

Lectures and practical exercises

Subject:	Medical Biochemistry 2		Code: ULCHBKB/LB-ZL2/15
Study Programme:	<i>Dental Medicine</i>	Study Period:	<i>3. semester</i>
Evaluation:	<i>exam</i>	Subject Type:	<i>compulsory</i>
Content:	<i>2 h lectures and 3 h practical exercises / week</i>		<i>Total 70 hours</i>

Department: **Department of Medical and Clinical Biochemistry UPJŠ FM**

Week	Lectures http://portal.lf.upjs.sk	Practical exercises http://portal.lf.upjs.sk Medical Biochemistry - Seminars
1.	METABOLISM OF AMINO ACIDS I. <ul style="list-style-type: none"> - Catabolism - degradation of amino acids (AAs) - Common degradation processes of AAs - NH₃ - formation and urea synthesis - Metabolism of carbon skeleton of AAs - Anabolism - biosynthesis of AAs - Intermediates of glycolysis and Krebs cycle and their roles in AAs metabolism 	Metabolism of proteins <ol style="list-style-type: none"> 1. The safety rules in laboratory 2. Determination of total proteins of blood serum (patient) Seminar: <ol style="list-style-type: none"> 1. Repetition of lipids metabolism (p. 83) 2. Protein digestion (p. 109)
2.	METABOLISM OF AMINO ACIDS II. <ul style="list-style-type: none"> - Formation of biogenic amines - Biosynthesis of catecholamines - Metabolism of serotonin, thyroxine and creatine - Biosynthesis of tetrapyrroles - Pathobiochemistry of amino acid metabolism 	Metabolism of amino acids I. <ol style="list-style-type: none"> 1. Isolation of albumin and globulin of blood serum 2. Determination of ammonia in urine (patient) Seminar: <ol style="list-style-type: none"> 1. Protein metabolism (p. 111) 2. Amino acid metabolism (p. 112)
3.	METABOLISM OF NUCLEOTIDES <ul style="list-style-type: none"> - <i>De novo</i> synthesis of purine and pyrimidine nucleotides - Synthesis of deoxyribonucleotides - Degradation of nucleotides - Inhibitors of purine and pyrimidine biosynthesis – relation to the chemotherapy of cancer 	Metabolism of amino acids II. <ol style="list-style-type: none"> 1. Determination of urea in blood serum (patient) 2. Proof of phenyl pyruvate presence in blood serum Seminar: <ol style="list-style-type: none"> 1. Degradation of carbon skeleton of AAs (p. 114) 2. Detoxification of ammonia (p. 128)
4.	1. REVISION TEST * INTERMEDIARY METABOLISM RELATIONSHIPS <ul style="list-style-type: none"> - Mutual relations in metabolism of saccharides, lipids and proteins - Metabolic regulations - Metabolic pathways 	Metabolism of nucleotides <ol style="list-style-type: none"> 1. Determination of uric acid in blood serum (patient) 2. The solubility of uric acid and its salts Seminar: <ol style="list-style-type: none"> 1. Metabolism of nucleotides (p. 131) 2. Disorders in metabolism of nitrogen compounds (p. 137)
5.	BIOCHEMISTRY OF BLOOD <ul style="list-style-type: none"> - Biochemical composition, functions of blood - Specificities of erythrocyte metabolism - Metabolism of haemoglobin, biochemical importance - Disturbances in metabolism of porphyrins, pathological haemoglobins - Blood plasma proteins, biochemistry of blood clotting - Buffering systems. Acid-base balance 	Diagnostic usage of the enzymes of cell metabolism <ol style="list-style-type: none"> 1. Determination of AST activity (patient) 2. Determination of ALP activity (patient) Seminar: <ol style="list-style-type: none"> 1. Enzymes in blood (p. 24) 2. Distribution of diagnostically important enzymes in tissues (p. 28)
6.	LIVER AND METABOLISM OF FOREIGN COMPOUNDS - XENOBIOCHEMISTRY <ul style="list-style-type: none"> - Biochemistry of the liver – metabolism, disturbances of metabolism - Importance of determination of selected biomarkers - Xenobiotics – definition, importance - Metabolism of xenobiotics, biotransformation reactions, conjugation 	Biochemistry of blood <ol style="list-style-type: none"> 1. Determination of bilirubin in blood serum (patient) 2. Hemoglobin and its derivatives Seminar: <ol style="list-style-type: none"> 1. Blood (p. 163) 2. Metabolism of tetrapyrroles (p. 133)

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7.	BIOCHEMISTRY OF KIDNEY <ul style="list-style-type: none"> - Kidney metabolism - The role of the kidneys in homeostasis - ABR and its disorders - Significance of determination of selected metabolites in urine (e.g. creatinine, urea) - Specialized metabolic processes - neurotransmitters, receptors 	Metabolism of liver <ol style="list-style-type: none"> 1. Determination of ALT in blood serum (patient) 2. Determination of γ-glutamyl transferase activity (patient) Seminar: <ol style="list-style-type: none"> 1. Liver (p. 195) 2. Responses of the liver to toxic damage (p. 204)
8.	BIOCHEMISTRY OF MUSCLES <ul style="list-style-type: none"> - Organization of muscle fibres, proteins of muscle tissue - Contraction and relaxation of muscles - Regulation of muscles activity - Energy sources for muscle work 	Metabolism of kidney I. <ol style="list-style-type: none"> 1. Biochemical examination of urine (patient) Seminar: <ol style="list-style-type: none"> 1. Kidney (p. 206) 2. Clinical-biochemical examination of urine (p. 239)
9.	CHEMICAL COMMUNICATIONS IN LIVING SYSTEMS <ul style="list-style-type: none"> - Chemical compounds as signal molecules - Hormones - chemical structure, classification, mechanism of hormone action - Receptors – structure, classification, mechanisms of signal transduction 	Metabolism of kidney II. <ol style="list-style-type: none"> 1. Determination of creatinine in blood serum (patient) Seminar: <ol style="list-style-type: none"> 1. Tests of kidney functions (p. 208) 2. Muscle (p. 211)
10.	METABOLISM OF HARD TISSUE <ul style="list-style-type: none"> - Inorganic components of hard tissues - Connective tissue (collagen, elastin) - Metabolism of calcium and phosphates in dental tissue - Metabolism of other elements of dental tissue 	Acid-base balance <ol style="list-style-type: none"> 1. Models of acid-base balance 2. Determination of HCO_3^- Seminar: <ol style="list-style-type: none"> 1. Biochemistry of the inner environment (p. 159) 2. Acid-Base balance (p. 165)
11.	2. REVISION TEST * ORAL BIOCH. AND PATHOBIOCHEMISTRY I <ul style="list-style-type: none"> - Organic components of teeth - Mineralization – crystals formation - Conditions and theories of mineralization - Saliva – composition, functions, importance 	Biochemistry of mineral compounds <ol style="list-style-type: none"> 1. Determination of calcium 2. Determination of inorg. Phosphorus Seminar: <ol style="list-style-type: none"> 1. Metabolism of mineral substances (p. 173) 2. Calcium in relation to bone metabolism (p. 223)
12.	ORAL BIOCH. AND PATHOBIOCHEMISTRY II <ul style="list-style-type: none"> - Dental plaque, tooth decay and tartar - Biochemistry of tooth decay - Pathobiochemistry of inflammatory periodontal diseases - Effect on the oral cavity on the condition of organism 	Biochemistry of the oral cavity <ol style="list-style-type: none"> 1. Argentometric determination of chlorides in saliva 2. Proof of thiocyanates presence in saliva Seminar: <ol style="list-style-type: none"> 1. Digestive system, oral cavity (p. 188) 2. Biochemistry and metabolism of bones (p. 219)
13.	BIOCHEMICAL BASIS OF NUTRITION <ul style="list-style-type: none"> - Biological value of nutrients - Requirements for nutrients content (e.g. limiting amino acids, vitamins) - Impact of technology and modification of nutrients on digestion, resorption and usability of nutrients 	Specialized metabolic processes <ol style="list-style-type: none"> 1. Determination of HCl output by the gastric mucosa Seminar: <ol style="list-style-type: none"> 1. Importance of HCl in the stomach (p. 189) 2. Patient evaluation - determination of diagnosis based on results of biochemical examinations 3. REVISION TEST *
14.	CLINICAL BIOCHEMISTRY <ul style="list-style-type: none"> - Biological material - Factors affecting the results and interpretation of biochemical examination - Clinical-biochemical examination - diagnostic and therapeutic application in medicine 	Evaluation of practical exercises <ol style="list-style-type: none"> 1. Individual assessment of students' work

** Students can come to see how their test was graded within one week of the test*