Subject: **BIOORGANIC CHEMISTRY**	Subject type:	**elective**
Study year: **1**	Content:	**1/1 summer term**
Study program: **General Medicine**		

Aim of the course

Bioorganic Chemistry contains selected parts from organic chemistry and biologically important organic compounds. Understanding of the relationship between structure and function of organic compounds leads to the better understanding of living organism functions. Bioorganic Chemistry is so fundamental for study of medical biochemistry.

Education: 1 hour lectures/1 hour seminars per week
Assessment: graduated (written tests, finished written work assignment)

Syllabus

Halogenated hydrocarbon compounds, their biological and medical significance; Hydroxy derivatives of hydrocarbons, oxocompounds: distribution and nomenclature, characteristics of medically relevant aldehydes and ketones and their reactions. Carboxylic acids and their substitution and functional derivatives: properties and structure, specific reactions, biochemical significance. Organic nitrogen compounds: amines, nitro compounds and their biological significance. Organic derivatives of sulfur, phosphorus, arsenic: structure, medical and toxicological significance. Organic derivatives of carbonic acid: carbamic acid, urea, guanidine, creatine, creatinine, barbiturates. Heterocyclic compounds: structure and properties (e.g. furan, pyrrole, thiophene, pyrazole, imidazole, thiazole and their derivatives). Six-membered heterocycles (e.g. pyran, pyridine, pyrimidine, pyridazine, pyrazine and their derivatives); heterocyclic compounds with fused heterocycles (derivatives of purine, pteridine, aloxazine and isoaloxazine) and their biochemical and medicinal relevance (e.g. amino acids, coenzymes, drugs, dyes). Monosaccharides, disaccharides, polysaccharides: structure, function, biochemical significance. Significant monosaccharide reactions - oxidation, reduction, aldol condensation. Properties of complex carbohydrates (e.g. proteoglycans, GAGs, glycolipids) and their biological importance. Fatty acids, triacylglycerols, sphingolipids, phospholipids, - structure, function, biochemical significance. Complex lipids (e.g. lipoproteins, glycolipids) and their biochemical function and importance. Derived lipids (e.g. terpenes, cholesterol): composition, biological significance. Amino acids: structure, isoelectric point, properties. Medically important peptides (e.g., vasopressin, oxytocin) and proteins (e.g. collagen, elastin): structure, peptide bond. Complex proteins (e.g., blood plasma proteins): structure and importance. Nitrogenous bases: nucleosides, nucleotides (e.g. structure, properties). Nucleic acids (DNA and RNA): structure, hydrolysis, importance. Vitamins - structure, biochemical significance.