

Name of the module: Clinical Biochemistry – The Metabolism of the human Body

Number of module: 471-8-2003

BGU Credits: 4.0

ECTS credits

Academic year: Second

Semester: A

Hours of instruction:

Sundays & Thursdays 8:15-10:00

Location of instruction: Faculty of
Health Sciences, M8 bldg, room 100

Language of instruction: Hebrew

Field of Education: Biochemistry

Responsible department: Department
of Clinical Biochemistry and
Pharmacology

General prerequisites: Pass

biochemistry course from the
previous biochemistry semester
(amino acids, nucleic acids and
enzyme kinetics)

Grading scale:

Percentage

Course Description:

Metabolism of the human body is taught through 12 units that include:

1. Glycolysis
2. Hexose monophosphate shunt
3. Krebs cycle
4. Oxidative phosphorylation
5. Gluconeogenesis
6. Glycogen
7. Hormonal signal transduction
8. Lipid
9. Lipoproteins
10. Alcoholism
11. Urea cycle
12. Integrative unit

Each unit extends to either 2, 4 or 6 hours, depending on the mass of material involved. For each unit there is an assignment that the students submit after the last lesson in each corresponding unit. In it there are on average 20 questions that span from informative to applicative and then to complex problem solving. The assignments are handed to the TA and are then corrected and sent back to the students within 7 days.

In some of the units there is a research article that deals with the topic of the unit, and the students divide between them preparation of a presentation on each element of the article, including introduction, figures and methodology.

In addition, there are three major problem-based-learning (PBL) sessions; they are placed after carbohydrates are taught, and another before lipids are taught, then during the remainder of the course. In each session, groups of 6-15 students are paired with a tutor, and are given 3 clinical cases to discuss. Once the groups decides on a strategy for solving the case, they are allowed to ask the tutor for lab/physical results, then regroup to finally solve the cases. At the end of each session, each group will present one case to the class.

Aims of the module: To provide a detailed appreciation of the human metabolism, its regulation and related clinical pathologies, with emphasis on integration between various aspects of metabolism.

Objectives of the module: To establish the ability to collect relevant metabolic signs upon patient presentation, order and interpret metabolic tests, diagnose metabolic conditions and identify the pathways involved in the pathogenesis of major metabolic disorders.

Lecturer:

Eli Lewis (coordinator, teacher)

Ehud Ohana (teacher)

Rachel Levy (teacher)

Shraga Shanny (teacher)

Yaakov Henkin (teacher)

Contact details: Surgery bldg. 4th
floor room 4-63, Soroka Medical
Center

Office phone: 08-6400830

Email: lewis@bgu.ac.il

Office hours: 24/7 upon appointment.

Module evaluation: Yes

Confirmation: the syllabus was
confirmed by the faculty academic
advisory committee to be valid on
2013-2014

Last update: 3 Sep. 2015

Assessment: Final exam = 90% Two mid-semester quizzes total at = 10%

Work and assignments: The students are required to fill-in an assignment for each unit. They receive the assignments at the beginning of the course, and are guided to submit each assignment at the end of each unit by sending the completed work to their assigned tutors. They receive corrected assignments plus answered inquiries by 7 days after submission. The students are encouraged to submit all the assignments and are followed for submission record, but the assignments are not graded.

Time required for individual work: in addition to attendance in class, the students are expected to do their assignment and individual work for an estimated at 2 hrs before each 2 hr lesson.

Module Content/schedule and outlines:

Topic	Hours	Day	Lesson Number
Introduction to metabolism and case presentations	08:15-10:00	Sunday	1
Glycolysis	08:15-10:00	Thursday	2
Glycolysis	08:15-10:00	Sunday	3
Hexose Monophosphate Shunt	08:15-10:00	Thursday	4
Kreb's cycles	08:15-10:00	Sunday	5
Kreb's cycles	08:15-10:00	Thursday	6
Phosphorylative oxidation	08:15-10:00	Sunday	7
Phosphorylative oxidation	08:15-10:00	Thursday	8
Gluconeogenesis	08:15-10:00	Sunday	9
Gluconeogenesis	08:15-10:00	Thursday	10
Glycogen	08:15-10:00	Sunday	11
Glycogen	08:15-10:00	Thursday	12
Midterm exam	08:15-10:00	Thursday	13
1st PBL meeting	08:15-10:00	Sunday	14
Signaling Hormonal	08:15-10:00	Sunday	15
2nd PBL meeting	08:15-10:00	Thursday	16
3rd PBL meeting	08:15-10:00	Thursday	17
4th PBL meeting	08:15-10:00	Sunday	18
Lipids	08:15-10:00	Thursday	19
Lipids	08:15-10:00	Sunday	20
5th PBL meeting	08:15-10:00	Sunday	21
Lipids	08:15-10:00	Thursday	22
Lipoproteins	08:15-10:00	Sunday	23
Lipoproteins	08:15-10:00	Thursday	21
Urea Cycle	08:15-10:00	Sunday	22
Urea Cycle	08:15-10:00	Thursday	23
Alcoholism	08:15-10:00	Thursday	24
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6th PBL meeting	08:15-10:00	Thursday	25
Intergrative unit	08:15-10:00	Sunday	26
Intergrative PBL	08:15-10:00	Wednesday	27

Required reading:

Lehninger's Principles in Biochemistry 6th edition, by topic (specific pages are detailed in the beginning of the course).

Additional literature:

Article discussions:

- ***Differential Effect of DCA Treatment on the Pyruvate Dehydrogenase Complex in Patients with Severe PDHC Deficiency.*** PEDIATRIC RESEARCH Vol. 53, No. 5, 2003
- ***MBO6322 (CS-917): A potent and selective inhibitor of fructose 1,6-bisphosphatase for controlling gluconeogenesis in type 2 diabetes.*** Proc. Natl. Acad. Sci. 102,7970-7975,2005
- ***Sustained hepatic and renal glucose-6-phosphatase expression corrects glycogen storage disease type Ia in mice.*** Human Molecular Genetics, 11: 2155–2164, 2002

* All learning material will be available to the students on the course's webpage:

http://www.lewislab.net/Teaching/Biochem_Med_2015.html