

Liverpool John Moores University

Title: MEDICAL BIOCHEMISTRY
Status: Definitive
Code: **5001BCBMOL** (101432)
Version Start Date: 01-08-2011

Owning School/Faculty: Pharmacy & Biomolecular Sciences
Teaching School/Faculty: Pharmacy & Biomolecular Sciences

Team	Leader
Kehinde Ross	Y
Kenneth Ritchie	
Gordon Lowe	
Amanda Reid	
David Billington	

Academic Level: FHEQ5 **Credit Value:** 12.00 **Total Delivered Hours:** 31.50
Total Learning Hours: 120 **Private Study:** 88

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	20.000
Practical	9.000
Workshop	1.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	3 essay-style/interpretative questions from 5	70.0	1.50
Report	AS2	1 practical report (time allowed for coursework preparation: 27 hours).	30.0	

Aims

To provide an appreciation of some biochemical control mechanisms that are

applicable to human disease states and to develop skills in biochemical techniques.

Learning Outcomes

After completing the module the student should be able to:

- 1 understand the ways in which cells respond to external signals.
- 2 understand how metabolic control mechanisms operate, with particular reference to glycogen and triglyceride metabolism.
- 3 describe cholesterol metabolism and compare and contrast plasma lipoproteins.
- 4 describe the role of membranes as selective permeability barriers and compare passive and active transport.
- 5 understand the principles of clinical biochemistry.
- 6 appreciate the value of assaying serum enzymes/isoenzymes as markers of disease.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

EXAM	1	2	3	4	5
Report	5	6			

Outline Syllabus

Introduction to signal transduction: receptors, G proteins, second messengers (cyclic AMP and IP₃, protein phosphorylation and intracellular Ca²⁺). Bacterial toxins and G-proteins.

General principles of metabolic control. Control of glycogen metabolism in muscle and liver. Control of triglyceride metabolism in liver and white adipose tissue. Leptin and control of body weight. Metabolic adaptations to starvation, exercise and diabetes mellitus.

Biosynthesis and fates of cholesterol. Regulation of cholesterol metabolism.

Plasma lipoproteins, hyperlipoproteinaemias and occlusive vascular disease.

Permeability properties of membranes. Passive and active transport. Associated diseases (e.g. cystic fibrosis).

Introduction to biochemical monitoring of health and disease (clinical biochemistry): clinical samples; fluid and electrolyte balance; regulation of acid-base balance; plasma proteins; serum enzymes.

Learning Activities

Four hours of lecture time will be allocated to each of 5 topics (Learning Outcomes 1-5): Signal transduction, metabolic control, cholesterol metabolism, membrane transport and clinical biochemistry.

A single 1-hour workshop will be used to introduce certain concepts prior to the project-type laboratory practical.

Three 3-hour practical sessions will examine enzymes of diagnostic importance (specifically, lactate dehydrogenase). Relative tissue activities will be measured and linearity of assays established. Isoenzymes will be detected by differential inhibition/stability and agarose gel electrophoresis.

References

Course Material	Book
Author	Baynes, J. and Dominiczak, K.H (eds)
Publishing Year	2005
Title	Medical Biochemistry.
Subtitle	
Edition	2nd ed
Publisher	Elsevier/Mosby.
ISBN	0723433410

Course Material	Book
Author	Berg, J.M., Tymoczko, J.L. and Stryer, L
Publishing Year	2007
Title	Biochemistry.
Subtitle	
Edition	6th ed
Publisher	Freeman.
ISBN	0-7167-8724-5

Course Material	Book
Author	Devlin, T.M. (ed.)
Publishing Year	2006
Title	Textbook of Biochemistry with Clinical Correlations.
Subtitle	
Edition	6th ed.
Publisher	Wiley.
ISBN	0-471678082

Notes

The module deals with some biochemical control mechanisms that are applicable to human diseases. Lecture topics include signal transduction, metabolic control, cholesterol metabolism and plasma lipoproteins, membrane transport and an introduction to clinical biochemistry. Laboratory work focuses on measurement of serum enzymes and isoenzymes as markers of disease.