Meds3020 – Introduction to Medical Biochemistry

Course Information

Syllabus

A one-semester course designed to introduce students to the basic tenets of biochemistry. The topics that will be discussed have been chosen to comply with the guidelines for the biochemistry component of the medical college admission test (MCAT), which will be incorporated into the 2015 offering of the MCAT (see https://www.aamc.org/students/applying/mcat/mcat2015/ for more information). The course will be taught in three components: the first is protein structure and function, enzyme mechanisms, and enzyme kinetics. The second component is nucleic acid biochemistry, including DNA replication and repair, synthesis of RNA (transcription), synthesis of proteins (translation), regulation of gene expression, and molecular techniques. The third component includes biochemical thermodynamics and an introduction to metabolism, which includes glycolysis, gluconeogenesis, TCA cycle, oxidative phosphorylation, glycogen metabolism, and fatty acid metabolism. The course will emphasize the relationship of biochemistry to disease, and will discuss, in particular, sickle cell anemia, prion diseases, collagen disorders, thalassemia, cancer in relation to mutations in DNA repair, toxins that affect RNA and protein synthesis, diabetes (both type 1 and type 2), glycogen storage diseases, mitochondrial disorders, and abnormalities in fatty acid oxidation.

Meeting Times

The class will meet in the Medical Sciences Building, room 2351, on Tuesdays and Thursdays, starting at 2:00 pm. Classes will end by 3:25 pm. The first class will begin at 2:00 pm, on August 23, 2016.

Each individual professor will set up their office hours, and discuss them with you when they first meet the class. Dr. Lieberman will have office hours every Tuesday and Thursday from 12:30 to 1:30 pm throughout the semester.

Grading Policies and Test Information

There will be four exams during the quarter, the first worth 40 points (September 20, 2016), the second worth 40 points (October 25, 2016), and the third exam will also be 40 points (December 1, 2016). There will be a final exam during finals week (tentatively set for December 8, 2016) that will be worth 45 points (15 questions from each section of the course). There will also be three online quizzes given at the end of each section (each worth 5 points, for 15 points total). These quizzes will test the material learned via working through the assigned problem sets (the problem sets will not be discussed in class, but should be discussed with others in the class). Previous knowledge is assumed on each exam. Students are expected to take the exams when scheduled. Any unexcused absence will result in a grade of zero for that
exam, and absences must be approved in advance. If ill, a doctor’s note will be
required to have a valid absence from an exam, and the doctor must have been seen
on the day of the exam.

The total points in the course will be 180 (15 from the online quizzes, and 165 from
the multiple-choice exams). It is anticipated that the course will be graded on a
curve, but there are certain targets that will guarantee a certain grade. A final score
of 162 points or more will guarantee a grade in the “A” range; a final score of 144
points of more will guarantee a grade in the “B” range; a final score of 126 points or
more will guarantee a grade in the “C” range; and a final score of 108 points or more
will guarantee a grade in the “D” range. Thus, even if all students score above 162
points for the year, all students will receive an A or A- grade. If the exams are more
difficult than anticipated, then these numbers may drop, but there is no guarantee
that such an adjustment will occur.

Textbook

The textbook for the semester will be Marks’ Essentials of Medical Biochemistry, A
should be available either in the University Bookstore or at Dubois Bookstore. You
can also purchase the book from Amazon.com
http://www.amazon.com/gp/product/1451190069/ref=s9_psimh_gw_p14_d12_i4?
pf_rd_m=ATVPDKIKX0DER&pf_rd_s=desktop-1&pf_rd_r=0XE5ATWF59663XYKFHF55&pf_rd_t=36701&pf_rd_p=2079475242&pf_r
d_i=desktop
The book is available in an electronic format.

Animations

A number of animations have been developed to help students learn certain aspects
of biochemistry. Animations on DNA synthesis and repair, Protein synthesis, the
Polymerase Chain Reaction, the TCA cycle, the Electron Transport Chain, and the
Proton-translocating ATP synthase, are available from the following link:
http://homepages.uc.edu/~lieberma/new_animations/MG4010_animations_3.html

Online Tutorial on Amino Acid structures and codes

A student from a previous class sent me the following link that is useful for learning
the structures and single letter and three letter codes for the amino acids. The site
also has quizzes through which you can test yourself.
http://www.biology.arizona.edu/biochemistry/problem_sets/aa/aa.html

Problem Sets

Each professor has crafted a set of discussion problems that should be answered on
your own or within groups. An online quiz will test your mastery of this material.
Work on the material as the semester progresses, and don’t save it until the day before the quiz. Material learned through this self-learning process is also fair game for the major exams.

**Practice multiple-choice questions**

There is a link in Blackboard that will take you to "exams" to test your knowledge on practice questions. After you do the test (or part of the test) you can see if you answered correctly or not, and see an explanation of the correct answer. These quizzes can be taken multiple times, and while you will see a score for them in the gradebook, they do not contribute to your grade - they are here for you to practice on. These questions are good for testing your overall knowledge, but are probably a little easier than the questions you will see on exams (there is little medical relevance to these practice questions, but they do test biochemistry).

**Audio Recordings**

All of the lectures of the MEDS3020 course will have the audio portion of the lecture available from the audio files section of the course. The files are usually loaded immediately after class. There is an initial test audio file, which is from a number of years ago (it references Autumn 2009). If you can successfully download that file, your podcasts should be set up correctly.

As with any technology, there will be times when the recording system fails. If that occurs a previous year's recording of the same material will be loaded, if available.

**Supplemental Instructors**

There are two supplemental instructors for the course Josh Lee and Karan Chawla. They will lead a review of course material twice each week, and they will also have separate office hours for you to ask them questions about the material. More details will be forthcoming on the first day of class. There is a section of Blackboard labeled “Supplemental Instruction” in which the discussion problems for each session will be posted. The faculty encourages the students to take advantage of the SI sessions.