

Week	Lectures: http://portal.lf.upjs.sk	Practical exercises: http://portal.lf.upjs.sk
1	ENZYMES AND THEIR ROLE IN METABOLISM <ul style="list-style-type: none"> - Specific features of chemical reactions in living systems (metabolism) - Enzymes as biocatalysts –structure and function - Peculiarity of enzyme molecules, active site, specificity, mechanisms of catalytic effect - Isoenzymes and allosteric enzymes - Classification and nomenclature of enzymes - Enzyme activity, enzyme inhibition, inhibitors <i>prof.Mareková</i>	<u>Principles of biochemical laboratory techniques</u> <ol style="list-style-type: none"> 1. Safety in biochemical laboratory 2. Introduction to clinico - biochemical diagnostics <u>Seminar</u> <ol style="list-style-type: none"> 1. Classification and catalytic activity of enzymes (1) 2. Enzymes in blood (1.4.1.) <i>RNDr. Mašlanková</i>
2	COENZYMES – THE STRUCTURE AND FUNCTION <ul style="list-style-type: none"> - Classification and function of coenzymes - The relation between apoenzyme and coenzyme - Coenzymes of oxidoreductases (transporting H⁺ or e⁻) - Coenzymes transporting chemical groups - Enzyme kinetics, the Michaelis-Menten equation - Ribozymes and other catalytic active molecules in living systems <i>prof.Mareková</i>	<u>Enzymes I.</u> <ol style="list-style-type: none"> 1. Calculation of Michaelis-Menten constant of urease (1.2.2.) <u>Seminar</u> <ol style="list-style-type: none"> 1. Kinetics of enzymatic reactions (1.2.) <i>RNDr. Mašlanková</i>
3	INTERMEDIARY METABOLISM – CELL BIOCHEMISTRY <ul style="list-style-type: none"> - General outline of cellular metabolism - Coordination and regulation of biochemical processes (enzymes) - Cell compartmentation, localization of individual biochemical processes in organelles - Biomembranes, cellular transport <i>prof.Mareková</i>	<u>Enzymes II.</u> <ol style="list-style-type: none"> 1. Effect of temperature on the activity of α-amylase (1.3.3.) 2. Activation and inhibition of α-amylase by inorganic ions (1.3.5.) <u>Seminar</u> <ol style="list-style-type: none"> 1. Catalytic activity of enzymes (1.1.) 2. Factors affecting the rate of enzymatic reaction (1.3.) <i>RNDr. Mašlanková</i>
4	BIOLOGICAL OXIDATIONS I. <ul style="list-style-type: none"> - The energy of biol. redox processes - Macroergic compounds, energetically coupled reaction - Macroergic compounds - The respiratory chain - Oxidative phosphorylation <i>prof.Mareková</i>	<u>Enzymes III.</u> <ol style="list-style-type: none"> 1. Effect of pH on the activity of salivary α-amylase (1.3.4.) <u>Seminar</u> <ol style="list-style-type: none"> 1. Diagnostically important enzymes (1.4.2.) <i>RNDr. Mašlanková</i>
5	BIOLOGICAL OXIDATIONS II. <ul style="list-style-type: none"> - The citric acid cycle - Central role of Acetyl-CoA - Localization of CAC in the cell - Regulation of the cycle <i>prof.Mareková</i>	<u>Biological oxidations I.</u> <ol style="list-style-type: none"> 1. Isolation of blood red cells membranes and detection of lipid phosphate (2.1.1.) 2. Test of katalase activity (1.5.1.) <u>Seminar</u> <ol style="list-style-type: none"> 1. Cellular membranes (2.1.) 2. Intercellular communication and receptors (2.2.) <i>RNDr. Mašlanková</i>
6	REVISION TEST 1st – 5th week topics CARBOHYDRATES METABOLISM I. <ul style="list-style-type: none"> - General characterization - Glycolysis - Oxidative decarboxylation of pyruvate <i>RNDr. Mašlanková</i>	<u>Biological oxidations II.</u> <ol style="list-style-type: none"> 1. Detection of dehydrogenases in animal tissue (2.5.4) <u>Seminar</u> <ol style="list-style-type: none"> 1. Formation and utilization of ATP (2.4.3.) <i>RNDr. Mašlanková</i>
7	CARBOHYDRATES METABOLISM II. <ul style="list-style-type: none"> - Gluconeogenesis - Anaplerotic reactions - The pentose phosphate pathway – direct oxidation of glucose, NADPH formation <i>RNDr. Mašlanková</i>	<u>Biological oxidation III.</u> <ol style="list-style-type: none"> 1. Substrate specificity of glycosidases <u>Seminar</u> <ol style="list-style-type: none"> 1. Sources of glucose (3.1.) <i>RNDr. Mašlanková</i>

8	CARBOHYDRATES METABOLISM III. <ul style="list-style-type: none"> - Glycogen biosynthesis and degradation - Biosynthesis of glucuronic acid - Metabolism of galactose and fructose - Metabolism of amino sugars <p style="text-align: right;">RNDr. Mašlanková</p>	<u>Carbohydrates metabolism I.</u> <ol style="list-style-type: none"> 1. Detection of glycolysis intermediates (3.2.1.) 2. Detection of lactic acid (3.1.3.) <p><u>Seminar</u></p> <ol style="list-style-type: none"> 1. Bioenergetic processes in the cell (2) <p style="text-align: right;">RNDr. Mašlanková</p>
9	METABOLISM OF COMPLEX SACCHARIDES <ul style="list-style-type: none"> - Metabolism of glycosaminoglycans and glycoproteins - Interrelations in carbohydrates metabolism - Regulation of carbohydrates metabolism - Disorders of carbohydrates metabolism <p style="text-align: right;">RNDr. Mašlanková</p>	<u>Carbohydrates metabolism II.</u> <ol style="list-style-type: none"> 1. Enzymatic determination of glucose in blood (3.2.2.) <p><u>Seminar</u></p> <ol style="list-style-type: none"> 1. Glycoproteins (3.4.) <p style="text-align: right;">RNDr. Mašlanková</p>
10	LIPIDS METABOLISM I. <ul style="list-style-type: none"> - Degradation of triacylglycerols - Fatty acid oxidations (α, β, ω) - Ketogenesis <p style="text-align: right;">Mgr. Urban</p>	<u>Carbohydrates metabolism III.</u> <ol style="list-style-type: none"> 1. Isolation and detection of glycogen from liver (3.3.1, 3.3.2) <p><u>Seminar</u></p> <ol style="list-style-type: none"> 1. Glycoprotein (3.4) 2. Diagnostically significant carbohydrates (3.5) <p style="text-align: right;">RNDr. Mašlanková</p>
11	LIPIDS METABOLISM II. <ul style="list-style-type: none"> - Fatty acid biosynthesis - Biosynthesis of triacylglycerols - Metabolism of phospholipids - Biosynthesis of prostaglandins, prostacyclins and thromboxans <p style="text-align: right;">Mgr. Urban</p>	<u>Lipids metabolism I.</u> <ol style="list-style-type: none"> 1. Hydrolytic cleavage of lipids by lipase (4.1.1.) 2. Determination of total lipids in blood serum (4.1.2.) <p><u>Seminar</u></p> <ol style="list-style-type: none"> 1. Metabolism of lipids (4.1.) <p style="text-align: right;">RNDr. Mašlanková</p>
12	REVISION TEST 6th – 11th week topics STEROID METABOLISM <ul style="list-style-type: none"> - Biosynthesis of cholesterol - Metabolic reactions of cholesterol - Formation of bile acids - Metabolism of sphingolipids and glycolipids <p style="text-align: right;">Mgr. Urban</p>	<u>Lipids metabolism II.</u> <ol style="list-style-type: none"> 1. Fractionation of blood serum lipids (4.1.3.) 2. Determination of triacylglycerols in blood serum (4.3.4.) <p><u>Seminar</u></p> <ol style="list-style-type: none"> 1. Eikosanoids (4.2.) 2. Lipoproteins (4.3.) <p style="text-align: right;">RNDr. Mašlanková</p>
13	LIPIDS METABOLISM III. <ul style="list-style-type: none"> - Composition and role of lipoproteins - Lipoproteins and cholesterol - Dysfunction of lipoproteins and cardiovascular diseases <p style="text-align: right;">Mgr. Urban</p>	<u>Lipid metabolism II.</u> <ol style="list-style-type: none"> 1. Determination of cholesterol in blood serum (4.3.2.) <p><u>Seminar</u></p> <ol style="list-style-type: none"> 1. Steroid metabolism (4.4.) <p style="text-align: right;">RNDr. Mašlanková</p>
14	OXIDATION STRESS <ul style="list-style-type: none"> - Reactive metabolites of oxygen - Mechanism of oxidative damage of FA and proteins - Defense systems against free radicals - Natural antioxidants <p style="text-align: right;">prof. Mareková</p>	Summary and evaluation of student work <p><u>Seminar</u></p> <ol style="list-style-type: none"> 1. Diagnostically significant lipids (4.5.) <p style="text-align: right;">RNDr. Mašlanková</p>