

Program of Study : General Medicine

Course : Biochemistry 2

Abbreviation : LCH/VAA20

Schedule : 60 hours of lectures
60 hours of tutorials

Course Distribution : 2nd year, 3rd semester

Number of Credits : 15

Course Form : Lectures, tutorials

Lectures:

Teachers: Prof. RNDr. Jitka Ulrichová, CSc.
Doc. Mgr. Jitka Vostálová, Ph.D.
Doc. Ing. Alena Rajnochová Svobodová, Ph.D.

Study: Continuous

	Date	Subject	No. of less.	Teacher
1	22.09.2022	Carbohydrate metabolism – overview. Glycolysis.	2	Rajnochová
	23.09.2022	Gluconeogenesis. Pentose phosphate pathway.	2	Rajnochová
2	29.09.2022	Glycogen metabolism.	2	Rajnochová
	30.09.2022	Metabolism other carbohydrates. Carbohydrate pathobiochemistry.	2	Rajnochová
3	06.10.2022	Lipid metabolism – overview. Lipoproteins.	2	Vostálová
	07.10.2022	Triacylglycerol, phospholipid and glycolipid metabolism.	2	Vostálová
4	13.10.2022	Fatty acid degradation.	2	Vostálová
	14.10.2022	Ketone bodies. Fatty acid biosynthesis.	2	Vostálová
5	20.10.2022	Polyunsaturated fatty acids. Eicosanoids.	2	Ulrichová
	21.10.2022	Cholesterol metabolism.	2	Vostálová
6	27.10.2022	Bile acids. Steroids. Vitamin D.	2	Vostálová
	28.10.2022	<i>State holiday</i>	2	
7	03.11.2022	Insulin, glucagon – effect on metabolism. Nutrition metabolism at various states.	2	Rajnochová
	04.11.2022	Proteolysis. General pathways of amino acids catabolism. Urea cycle.	2	Ulrichová
8	10.11.2022	Amino acids biosynthesis. Metabolism of aromatic amino acids. Catecholamines.	2	Ulrichová
	11.11.2022	Tetrapyrroles – heme biosynthesis. Bile pigments.	2	Ulrichová
9	17.11.2022	<i>State holiday</i>	2	

	18.11.2022	Gastrointestinal digestion and absorption.	2	Ulrichová
10	24.11.2022	Glycoprotein.	2	Vostálová
	25.11.2022	Glycosaminoglycans. Proteoglycans.	2	Vostálová
11	01.12.2022	Extracellular matrix - proteins. Osteosynthesis.	2	Rajnochová
	02.12.2022	Biochemistry of muscle contraction – energy supply in skeletal and heart muscle.	2	Ulrichová
12	08.12.2022	Metabolism of iron, copper and selected elements.	2	Vostálová
	09.12.2022	Metabolism of xenobiotics.	2	Ulrichová
13	15.12.2022	Biochemistry of liver.	2	Ulrichová
	16.12.2022	Biochemistry of kidney. Role in ion homeostasis.	2	Vostálová
14	22.12.2022	Biochemistry of neurodegenerative diseases.	2	Ulrichová
		Biochemistry of vision.	2	
	23.12.2022	Christmas holidays		
15	05.01.2023	Overview of biochemistry.	2	Ulrichová
	06.01.2023	Overview of biochemistry.	2	Ulrichová

Tutorials:

Leading Teacher: Mgr. Pavel Kosina, Ph.D.

Study: Continuous

	Week from-to	Subject	No. of less.
1	19.09. – 23.09.2022	Information sources, databases. Training of laboratory skills. Blood collection systems.	4
2	26.09. – 30.09.2022 28.09.2022 State holiday	Acid-basic equilibrium. (Thursday)	4
3	03.10. – 07.10.2022	Enzymes I. Demonstration of substrate specificity of α -amylase and sucrase. Determination of optimum temperature for trypsin	4
4	10.10. – 14.10.2022	Enzymes II. Determination of Michaelis constant of alkaline phosphatase (ALP) in serum. Inhibition of catalase activity.	4
5	17.10. – 21.10.2022	Enzyme III. Determination of serum lactate dehydrogenase, aspartate aminotransferase and alanine aminotransferase activity in serum.	4
6	24.10. – 28.10.2022 28.10.2022 State holiday	Metabolism of saccharides. Determination of glucose in blood and urine. Oral glucose tolerance test. Determination of glucose in blood by glucometer. Determination of glucose and ketones in urine by diagnostic test strips. Determination of glycated hemoglobin.	4

7	31.10. – 04.11.2022	Lipid metabolism. Determination of diagnostically important atherosclerosis parameters in serum (total cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides).	4
8	07.11. – 11.11.2022	Chapters from biochemistry (presentation).	4
9	14.11. – 18.11.2022 <i>17.11.2021 State holiday</i>	Acid-basic equilibrium. (Wednesday)	4
10	21.11. – 25.11.2022	Immunoanalytical methods. Point of care testing. Test for blood in faeces. Determination of specific antigen by ELISA method.	4
11	28.11. – 02.12.2022	Analysis of gastric juice. Microscopy of urinary sediment, urinalysis. Urinalysis, detection of selected parameters in urine. Determination of gastric output.	4
12	05.12. – 09.12.2022	Amino acids metabolism. Digestion of proteins. Determination of creatinine in serum and urine. Determination of cystatin C in serum. Clearance and glomerular filtration calculations. Semi-quantitative determination of albuminuria.	4
13	12.12. – 16.12.2022	Practical test.	4
14	19.12. – 22.12.2022	Revision of key metabolic pathways. Substitutions.	4
15	02.01.– 06.01.2023	Revision of key metabolic pathways. Substitutions.	4

Completed by: Course unit credit; written exam test

Requirements: 100% tutorial attendance*; obtaining at least 70 % points (cumulative) in continuous test (if 70 % points (cumulative) in continuous tests are not reached, at least 70 % points in course unit credit test on principles of methods and calculations in biochemistry have to be obtained); presentation of one selected biochemical topic; elaboration of protocols including evaluation of results and formulation of conclusions (correctness of each complete protocol is approved by the teacher); to pass the practical test.

* possibility of excuse 10% of obligatory classes according to Faculty of Medicine and Dentistry Policy LF-B-18/14

The written exam test.

Literature:

Abali E.E., Cline S.D., Franklin D., Viselli S.M.: Biochemistry (8th ed.) Lippincott Illustrated Reviews. Wolters Kluwer 2021.
 Ferrier D.S.: Biochemistry (7th ed.), Lippincott Illustrated Reviews. Wolters Kluwer 2016.
 Champe P.C., Harvey R.A.: Biochemistry (6th ed.), Lippincott Williams & Wilkins 2014.
 Devlin T.M. Textbook of biochemistry with clinical correlations (7th ed.), John Wiley & Sons, Inc. 2010.

Murray R.K., Bender D.A., Botham K.M., Kennelly P.J., Rodwell V.W., Weil P.A. Harper's Illustrated Biochemistry (29th ed.), Lange Medical Book 2012.

Koolman J. Color Atlas of Biochemistry (3rd ed.), Georg Thieme Verlag 2012

Newsholme E., Leech T. Functional Biochemistry in Health and Disease (2nd ed.), Wiley-Blackwell, 2010

Dvořáčková S., Dvořák Z., Valentová K., Vičar J. Biochemistry. Laboratory classes. 2007.