

BIOCHEMISTRY II: Metabolism - BMD 322

-Spring Semester 2009-

Course director: Julio F. Turrens, Ph.D.
Class time: Tuesday and Thursday, 12:30 to 1:45
Place: UCOM 6001
Office hours: Tuesday and Thursday from 11:30 to 12:30 or by appointment.
Office location: Dean's office. UCOM 1500
Telephone: 380-2785 (office) or 639-7111 (home)
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Objective:

The course is designed to expose students to the major chemical pathways responsible for the synthesis and degradation of a variety of biomolecules in most living organisms, particularly in humans. Major emphasis is put in understanding how both hormonal control and specific metabolic differences in different organs are responsible for the regulation of these processes. In addition, a variety of diseases resulting from alterations of some of these metabolic processes will be described.

Goals:

This course applies several concepts discussed in the previous course (particularly protein structure and function) to understand the interactions among different metabolic pathways and their regulation.

Text: Biochemistry by Berg, Tymoczko and Stryer 6th Edition, W.H. Freeman Publishers, New York.

Grading Policy

The final grade will be the average of four examination grades (three regular exams and a comprehensive final exam). All regular exams will include multiple choice, true/false and essay questions. The final exam will not have essay questions. If the grade of the final exam is higher than the average from the other three exams, its weight will be increased to 40% in order to reward students for their effort.

Students will have one week after the exams are returned to discuss any discrepancies in grades. After this time the grades will not be modified. Examinations missed due to an un-excused absence will not be made-up.

Course grades:

A > 90 %
B > 80 %
C > 70 %
D > 60 %
F < 59 %

Other:

- **Students are expected to have a general idea of the topic covered in every session.**
- **Students are expected to take notes and to actively participate in class.**
- **Personal computers should be turned off unless they are required for a specific task assigned by the instructor.**
- **The use of beepers, portable phones and any other electronic device that could distract the class is forbidden.**
- **The BMD department has established an email account (BMDdept@usouthal.edu) for the purpose of anonymous student feedback. The departmental secretary will be checking this email and will forward student comments to appropriate faculty without any identifiers.**
- **Students with specific disabilities requiring academic accommodations should notify the instructor and provide certification of Disability Services. For more information contact the Office of Student Services, Student Center # 270, Phone: 460-7212.**

HUMAN BIOCHEMISTRY (Metabolism) - BMD 322
Text: Biochemistry by Berg, Tymoczko and Stryer 6th Edition
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Lecture	Pages	Date	Topic
1	212-221; 225-226; 275-277; 282-287; 288-292	T Jan 13	Review on mechanisms of enzyme action. K_M . Inhibitors and drug design. Regulation of enzyme activity.
2	303-312	R Jan 15	Carbohydrates. Monosaccharides. Anomeric carbons. α and β configurations. Derivatives. Polysaccharides.
3	312-319; 321-323 232-234	T Jan 20	Glycoconjugates. Proteoglycans, Glycoproteins. Bacterial wall. Penicillin. Blood groups.
4	326-338, 342-347	R Jan 22	Lipid structures. Membranes. Membrane proteins.
5	351-354; 360-362, 374-75	T Jan 27	Passive and active transport. Receptors. Water movement.
6	381-383; 385-395; 400-402	R Jan 29	Signal Transduction. Cancer.
7	EXAM	T Feb 3	EXAM # 1 (Lectures 1-6)
8	409-420	R Feb 5	Metabolism. Bioenergetics. Free energy. Differences between ΔG and ΔG° .
9	420-430	T Feb 10	Vitamins and co-enzymes. Examples of biochemical reactions
10	433-452	R Feb 12	Glycolysis.
11	452-471	T Feb 17	Glycolysis and gluconeogenesis. Regulation.
12	475-490	R Feb 19	Pyruvate dehydrogenase. Citric acid cycle.
13	EXAM	R Feb 26	EXAM # 2 (Lectures 8-12)
14	490-495	T Mar 3	Citric acid cycle. Regulation.
15	502-519	R Mar 5	Mitochondria. Respiratory complexes.
16	520-535	T Mar 10	Complex V. Oxidative phosphorylation. Shuttles.
17	565-566; 577; 586-587	R Mar 12	Pentose phosphate pathway. G6PD deficiency.
18	592-596; 598-612	T Mar 24	Glycogen synthesis and degradation. Regulation
19	617-628	R Mar 26	Oxidation of Fatty acids. Regulation. Ketone bodies
20	631-642	T Mar 31	Fatty acid biosynthesis.

21	732-736; 738-742	R Apr 2	Synthesis of other lipids. Sphingolipid degradation and Tay-Sachs disease. Cholesterol.
22	742-755	T Apr 7	Regulation of Cholesterol synthesis. Lipoproteins and cardiovascular diseases. HMG CoA inhibitors. Hormones.
23	EXAM	R Apr 9	EXAM # 3 (Lectures 14-22)
24	649-654; 656-658;	T Apr 14	Nitrogen metabolism. Protein turnover. Apoptosis.
25	660-663; 666-674	R Apr 16	Amino acid catabolism. Urea cycle. PKU and other genetic diseases.
26	679-680; 683-686; 688; 699-702	T Apr 21	Synthesis of nonessential amino acids. PKU
27	Chapter 27	R Apr 23	Integration
28	Chapter 27	T Apr 28	Metabolism during the Fed State
29	Chapter 27	R Apr 30	Overnight fasting. Starvation. Diabetes. COURSE REVIEW
30			
	FINAL EXAM	R May 7	FINAL EXAM (from 1:00 to 3:00 p.m.)