

**Thematic plan of seminar-type classes
the subject in the discipline
“Immunobiological and gene therapy drugs”
for students in the specialty educational program specialty 33.05.01
Pharmacy, focus (profile) Pharmacy, Full-time form of education for the
2024-2025 academic year**

№	Thematic plan of seminar	hour
1.	History of the use of biological drugs, their place in medicine and pharmaceuticals.1 Production of biological drugs and pharmacological safety of the country. Biological drugs: classification, use in medicine. Representatives of this group in the lists of drugs for medical use.	2
2.	Immunobiological drugs. Live (attenuated), inactivated, adjuvant vaccines. Advantages and disadvantages of this group of immunobiological drugs.	2
3.	Toxoid and split vaccines. Subunit vaccines – polysaccharide, conjugate, protein-based, recombinant or pathogen-based vaccines. Advantages and disadvantages of these groups of immunobiological drugs	2
4.	Vaccines based on viral vectors and based on messenger RNA (mRNA). Advantages and disadvantages of these groups of immunobiological drugs.	2
5.	Immunobiological drugs. Serums, toxoids and immunoglobulins, chemical vaccines (antigens), toxoids, globulins, bacteriophages, interferons, probiotics. Advantages and disadvantages of these groups of immunobiological drugs	2
6.	Recombinant drugs: cytokines (interferons, interleukins, colony-stimulating factors, tumor necrosis factors).	2
7.	Recombinant drugs: growth hormones and growth factors, hybrid proteins (fusion proteins, chimeric proteins), enzymes, receptors.	2
8.	Biological medicinal products affecting the blood coagulation system. Enzyme preparations B01AD.	2
9.	Immunobiological medicinal products: medicinal products obtained from human and animal blood, blood plasma (except whole blood). History of development (timeline) and use. Classification by origin (human albumin preparations; human immunoglobulin preparations; blood coagulation factor preparations containing one of the blood coagulation factors or their combination) with examples.	2
10.	Immunobiological medicinal products - blood products. Classification by action: complex action drugs (plasma products and albumin solutions), immunologically active and hemostatic (cryoprecipitate,	2

	prothrombin complex, fibrinogen and individual coagulation factors of the B02BD subgroup).	
11.	Recombinant drugs: monoclonal antibodies. History (timeline) of development, classification (based on murine, chimeric, humanized and human antibodies).	2
12.	Recombinant drugs: monoclonal antibodies in rheumatology, in transplantology, in oncology and oncohematology, in the treatment of COVID-19	2
13.	Gene therapy drugs. Nomenclature (gene therapy drugs, cell therapy drugs, cell-based gene therapy drugs and virus-based therapy drugs).	2
14.	Gene and cell therapy. Gene therapy technologies. Types of cell modifications ex vivo, in vivo. Prospects in the treatment of congenital immunological diseases, the hematopoietic system, oncohematological diseases using T cells with a chimeric antigen receptor (CAR-T).	2
15.	Vectors as carriers for gene delivery. Main types, principles of action and characteristics of viral vectors (capacity, selectivity, duration of gene expression, immunogenicity, ease of production, possibility of integration into DNA cells, probability of the patient having antibodies). Physical and chemical methods of delivery of virus-based vectors (gene gun, electroporation, magnetofection, sonoporation, using various nanoparticles - silicon, gold, calcium phosphate, lipids)	2
16.	Preclinical development of gene therapy drugs. Regulatory documents. Strategy. Experimental models. Potential risks when using gene therapy drugs. Toxicity.	2
17.	Interim assessment	2
	Total	34

Обсуждено на заседании кафедры фармакологии и биоинформатики, протокол №14 от 26/04/2024

Заведующий кафедрой,
академик РАН



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