



**CHARLES UNIVERSITY – FIRST FACULTY OF MEDICINE
AND
GENERAL UNIVERSITY HOSPITAL IN PRAGUE**
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Announcement for Summer Term 2024/2025

2nd year GENERAL MEDICINE

Exam Test

The final examination from Medical Chemistry and Biochemistry consists of two parts: written and oral.
The written test will contain:

| Part (% points) | Topics, detailed specification |
|--|---|
| Calculation tasks (cca 16 % points) | <ul style="list-style-type: none">• Stoichiometry, osmolarity, pH of acids, bases and buffers, dilutions, concentration of solutions |
| General chemistry (cca 8 % points) | <p>Topic:</p> <ul style="list-style-type: none">• Hydrophobicity and hydrophilicity of substances, consequences• Thermochemistry• Kinetics of chemical reactions• Oxidation/reduction• Chemical equilibrium• Types of chemical bonds• Weak bonding interactions• Toxicity of elements and inorganic compounds |
| Biochemistry (cca 55 % points) | <p>Topic:</p> <ul style="list-style-type: none">• Citric acid cycle, respiratory chain, metabolism of saccharides, fats, amino acids, nucleotides, heme and porphyrins• Structures*• Enzymatic reactions (structures, names, cofactors, enzymes)• Pathways (key enzymes, input and output)• Connections of intermediates among pathways• Exchange of intermediates among organs• Metabolism of different organs• Metabolic state after meal and during fasting• Regulation of metabolism: basic principles, hormonal and energetic regulation, regulation by metabolic intermediates |
| Molecular biology (cca 20 % points) | <p>Topic:</p> <ul style="list-style-type: none">• Cell signaling (basic principles, second messengers)• Cell cycle• Apoptosis• Biochemical foundation of cancerogenesis (tumor suppressor genes, proto-oncogenes, mutator genes)• Flow of genetic information (replication, transcription, translation)• Regulation of gene expression, epigenetic tools• Post-transcriptional modifications of (m)RNA and post-translational modifications of proteins• Proteosynthesis and protein folding, degradation of proteins• Methods – RFLP, PCR, sequencing |

*Required as announced: <https://ulbld.lf1.cuni.cz/file/6274/list-of-structures2425.pdf>

An active ability to assemble complex formulas from simple ones as well as deduction of conversion of an intermediate according to a given enzyme is expected.

In order to continue to the oral part of the exam at least 57 % from the maximal number of points must be obtained in this test. This requirement does not apply to the third exam attempt. Students who pass the written test but fail in the oral part, shall not write the test in the subsequent exam attempts.

February 6th 2025

Prof. MUDr. Tomáš Zima, DrSc. MBA
Head of the Institute of Medical Biochemistry
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