Biology 5325: Protein Structure and Function Fall 2006

Class Meetings: Tuesday and Thursday, 8:15-9:45, 521 Medical Library
Coursemaster: Jay Ponder (CCB 208, 362-4195, ponder@dasher.wustl.edu)

Aug 31	Taxonomy I: Primary & Secondary Structure	Ponder
Sep 5	Taxonomy II: Motifs & Supersecondary Structure	Ponder
Sep 7	Taxonomy III: Tertiary Structure & Fold Types	Ponder
Sep 12	Folding I: Forces that Determine Protein Structure	Ponder
Sep 14	Folding II: Mechanisms of Protein Folding	Ponder
Sep 19	Folding III: Characterization of Folding Pathways	Ponder
Sep 21	Folding IV: Mutagenesis Studies	Ponder
Sep 26	Special Topics I: Multiscale Modeling of Electrostatics	Baker
Sep 28	Spectroscopy I: Background and Basic Principles	Pryse
Oct 3	Spectroscopy II: Absorption and Fluorescence	Elson
Oct 5	Spectroscopy III: Circular Dichroism and Optical Rotation	Elson
Oct 10	Spectroscopy IV: Fluctuation Spectroscopy	Elson
Oct 12	Spectroscopy V: Mass Spectrometry	Chivers
Oct 17	Protein Design I: Structural Scaffolds	Chivers
Oct 19	Protein Design II: Enzymatic Function	Chivers
Oct 24	**Mid-Term Examination**	
Oct 26	NMR I: Basic NMR Principles and Parameters	Cistola
Oct 31	NMR II: Vector & Product Operator Formalisms	Cistola
Nov 2	NMR III: Heteronuclear Correlation Experiments	Cistola
Nov 7	NMR IV: Resonance Assignment Strategies	Cistola
Nov 9	NMR V: Protein Structure Determination	Cistola
Nov 14	Special Topics II: ^{19}F NMR Studies of Protein Folding	Frieden
Nov 16	Special Topics III: GPCR Signal Transduction	Marshall
Nov 21	NMR VI: Ligand-Protein Interactions	Cistola
Nov 23	Thanksgiving Break – No Class Meeting	
Nov 28	X-Ray I: Crystals, Symmetry & Diffraction Patterns	Ellenberger
Nov 30	X-Ray II: Reciprocal Space, Bragg's Law, Laue's Equations	Ellenberger
Dec 5	X-Ray III: Structure Factors, Density & Patterson Maps	Ellenberger
Dec 7	X-Ray IV: Phase Determination Methods & Refinement	Ellenberger
Dec 12	X-Ray V: Protein Crystallography in Practice	Ellenberger
Dec 19	**Final Examination**	

Classes are held in the DBBS Classroom (521 Medical Library, 5th Floor). Bio 5325 is required by the Graduate Programs in Biochemistry and in Molecular Biophysics. Lectures coincide with the corresponding Medical School course; 1st-year Medical and MSTP students may substitute Bio 5325 for credit.

There are no required textbooks. However, the following books may be useful for parts of the course, and are available from online booksellers:

Introduction to Protein Structure, 2nd Ed., Branden and Tooze, 1999
Protein Structure and Function, Petsko and Ringe, 2004
Principles of Physical Biochemistry, 2nd Ed., van Holde, Johnson and Ho, 2005