

**THEMATIC PLAN**  
**“Bioorganic chemistry”**  
*Lectures for the first year students*  
**Medical Faculty**  
(Spring semester)

№	Topic	Hours
1	Bioorganic chemistry. Classification of the chemical reagents and reactions. Reactivity of the hydrocarbons. Hydroxy derivatives of the hydrocarbons. Thioles. Amines.	2
2	Carbonyl-containing compounds. Carboxylic acids. Heterofunctional compounds.	2
3	Lipids. Proteinogenous aminoacids. Peptides & proteins.	2
4	Carbohydrates.	2
5	Heterocyclic compounds. Alkaloids. Nucleic acids.	2
	<b>Total hours</b>	<b>10</b>

Head of Pharmaceutical, Organic  
& Bioorganic Chemistry Chair, prof.

R. Lesyk

**THEMATIC PLAN**  
**“Bioorganic chemistry”**  
*practical classes for the first year students of the Medical Faculty*  
 (Spring semester)

№	Theme	Hours
<b>Part 1. Theoretical aspects of bioorganic chemistry. Hydrocarbons and their mono-functional derivatives</b>		
1	Introduction. Classification and nomenclature of the bioorganic compounds. Classification of the chemical reactions and reagents. Structure of chemical bonds.	2
2	Structure of bioorganic compounds. Conjugated systems. Electron effects (mesomeric and inductive effects). Reactivity of hydrocarbons.	2
3	Acidic and basic properties of organic compounds. Reactivity of hydroxy derivatives of hydrocarbons, thiols, amines and carbonylic compounds.	2
4	Biologically important carboxylic acids and their derivatives. Control work “Theoretical aspects of bioorganic chemistry. Structure and properties of the hydrocarbons and their monofunctional derivatives”	2
<b>Part 2. Heterofunctional bioorganic compounds. Biopolymers and bioregulators</b>		
5	Heterofunctional bioorganic compounds.	2
6	Amino-acids, peptides, proteins.	2
7	Saponifiable lipids.	2
8	Nonsaponifiable lipids. Control work “Heterofunctional bioorganic compounds. Lipids”.	2
<b>Part 3. Structure and functions of carbohydrates</b>		
9	Structure, chemical properties and functions of monosaccharides.	2
10	Structure, chemical properties and functions di- and polysaccharides.	2
11	Control work “Carbohydrates”.	2
<b>Part 4. Structure and biological properties of heterocyclic compounds, alkaloids, nucleotides, nucleosides and nucleic acids.</b>		
12	Biologically active 5-membered heterocyclic compounds.	2
13	Biologically active 6-membered heterocyclic compounds.	2
14	Biologically active fused heterocyclic compounds. Alkaloids. Nucleic acids.	2
15	Control work “Heterocyclic compounds, alkaloids, nucleic acid”.	2
<b>Total</b>		<b>30</b>

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**“Bioorganic chemistry”**  
*of out-classes work for the first year students of the*  
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 (Spring semester)

№	Theme	Hours
<b>Part 1. Theoretical aspects of bioorganic chemistry. Hydrocarbons and their mono-functional derivatives.</b>		
1	Types of hybridisation of Carbon. Electronic structure of chemical bonds. Conjugated and aromatic systems. Reactivity of arens, alkanes, alkenes and cycloalkanes.	5
2	Reactions of polymerization and polycondensation of aldehydes and carboxylic acids.	5
<b>Part 2. Heterofunctional bioorganic compounds. Biopolymers and bioregulators.</b>		
3	Transformation of keto- and hydroxyacids (reactions of oxidation, reduction, decarboxylation, aldol condensation). Keto-enol tautomerism.	5
4	Simple and complex saponifiable lipids. Low-molecular weight bio-regulators – terpenes, carotenoids, steroids, prostaglandins.	7
<b>Part 3. Structure and functions of carbohydrates.</b>		
5	Stereo-isomerism and tautomerism of monosaccharides. D- & L-row of monosaccharides. Enantiomers and diastereomers. Anomers and epimers. Synthesis and hydrolysis of glycosides, ethers and esters of monosaccharides.	5
6	Reducing and nonreducing sugars. Structure and properties of homo- (starch, celulouse, inulin) and heteropolysaccharides (Hyaluronic acid, chondroitin sulfate, heparin).	5
<b>Part 4. Structure and biological properties of heterocyclic compounds, alkaloids, nucleotides, nucleosides and Nucleic acids.</b>		
7	Biologically active 5-membered heterocyclic compounds. Aromaticity. Reaction of nucleophilic and electrophilic substitution. Lactam-lactim and azole tautomerisms.	5
8	Pyridine-carboxylic acids based drugs.	2
9	Alakoilds: structure, classification, properties.	6
10.	Nucleotides, nucleosides and nucleic acids.	5
<b>Total hours</b>		<b>50</b>

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