

BIOCHEMISTRY-2 PHL 285 (2 + 1)

Prerequisite: PHL 284

Course Description:

This course includes normal metabolic pathways of carbohydrates, lipids, proteins and minerals. The laboratory work is concerned with the determination of blood and urine biochemical parameters. Clinical correlations are explained whenever possible.

Course contents:

Hours

1. Carbohydrate Metabolism:	4
- Digestion and absorption.	
- Metabolism of monosaccharides.	
- Anaerobic and aerobic oxidation of glucose (glycolysis).	
- Glycogen formation and degradation.	
- Gluconeogenesis.	4
- The hexose monophosphate shunt.	
- Blood glucose level and its regulation.	
- Effect of hormones on carbohydrate metabolism.	
2. Lipid Metabolism:	2
- Digestion, absorption and the role of bile.	
- Body and blood lipids.	
- Oxidation of fatty acids.	2
- Biosynthesis and function of triglycerides and phospholipids.	
- Metabolism of ketone bodies and ketosis.	2
- Cholesterol metabolism.	
- Role of the liver in lipid metabolism.	1
3. Protein Metabolism:	2
- Digestion and absorption.	
- Biosynthesis of non-essential amino acids.	
- Catabolism of amino acid nitrogen.	
- Transport of ammonia.	
- Urea cycle and regulation of urea synthesis.	
- Metabolic disorders involving the urea cycle.	
- Catabolism of the carbon skeleton of amino acids. (glycine, serine, methionine, cysteine, phenylalanine, tryptophan and glutamic acid).	3

4. Mineral Metabolism:	3	
- Sodium, potassium & chloride.		
- Calcium, phosphorus and magnesium.		
- Iron.	1	
- Trace elements:	2	
• Chromium.	• Cobalt.	• Copper.
• Florien.	• Iodine.	• Manganese.
• Molybdenum.	• Selenium.	
• Zinc.		
EXAMINATIONS:	2	
	<hr/> Total Hours: 28	

PRACTICAL BIOCHEMISTRY-2 PHL 285 (2+1)

Lab 1 Blood Analysis:

- Preparation of plasma and serum samples.
- Deproteinization of blood by various agents.

Carbohydrates:

- Glucose determination.
 - . Fasting glucose level.
 - . Post-prandial level (2 hours after glucose load).

Lab 2 Proteins:

- Identification and characterization of amino acids.
- Precipitation of proteins, and protein denaturation.
- Quantitative estimation of total plasma proteins.
- Determination of albumin, globulins and albumin/globulinisation.

Lab 3 Non-protein nitrogen (NPN):

- Determination of plasma uric acid.

Lab 4 Determination of blood urea nitrogen (BUN).

- Determination of creatine and creatinine.

Lab 5 Nucleotides:

- Separation of acid-soluble nucleotides from mammalian liver.
- Identification and characterization of nucleotides (purine bases, ribose and phosphate).

Lab 6 Hemoglobin, Porphyrins and Bile Pigments:

- Hemoglobin determination
- Iron determination.

Lab 7 Bilirubin (Total conjugated and non-conjugated) in serum.

Lab 8 Lipids:

- Total cholesterol (Free + esterified).

Lab 9 Triglycerides

- Lipids in blood.

Lab 10 Enzymes:

- Factors affecting the rate of enzymic activity of serum amylase:
 - . Substrate concentration.
 - . Temperature.
 - . Electrolyte
 - . pH.

Lab 11 Determination of serum enzyme activity of:

- . -amylase.
- . Aspartate aminotransferase (AST).
- . Alanine amino transferase (ALT).

Lab 12 Alkaline and acid phosphatases (ALP and ACP).

Lab 13 Urine analysis:

- Normal constituents (urea, phosphate, uric acid, etc.)
- Pathological constituents (glucose, excess phosphate, ketone bodies, proteins, bile pigments, bile salts etc.)

Lab 14 Examinations