

Week	Lectures: <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a>	Practical exercises: <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> RNDr. Mašlanková
1	<b>ENZYMES AND THEIR ROLE IN METABOLISM</b> <ul style="list-style-type: none"> <li>- Specific features of chemical reactions in living systems (metabolism)</li> <li>- Enzymes as biocatalysts – structure and function</li> <li>- Peculiarity of enzyme molecules, active site, specificity, mechanisms of catalytic effect</li> <li>- Isoenzymes and allosteric enzymes</li> <li>- Classification and nomenclature of enzymes</li> <li>- Enzyme activity, enzyme inhibition, inhibitors</li> </ul> <i>prof. Mareková</i>	<b>Principles of biochemical laboratory techniques</b> <ol style="list-style-type: none"> <li>1. Safety in biochemical laboratory</li> <li>2. Introduction to clinico - biochemical diagnostics</li> </ol> Seminar <ol style="list-style-type: none"> <li>1. Classification and catalytic activity of enzymes</li> <li>2. Enzymes in blood</li> </ol> <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry enzymes Mgr. Urban
2	<b>COENZYMES – THE STRUCTURE AND FUNCTION</b> <ul style="list-style-type: none"> <li>- Classification and function of coenzymes</li> <li>- The relation between apoenzyme and coenzyme</li> <li>- Coenzymes of oxidoreductases (transporting H<sup>+</sup> or e<sup>-</sup>)</li> <li>- Coenzymes transporting chemical groups</li> <li>- Enzyme kinetics, the Michaelis-Menten equation</li> <li>- Ribozymes and other catalytic active molecules in living systems</li> </ul> <i>prof. Mareková</i>	<b>Enzymes I.</b> <ol style="list-style-type: none"> <li>1. Calculation of Michaelis-Menten constant of urease</li> </ol> Seminar <ol style="list-style-type: none"> <li>1. Kinetics of enzymatic reactions</li> </ol> <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry enzymes Mgr. Urban
3	<b>BIOLOGICAL OXIDATIONS I.</b> <ul style="list-style-type: none"> <li>- The citric acid cycle (CAC)</li> <li>- Central role of Acetyl-CoA</li> <li>- Localization of CAC in the cell</li> <li>- Regulation of the citric acid cycle</li> </ul> <i>RNDr. Stupák</i>	<b>Enzymes II.</b> <ol style="list-style-type: none"> <li>1. Effect of temperature on the activity of α-amylase</li> <li>2. Activation and inhibition of α-amylase by inorganic ions</li> </ol> Seminar <ol style="list-style-type: none"> <li>1. Catalytic activity of enzymes</li> <li>2. Factors affecting the rate of enzymatic reaction</li> </ol> <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry-Enzymes Mgr. Urban
4	<b>BIOLOGICAL OXIDATIONS II.</b> <ul style="list-style-type: none"> <li>- The energy of biol. redox processes</li> <li>- Macroergic compounds,</li> <li>- The respiratory chain</li> <li>- Oxidative phosphorylation</li> </ul> <i>prof. Mareková</i>	<b>Enzymes III.</b> <ol style="list-style-type: none"> <li>1. Effect of pH on the activity of salivary α-amylase</li> </ol> Seminar <ol style="list-style-type: none"> <li>1. Diagnostically important enzymes</li> </ol> <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry Bioenergetic processes in the cells Mgr. Urban
5	<b>INTERMEDIARY METABOLISM – CELL BIOCHEMISTRY</b> <ul style="list-style-type: none"> <li>- General outline of cellular metabolism</li> <li>- Coordination and regulation of biochemical processes (enzymes)</li> <li>- Cell compartmentation, localization of individual biochemical processes in organelles</li> <li>- Biomembranes, cellular transport</li> </ul> <i>prof. Mareková</i>	<b>Biological oxidations I.</b> <ol style="list-style-type: none"> <li>1. Isolation of blood red cells membranes and detection of lipid phosphate</li> <li>2. Test of katalase activity</li> </ol> Seminar <ol style="list-style-type: none"> <li>1. Cellular membranes</li> <li>2. Intercellular communication and receptors</li> </ol> <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry Bioenergetic processes in the cells
6	<b>CARBOHYDRATES METABOLISM I.</b> <ul style="list-style-type: none"> <li>- General characterization</li> <li>- Glycolysis</li> <li>- Oxidative decarboxylation of pyruvate</li> </ul> <i>Credit test from enzymes and biological oxidation (1 – 5 week of semester)</i> <i>prof. Mareková</i>	<b>Biological oxidations II.</b> <ol style="list-style-type: none"> <li>1. Detection of dehydrogenases in animal tissue</li> </ol> Seminar <ol style="list-style-type: none"> <li>1. Formation and utilization of ATP</li> </ol> <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry Bioenergetic processes in the cells Mgr. Urban
7	<b>CARBOHYDRATES METABOLISM II.</b> <ul style="list-style-type: none"> <li>- Gluconeogenesis</li> <li>- Anaplerotic reactions</li> <li>- The pentose phosphate pathway – direct oxidation of glucose, NADPH formation</li> </ul> <i>Mgr. Urban</i>	<b>Biological oxidation III.</b> <ol style="list-style-type: none"> <li>1. Substrate specificity of glycosidases</li> </ol> Seminar <ol style="list-style-type: none"> <li>1. Sources of glucose</li> </ol> <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry Metabolism of saccharides Mgr. Urban

8	<b>CARBOHYDRATES METABOLISM III.</b> - Glycogen biosynthesis and degradation - Biosynthesis of glucuronic acid - Metabolism of galactose and fructose - Metabolism of amino sugars  <i>Mgr. Urban</i>	<b>Carbohydrates metabolism I.</b> 1. Detection of glycolysis intermediates 2. Detection of lactic acid  Seminar 1. Bioenergetic processes in the cell  <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry Metabolism of saccharides <i>Mgr. Urban</i>
9	<b>METABOLISM OF COMPLEX SACCHARIDES</b> - Metabolism of glycosaminoglycans and glycoproteins - Interrelations in carbohydrates metabolism - Regulation of carbohydrates metabolism - Disorders of carbohydrates metabolism  <i>Mgr. Urban</i>	<b>Carbohydrates metabolism II.</b> 1. Enzymatic determination of glucose in blood  Seminar 1. Glycoproteins  <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry Metabolism of saccharides <i>Mgr. Urban</i>
10	<b>LIPIDS METABOLISM I.</b> - Degradation of triacylglycerols - Fatty acid oxidations ( $\alpha$ , $\beta$ , $\omega$ ) - Ketogenesis  <i>RNDr. Stupák</i>	<b>Carbohydrates metabolism III.</b> 1. Isolation and detection of glycogen from liver  Seminar 1. Glycoprotein 2. Diagnostically significant carbohydrates  <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry Metabolism of saccharides <i>Mgr. Urban</i>
11	<b>LIPIDS METABOLISM II.</b> - Fatty acid biosynthesis - Biosynthesis of triacylglycerols - Metabolism of phospholipids - Biosynthesis of prostaglandins, prostacyclins and thromboxans  <i>RNDr. Stupák</i>	<b>Lipids metabolism I.</b> 1. Hydrolytic cleavage of lipids by lipase 2. Determination of total lipids in blood serum  Seminar 1. Metabolism of lipids  <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry Metabolism of lipides <i>Mgr. Urban</i>
12	<b>STEROID METABOLISM</b> - Biosynthesis of cholesterol - Metabolic reactions of cholesterol - Formation of bile acids - Metabolism of sphingolipids and glycolipids  <i>Credit test from metabolism of saccharides and lipids (7 - 11 week of semester)</i>  <i>RNDr. Stupák</i>	<b>Lipids metabolism II.</b> 1. Fractionation of blood serum lipids 2. Determination of triacylglycerols in blood serum  Seminar 1. Eikosanoids 2. Lipoproteins  <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry Metabolism of lipides <i>Mgr. Urban</i>
13	<b>LIPIDS METABOLISM III.</b> - Composition and role of lipoproteins - Lipoproteins and cholesterol - Dysfunction of lipoproteins and cardiovascular diseases  <i>RNDr. Stupák</i>	<b>Lipid metabolism II.</b> 1. Determination of cholesterol in blood serum  Seminar 1. Steroid metabolism  <i>Credit test from practical excercises (1 – 13 week of semester)</i>  <a href="http://portal.lf.upjs.sk">http://portal.lf.upjs.sk</a> – seminar from biochemistry Metabolism of lipides <i>Mgr. Urban</i>
14	<b>OXIDATION STRESS</b> - Reactive metabolites of oxygen - Mechanism of oxidative damage of FA and proteins - Defense systems against free radicals - Natural antioxidants  <i>doc. Tomečková</i>	<b>Summary and evaluation of student work</b>  1. Granting credit 2. Credit test  <i>Mgr. Urban</i>