

# MEDICAL CHEMISTRY AND BIOCHEMISTRY II

2<sup>nd</sup> year - GENERAL MEDICINE - *winter semester 2023/2024*

Lectures: Prof. MUDr. Radim Černý, CSc.

Tuesday 8<sup>00</sup> – 10<sup>30</sup> Brown Lecture Room

Wednesday 8<sup>00</sup> – 10<sup>30</sup> Brown Lecture Room

Week	Date	Topic
1	3.10.	Summary of the biochemistry lectures from the previous semester: Metabolism of saccharides and lipids.
	4.10.	Cholesterol, its synthesis and distribution. Lipid distribution in the body.
2	10.10.	Blood plasma lipoproteins. Steroid hormones, vitamin D.
	11.10.	Metabolism of non-saturated fatty acids and eicosanoids. Biological membranes.
3	17.10.	Protein and amino acid metabolism – overview. Direct and indirect deamination.
	18.10.	Detoxification of ammonia, urea cycle.
4	24.10.	Metabolism of glutamate, aspartate, alanine, proline, arginine, cysteine, methionine, valine, leucine, isoleucine, phenylalanine, and tyrosine.
	25.10.	PKU. Tetrahydrofolate and one-carbon fragments.
5	31.10.	Metabolism of glycine, serine, threonine, lysine, histidine, and tryptophan.
	1.11.	Biosynthesis of porphyrins and their degradation. Bile pigments.
6	7.11.	Biosynthesis of purine and pyrimidine nucleotides and their degradation. Structure of DNA and RNA.
	8.11.	Biosynthesis of DNA, DNA repair and recombination.
7	14.11.	DNA transcription and its regulation. Formation and role of rRNA, tRNA and mRNA.
	15.11.	Genetic code and mutations. Mechanism of proteosynthesis. Gene structure and gene expression. Replication of viruses.
8	24.11.	DNA manipulation and cloning, its significance in medicine. PCR and its medical applications.
	22.11.	Methods using DNA and RNA analysis in diagnostics.
9	28.11.	Hemoglobin and its function.
	29.11.	Immunoglobulins – structure and mechanism of gene reconstruction and expression. Immunoglobulin family.
10	5.12.	Biochemistry of the liver. Nutrition and starvation. Xenobiochemistry and biotransformations. Free radicals, their formation and protection against them.
	6.12.	Biochemistry of neural tissue. Main neurotransmitters. Metabolism of muscles.
11	12.12.	Regulation of metabolism.
	13.12.	Properties of water. Acid-base balance in human body, its regulation.

12	19.12.	Main disorders of acid base balance.
	<b>20.12.</b>	<b>Credit test.</b>
<i>Christmas holidays</i>		
13	2.1.	Cellular and extracellular proteolysis. Biochemical aspects of diabetes.
	<b>3.1.</b>	<b>Credit test – resit date.</b>
14	9.1.	Antimetabolites and their significance in biochemistry and medicine.
	10.1.	Consultations.

**Textbook:** Rodwell V.W. et al.: Harper's Illustrated Biochemistry, 31<sup>th</sup> edition, 2018 McGraw-Hill Education, ISBN 978-1-259-83793-7. Any previous edition or any later edition is possible or any other standard textbook of Biochemistry.