

CHEM652 Independent Study, S'08

Practical Approaches to Biological Chemistry
T,Th 5-6:15pm (pending on classroom availability)

TEXTBOOKS & READINGS

- 1 The Chemistry of Metabolic and Biosynthetic Pathways, John McCurry and Tadhg Begley, 2005, Robert & Co, Publishers
- 2 Organic Structural Spectroscopy, Joseph B. Lambert et al., 1998
Instrumental methods of analysis, 7th Ed., Hobart H. Willard et al.
- 3 Fundamentals of Biochemistry by Donald Voet et al.
- 4 Harper's Illustrated Biochemistry by Murray, R.K. et al
- 5 High-Resolution NMR Techniques in Organic Chemistry, Timothy, D. W. Claridge
- 6 Principles and Practice of Biological Mass Spectrometry, Chhabil Dass
- 7 Structure Elucidation by NMR in Organic Chemistry : A Practical Guide, Eberhard Breitmaier
- 8 Metabolite Profiling by One and Two-Dimensional NMR Analysis of Complex Mixtures, T.W.-M. Fan, Progress in Nuclear Magnetic Resonance Spectroscopy, 28, 161-219 (1996).

Date		# Topic	Subtopic	Assignments	Instructor	LOCATION
10-Jan	Th	1 I. Biochemical Pathways	1.a. Common biochemical functional groups & reactions		TF	TBD
15-Jan	T	2	1.b. Lipid Biosynthesis & Degradation		TF	
17-Jan	Th	3	1.c. Glycolysis & TCA cycle		TF	
22-Jan	T	4	1.d. Nucleotide Metabolism		TF	
24-Jan	Th	5	1.e. Amino Acid Metabolism		TF	
29-Jan	T	6 II. Pathway Tracing	2. Pathway elucidation by stable isotope labeling	Problem set: biochemical pathways (10%)	TF	
31-Jan	Th	7 III. Metabolic Regulations	3A. Gene Expression, protein translation & Regulation		ANL	
5-Feb	T	8	3A. Gene Expression, protein translation & Regulation		ANL	
7-Feb	Th	9	3B. Enzyme Kinetics		ANL	
12-Feb	T	10	3C. Metabolic Regulation		ANL	
14-Feb	Th	11	3D. META approach		TF	
19-Feb	T	12	3D. META approach	Problem set: Omics integration/flux analysis (10%)	TF	
21-Feb	Th	13	3E. Metabolic Flux Modeling		THY	
		IV. Introduction to metabolomic methods		Submit term paper topic/title for approval	TF	
26-Feb	T	14 V. Sample Prep	5A. In vitro methods 5B. In vivo methods		TF	
28-Feb	Th	15 VI. Analytical Approaches	6.a. NMR theory and hardware		ANL	
4-Mar	T	16	6.a. NMR theory and hardware		ANL	
6-Mar	Th	17	6.b. 1-D NMR		TF	
3/10-3/16		SPRING BREAK				
18-Mar	T	18	6.c. NMR quantification & demo	Problem set: NMR analysis (10%)	TF	
20-Mar	Th	19	6.d. 2-D NMR & demo		TF	
25-Mar	T	20	6.e. MS intro: the Mass Spectrum; How Do We Get it; Types & Uses of MS		RH	
27-Mar	Th	21	6.f. Why GC-MS; hardware; sample considerations; GC-MS analysis	Problem set: Selection of MS methods (5%)	RH	
1-Apr	T	22	6.g.1 Why LC-MS; hardware; sample considerations		RH	
3-Apr	Th	23	6.g.2 LCMS analysis		RH	
8-Apr	T	24	6.g.3 Interpretation and quantification aspects; LIVEdemo	Problem set: Interpretation & Quantification (5%)	RH	
10-Apr	Th	25	6.g.4 ICPMS & IRMS 2.e		RH	
15-Apr	T	26 VII. Special Topics	Other/Future MS techniques		RH	
17-Apr	Th	27	7A. Proteomics		Zhang	
22-Apr	T	28	7B. In situ Chemical Imaging		CY	
		28	Facility Tour		TF,RH	
24-Apr	Th	29	Term paper presentation	Term paper & presentation (60%)	TF,RH,ANL	
29-Apr	T	30	Term paper presentation	Term paper & presentation (60%)	TF,RH,ANL	