

Level: PhD				
Course title: Selected topics in biochemistry of nucleic acids (DSB707)				
Status: elective				
ECTS: 15				
Requirements: none				
Learning objectives The aim of the course is to train students for scientific research in the field of biochemistry of nucleic acid. Also, the goal of the course is to further broaden and deepen student's knowledge in the field, previously gained during bachelor and master studies.				
Learning outcomes Upon successful completion of the course, student should be able to: 1. Predict different mechanisms that can be responsible for controlling the expression of genes and proteins 2. Compare different types of mutations and predict how each of them can affect the structure and function of genes and proteins 3. Analyzes the relationship between changes in the structure and function of DNA and RNA with disorders in biochemical pathways and the aetiology of human diseases, and potential applications of DNA and RNA in the therapy 4. Critically follow scientific literature, present scientific data orally and in writing, and evaluate biochemical experiments in the field of nucleic acid biochemistry.				
Syllabus <i>Theoretical instruction</i> Structure and function of DNA, RNA and chromosomes. Molecular mechanisms of DNA replication and its regulation. Molecular mechanisms of transcription and its regulation. Post-transcriptional modifications of primary transcript. Roles of functional RNAs. Molecular mechanisms of translation and its regulation. Structure of human genome and human genome project. Mechanisms of DNA mutations and repair. Epigenetics. Interactions between nucleic acids and proteins. Experimental methods used in nucleic acids research (sequencing, genotyping, RT-PCR, qPCR, southern blot, northern blot, gene silencing, DNA microarray and DNA fingerprinting, etc.). Identification of genes responsible for human diseases. Basics of molecular pathology. Basics of gene therapy. Manipulation of genetic material. <i>Practical instruction</i> Practical instruction (study research work) includes the student's independent work on a scientific project in the field of biochemistry of nucleic acids.				
Weekly teaching load				Other: /
Lectures: 5	Exercises: /	Other forms of teaching: /	Student research: 5	