

Medical Chemistry and Biochemistry - B83120 (General Medicine) - summer semester 2024/2025

Week	Week from	LECTURES Wednesday 10.45-12.15 (Lecture Hall ŮBLD, No.3.073) Thursday 12.30-14.00 (Lecture Hall, U Nemocnice 4, No. 1.26)	Teacher	SEMINARS Monday 14.15-15.45 (2051, 2054) Tuesday 14.15-15.45 (2052, 2053) Friday 14.15-15.45 (2055, 2056) (Lecture Hall ŮBLD, No.3.073)	Teacher	PRACTICAL LESSONS Tuesday 14.15-17.15 (2055, 2056) Wednesday 14.15-17.15 (2051, 2052) Thursday 14.15-17.15 (2053, 2054)
1.	24.02.2025	Introductory lecture to the molecular biology block.	Prof. Kleibl	REVISION TEST: Metabolism of saccharides, lipids, amino acids	Group teachers	Introduction to pre-analytics of laboratory examination (Practice of venipuncture on a model of arm)
		Nucleic acids: Structure, properties and significance. Levels in DNA & RNA structure. Organization of nuclear DNA, histones. Principles of DNA-protein interaction.	Doc. Vachtenheim			
2.	03.03.2025	DNA replication. Pro- and eukaryotic DNA polymerases. Types and classifications of DNA alterations.	Dr. Ševčík	Introduction to the block of molecular biology	Prof. Kleibl	Toxicology
		DNA repair. DNA reparation pathways. Direct repair, BER, NER, MMR, repair of DNA strand breaks.	Dr. Ševčík			
3.	10.03.2025	Biosynthesis of RNA (DNA transcription) in prokaryotic and eukaryotic cells. Posttranscriptional RNA processing. Splicing and export of RNA from the cell nucleus. Participation of histone modification in transcriptional regulation.	Doc. Vachtenheim	Structure of nucleic acids	Dr. Leníček	Isolation of DNA from buccal smear. Measurement of concentration of isolated DNA. Cell fractionation, isolation and purification of genetic material. Characterization and quantification of DNA. Properties of DNA/RNA.
		Regulation of gene expression in pro- and eukaryotic cells at the level of transcription.	Prof. Kleibl			
4.	17.03.2025	Synthesis of proteins (translation) and its regulation.	Dr. Soukupová	Selected methods of molecular biology	Dr. Šafaříková	Electrophoresis of isolated DNA. Amplification of fragments including intron 10, exon 13 and exon 14 of DPYD gene by means of PCR. / PCR and its modification (RT-PCR, qPCR).
		Post-translational protein modifications. Cellular protein targeting.	Doc. Křepela			
5.	24.03.2025	Intracellular protein degradation: role of lysosomes and proteasomes.	Doc. Křepela	Next Generation Sequencing (NGS)	Dr. Šafaříková	Electrophoresis of all PCR products. Restriction analysis of PCR products with intron 10 and exon 14 of DPYD gene. / Restriction enzymes and their usage (restriction analysis, DNA cloning).
		Structure and function of biomembranes, cellular junctions.	Dr. Vecka			
6.	31.03.2025	Mechanisms of cellular signaling and hormone actions I	Dr. Pláteník	Regulation of expression of genetic information at various levels, RNA interference, microRNA.	Dr. Žižalová	Electrophoresis of restriction analysis. Preparation of sequencing reaction for DPYD exon 13. /Sanger's sequencing and evaluation of sequencing chromatograms.
		Mechanisms of cellular signaling and hormone actions II	Dr. Pláteník			
7.	07.04.2025	The cell cycle. Molecular basis of tumor growth.	Doc. Vachtenheim	Advanced analytical methods (GC, HPLC, MS, MALDI)	Dr. Vecka	Precipitation of sequencing reaction and preparation of Sanger's sequencing. / Significance of analysis DNA, RNA and proteins in diagnostics.
		Programs of cellular senescence and cellular death.	Dr. Pláteník			
8.	14.04.2025	Lecture cancelled		Regulations of energetic metabolism Mon, Tue	Dr. Pláteník	Evaluation of sequencing chromatograms and restriction analyses, relationship of found phenotypes to 5FU toxicity. REVISION TEST molecular biology Tue, Wed
		Dean's Day				
9.	21.04.2025	Introduction to organ biochemistry. Metabolism of liver, starvation, obesity.	Dr. Krtíl	Regulations of energetic metabolism Fri	Dr. Pláteník	Evaluation of sequencing chromatograms and restriction analyses, relationship of found phenotypes to 5FU toxicity. REVISION TEST molecular biology Thu
		Vitamins, nutrition and nutritional supplements.	Dr. Dvořák			
10.	28.04.2025	Blood clotting. Specific features of red blood cell metabolism.	Dr. Krtíl	Metabolism of iron	Ing. Čierna (Dr. Mikulová)	Liver, tetrapyrrois: GGT, total and direct bilirubin. Blood clotting. Cardiomarkers.
		National Holiday				
11.	05.05.2025	Metabolism of the kidney.	Dr. Krtíl	Diabetes mellitus and metabolic syndrome	Dr. Mráz	Examination of urine (physical, chemical examination, urinary sediment)
		National Holiday				
12.	12.05.2025	Xenobiochemistry	Dr. Vecka	TUTORIAL 4: Liver and metabolism		Examination of renal function: Creatinin, uric acid. Sodium ions. Proteinuria: total proteinuria, evaluation of ELFO. Protein in cerebrospinal fluid
		Biochemistry of muscle contraction. Extracellular matrix (proteoglycans, collagen, elastin).	Doc. Křepela			
13.	19.05.2025	Cellular and humoral immunity. Structure of antibodies, interaction with antigen, origin of heterogeneity.	Dr. Nosková (Dr. Mikulová)	Disorders of acid-base balance	Doc. Brodská Dr. Tomšovic	Metabolism of calcium and phosphorus, osteoporosis.
		Biochemistry of neurotransmission and sensory organs I.	Dr. Pláteník			
14.	26.05.2025	Biochemistry of neurotransmission and sensory organs II.	Dr. Pláteník	Consultations/compensations for missed lessons	Group teachers	PRAKTICAL CREDIT EXAMINATION
		Reactive oxygen and nitrogen species	Prof. Zima (Prof. Kalousová)			
15.	02.06.2025					Credit

17.4.2025 čtvrtek děkanský den

18.4. 2025 pátek státní svátek

21.4.2025 pondělí státní svátek

1.5.2025 čtvrtek státní svátek

8.5.2025 čtvrtek státní svátek

13.5. 2025 úterý rektorský den