Biochemistry 322: Jakubowski

Biochemistry (BCHM 322)
Instructor: Dr. Henry Jakubowski

Interactive Web Programs: Guide to Use
On Line Lab Manual
Molecular Modeling Programs

Course/Lab Syllabi and Schedules
Chapter Problem Sets
On-Line Journals Biomolecule Library Internet Resources Course Web

Material

• WHY CHEMICAL LOGIC?
• UPDATES
• INTRODUCTION TO BIOCHEMISTRY
• BIOCHEMISTRY/MOLECULAR BIOLOGY DICTIONARIES
• REVIEW: THE CELL

Chapter 1: LIPID STRUCTURE

A. Lipid Structure
B. Lipids in Water: Structure
C. Dynamics of Membrane Lipids
D. Lipids in Water: Thermodynamics
E. Why do Single Chain Amphiphiles form Micelles not Bilayers, and Double Chain Amphiphiles from Bilayers and not Micelles?
F. Lipids as Biological Signals

SUPPLEMENT: MOLECULAR MECHANICS AND DYNAMICS
• REVIEW THERMODYNAMICS

Lipid Structure: Literature Learning Module

Chapter 2: PROTEIN STRUCTURE

1. The Structure and Property of Amino Acids
2. Composition, Sequence and Conformational Analysis of Proteins (Molecular Mass and Structure Determination using Mass Spectrometry)
3. Understanding Protein Conformation

http://biowiki.ucdavis.edu/Wikitexts/Biochemistry_322%3A_Jakubowski
Updated: Fri, 27 Mar 2015 04:35:00 GMT
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4. Proteins Folding - In Vivo and In Vitro (Intrinsically Disordered Proteins)
5. Laboratory Determination of $\Delta G_0$ for Protein Folding/Unfolding
6. Thermodynamics and IMF's in Protein Stability (H bonds and Backbone Interactions: n to $\pi^*$ interaction)
7. Predicting Protein Properties Using Computational Biology and Bioinformatics - Proteomics
8. Protein Aggregates - Not Just Junk

Protein Structure: Literature Learning Module

Chapter 3: CARBOHYDRATES
1. Monosaccharides and Dissacharides
2. Complex Oligosaccharides
3. Jeopardy | (scrambled list of all Jeopardy answers for which you supply the correct question)
4. Glycoproteins: Biosynthesis and Function

Chapter 4: DNA, GENOMICS, AND PROTEOMICS
1. The Structure of DNA
2. The Central Dogma of Biology
3. The Language of DNA
4. Genomes and Other Omes (not Gnomes)

Chapter 5: BINDING
1. Reversible Binding I: Equations and Curves
2. Reversible Binding II: Experimental Binding Curves, $K_d$, and Error Analysis
3. Model Binding Systems
4. Binding and the Control of Gene Transcription
5. New Methods in Drug Development

Binding: Literature Learning Module

Chapter 6: TRANSPORT AND KINETICS
1. Passive and Facilitated Diffusion
2. Steady State and Rapid Equilibrium Kinetics
3. Models of Enzyme Inhibition
4. More Complicated Enzymes

Transport and Kinetics: Literature Learning Module
Chapter 7: CATALYSIS

REVIEW: ORGANIC CHEMISTRY

1. Methods of catalysis
2. Mechanisms of enzyme-catalyzed reactions
3. Cofactors and Electron Pushing: Sources and Sinks
4. Enzyme catalyzed reactions in organic solvents
5. Ribozymes and the RNA World

Catalysis: Literature Learning Module

Chapter 8: OXIDATION/PHOSPHORYLATION

1. The Chemistry of Dioxygen
2. Biological Oxidation Reactions - Dehydrogenases, Mono and Dioxygenases, and Oxidases
3. ATP and Oxidative Phosphorylation Reactions
4. Photosynthesis: The Light Reaction

Oxidation/Phosphorylation: Literature Learning Module

Chapter 9: SIGNAL TRANSDUCTION

1. Energy Transduction: Uses of ATP
2. Signal Transduction: Neurochemistry
3. Signal Transduction at Cell Membranes: Protein Kinases/Phosphatases

Capstone: The Origin of Life

Appendices

- List of Figures
- List of Tables
- List of Moodle Quizzes
- Chime and Jmol Files
- Experimental Techniques