

The schedule of Lectures and Practical lessons in Molecular biology
Study program Medicine, 1st year, academic year 2022-2023

	<i>Theoretical classes</i>	Hours		<i>Practical lessons</i>	Hours
	Molecular biology as biological science. Importance of Molecular biology for medicine.	2		The biological systems. Methods of cell analysis.	3
	Nucleic acids: DNA and RNA. Structure, levels of organization, flexibility.	2		Nucleic acids: DNA and RNA. Structure, levels of organization, flexibility.	3
	Functions and interactions of macromolecules in biological systems.	2		Biological membranes. Plasma membrane. Intracellular membranes. Transmembrane transport of substances. Cell junctions.	3
	Compartments of eukaryotic cell.	2		Compartments of eukaryotic cell. Cell organelles - structure and functions. Biogenesis of membranes. Cytoskeleton.	3
	Location and organization of DNA in eukaryotic cell. Human chromosomes.	2		Structure and functions of the nucleus. The steps of biogenesis of ribosomes. Human chromosomes: structure and classification	3
	Structure and functions of genes.	2		Interaction of macromolecules in biological systems. Concluding test 1.	3
	Transcription of genetic material.	2		Structure of prokaryotic and eukaryotic genes. Coding, non-coding, regulatory and modulatory sequences.	3
	Translation. Genetic code.	2		Transcription. Apparatus of transcription. Peculiarities of transcription in prokaryotes. Processing of RNA.	3
	Control of gene expression in eukaryotes. Control of gene activity in ontogenesis and cell specialization/differentiation.	2		Translation. Genetic code. Steps and apparatus of translation. Control of translation.	3
	DNA replication. The steps of replication. Apparatus of replication.	2		DNA replication. DNA repair in prokaryotes and eukaryotes.	3
	DNA repair.	2		Control of gene expression. Concluding test 2.	3
	Cell cycle. Control of cell cycle. Evolution of the cells in multicellular organisms. Apoptosis. STEM cells.	2		Steps of cell cycle: interphase in mitosis. Apoptosis. Meiosis and its periods. Biological importance of meiosis. Genetic recombination.	3
	Genetic recombination. Meiosis.	2		Recombinant DNA methods.	3
	Recombinant DNA methods.	2		Methods of gene analysis. Application of the gene manipulation techniques in medicine: indication and limits.	3
	Cloning of genes <i>in vivo</i> and <i>in vitro</i> .	2		Presentation of scientific projects. Concluding test 3.	3
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