Study program: Integrated academic studies in dentistry

Type and level of the study program: integrated academic studies

Course title: Human genetics (DI-HUGE)

Teacher: Mihajla R. Đan

Course status: compulsory

ECTS Credits: 5

Condition: -

Course aim

Purpose of this subject is to teach students facts about human genome as well as genetic mechanisms of hereditary diseases. Students will be able to use different sources of information and learn about technological achievements in exploration of human genome. They will also learn about transferring genetic information at the level of the molecule, chromosome, organism and population.

Expected outcome of the course:

Students will be able to use basic genetic terms and be aware of the importance of genetics in modern science. They will learn about structure of chromatin, morphological and functional chromosome organization. They will be able to clearly differentiate the meiotic stages and understand the importance of cell division in transmission genetics. They will be able to apply Mendel's laws and understand inter- and intralocus gene interactions. They will be able to predict inheritance mechanisms and precisely construct family trees based on the given data. They will understand mechanisms of mutation, principles of mutagenic actions and mechanisms of DNA reparation. They will understand basic techniques of molecular genetics and prenatal diagnostics, population genetics and forensics, as well as principles of gene therapy. After pre-exam and exam obligations student will be able to: See difference in structural levels and functional organization of human genome; Identify mechanisms of regulating gene expression; Understand genetic experiments aimed at determining causes for genetic diseases; Explain methodology of basic techniques of molecular genetics in prenatal diagnostics, population genetics and forensics; To use the internet and other information sources and relevant scientific references.

Course description

Theoretical education

Introduction to human genetics. Structure of nucleic acids; Gene expression and gene regulation. Human genome structure; Morphologic and mollecular organization of chromosomes; Cell division. Gametogenesis; Basic rules of inheritance. Autosomal dominant and autosomal recessive inheritance. Family tree analysis; Intralocus and interlocus gene interactions; Determination of gender. Gender related inheritance and holandric inheritance; Polygenic inheritance. Multifactorial and complex hereditary diseases; Mutations, reparation and DNA recombinations; Changes in number and structure of chromosomes. Hereditary diseases induced by structural and numerical chromosomal aberrations; Mollecular markers in human genetics. Prenatal and preimplantation diagnosis of genetic diseases; Genetic counseling. Potentialities of gene therapy.

Practical education: exercises, other forms of education, research related activities

Nucleic acids and gene expression; Structural and mollecular organization of chromosomes; Cell division and gametogenesis; Basic inheritance laws; Analysis of family tree; Gene interactions. Multiple alleles – abo system of blood groups and rh system; Gene interactions. Partial domination. Co domination. Epistasis; Sex determination. Sex related characteristics; Changes in number and structure of chromosomes; Multifactorial inheritance; Molecular markers in human genetics.

Literature

Compulsory

1. Turnpenny P, Ellard S. Emery's elements of medical genetics. Elsevier; 2009.

Additional

1. Lewis R. Human genetics. UK: Cambridge University Press; 2007.
2. Strachan T, Read A. Human molecular genetics. 4th ed. USA: Garlan Science; 2011.

Number of active classes				Other:
Lectures: 45	Practice: 30	Other types of teaching:	Research related activities:	

Teaching methods: lectures, practice

Student activity assessment (maximally 100 points)

Pre-exam activities	**points**	**Final exam**	**points**
Lectures		Written	65
Practices	5	Oral	
Colloquium	30	.....	
Essay			