csusm.edu

Course Objective: In this course we will discuss the chemical basis for the intimate relationship between protein structure and protein function. Representative classes of proteins will be discussed to illustrate the principles that govern the structure-function relationship. Relevant concepts will be discussed while exposing students to an introductory exploration of topics in computational biochemistry such as database accession, sequence alignment, extraction of sequence information, structure and function prediction from homology, and molecular visualization.

Student Learning Outcomes:

Upon completion of this course students should:

- (1). Be able to describe the importance of protein structure to protein function.
- (2). Be able to identify representative classes of proteins, and be able to describe how structure facilitates function.
- (3). Be able to demonstrate their ability to use database information and computational tools to solve problems in biochemistry.

Textbook: No required textbook. We will refer to 'Biochemistry' by Garrett and Grisham as the need arises (especially in the introductory/review sections).

Readings: Course discussion will focus on relevant articles from the literature and on relevant chapters from 'Biochemistry' by Garrett and Grisham.

Topics (in no particular order):

Protein structure (mainly review)

Methods of determining protein structure – survey of x-ray crystallography, NMR, EPR, CD, and fluorescence spectroscopic methods

Introduction to computational methods in biochemistry – survey of databases and information contained within these databases, information retrieval, prediction of secondary structure, sequence alignment, introduction to molecular visualization using VMD.

Representative globular proteins – their structure, fold and domain classification, how structure facilitates function.

Representative membrane proteins – their structure, difference between soluble and membrane proteins, their importance in health and disease, relationship between structure and function

Diseases of protein misfolding – consequence of incorrect structure

Natively unfolded proteins.

In Class presentations:

Students will lead class discussion on the relationship between a selected proteins structure and function. Students will be responsible for reading the primary literature, summarizing the information, and presenting this information to the class.

Grading (points):	Attendance, class participation and literature presentation	50
	Projects	150
	Oral presentation	50
	Final exam and project	50

Writing Requirement: The University Writing Requirement will be satisfied upon successful completion of the projects and the final project.

Students with Disabilities:

Students with disabilities who require accommodation must be approved by the Office of Disabled Student Services (DSS). Please contact this office as soon as possible and should meet with the instructor during office hours (or at some other mutually agreeable time). The DSS office is located in Craven hall 5205. Their telephone number is (760) 750-4905 or TTY (760) 750-4909.

Academic Honesty: All students are expected to maintain academic honesty. **All submitted work must be your own and must be written in your own words.**

All students should be familiar with the university policies and procedures concerning academic honesty as detailed in the university catalog. An online version of these polices and procedures can also be found at:
http://lynx.csusm.edu/policies/procedure_online.asp?ID=187