

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

Petro Mohyla Black Sea National University

Medical institute

Department of pharmacy, pharmacology, medical, bioorganic and biological chemistry

“APPROVED”

The first vice-rector

N.M. Ishchenko

“ ” 2021

Course Discription

PHARMACOLOGY

training of specialists of the second (master's) level of higher education

Field of knowledge 22 “Health care”
in the speciality 222 “Medicine”

Developers

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1. DESCRIPTION OF THE COURSE

Indicator name	Characteristics of the discipline	
Name of the discipline	Pharmacology	
Field of knowledge	22 "Health care"	
Specialty	222 "Medicine"	
Specialization (if any)		
Educational program	Medicine	
Higher education level	Master	
Discipline status	Normative	
Curriculum	3 ^d	
Academic year		
Numbers of semesters:	Day form	Absentee form
	5 th , 6 th	-
Total ECTS credits / hours	5 credits / 150 hours	
Course structure: - lectures - seminars (practical, laboratory, semi-group) - hours of students' independent work	Day form	Absentee form
	25 (15/10) hours	-
	50 (30/20) hours	
75 (45/30) hours		
Percentage of classroom load	50%	
Teaching language	Ukrainian, English	
Intermediate control form (if any)	5 th semester – Attestation	
Form of final control	6 th semester – Exam	

1.1. Program of study of educational discipline "Pharmacology" is made in accordance with the sample program of the discipline "Pharmacology" training of specialists of the second (master's) level of higher education in the field of knowledge 22 "Health", specialty 222 "Medicine", approved on September 20, 2018 by the Ministry of Health Ukraine, the State Institution "Central Methodical Office for Higher Education" of the Ministry of Health of Ukraine, and on the basis of the educational professional program "Medicine" in the field of knowledge 22 "Health" specialty 222 "Medicine".

1.2. The subject of study of discipline is:

- Changes in the body under the influence of drugs (pharmacodynamics), as well as their transformation in the body (pharmacokinetics).
- Patterns between the chemical structure, physicochemical and quantum chemical properties and pharmacological action of drugs (the latter may be manifested by therapeutic and toxic effects).
- The use of drugs for the treatment of patients and for prophylactic purposes.

The set of processes that determine the interaction of the organism with drugs is referred to as the system "organism – drug". The study of this system in interaction with the environment is the methodological basis of modern pharmacology.

2. AIM, TASK AND RESULTS OF STUDY OF DISCIPLINE

2.1. The aim of the discipline involves the acquisition by each student of theoretical knowledge and practical skills on the basic principles of substantiation of rational and safe for human health use of drugs for the treatment and prevention of diseases. Achieving the goal will prepare students for practical activities, quality performance of functional responsibilities associated with the rational choice of drugs, self-preparation of pharmacotherapy regimens and further monitoring of the effectiveness and safety of pharmacotherapy, prevention of adverse reactions.

The ultimate goals of the discipline:

- Determine the group affiliation of drugs according to modern classifications.
- Determine the pharmacodynamics and pharmacokinetics of drugs and their mechanism of action.
- Identify the manifestations of possible side effects and symptoms of overdose, methods of prevention and treatment.
- Justify the main indications for use, adequate dosage form, routes of administration and interaction with other drugs.

2.2. The main tasks of the study of the discipline “Pharmacology” are providing students with theoretical knowledge on determining the group affiliation of drugs, their pharmacokinetics, pharmacodynamics, manifestations of possible side effects, symptoms of overdose, measures to prevent and help eliminate adverse reactions, the main indications for prescribing and interacting with other drugs and gaining practical skills, in particular prescribing drugs in various dosage forms.

2.3. Interdisciplinary links:

Pharmacology as a discipline:

a) is based on the study of Latin, ethics, philosophy, ecology, medical biology, medical chemistry, biological and bioorganic chemistry, biophysics, human anatomy, pathological anatomy, physiology, pathological physiology, microbiology and integrates with these disciplines;

b) lays the foundations for the study of clinical pharmacology and pharmacotherapy by students and the formation of skills to apply knowledge of pharmacology in the process of further study of all clinical disciplines and in future professional activities.

2.4. Competencies and learning outcomes the formation of which is facilitated by the discipline (the relationship with the normative content of higher education, formulated in terms of the results of the educational program "Medicine"). The discipline provides students with the acquisition of competencies:

- Integral:

Ability to solve typical and complex specialized problems and practical problems in a professional health care activity, or in a learning process that involves research and / or innovation and is characterized by the complexity and uncertainty of conditions and requirements.

- General (corresponds to the general competencies of EP “Medicine” GC 1-5, 7-9):

GC 1. Ability to abstract thinking, analysis and synthesis, the ability to learn and master modern knowledge.

GC 2. Ability to apply knowledge in practical situations.

GC 3. Knowledge and understanding of the subject area and understanding of professional activity.

GC 4. Ability to adapt and act in a new situation.

GC 5. Ability to make informed decisions; work in a team; interpersonal skills.

GC 7. Information and communication technology skills.

GC 8. Definiteness and perseverance in terms of tasks and responsibilities.

GC 9. Ability to act on the basis of ethical considerations (motives).

- **Special (professional, subject)** (corresponds to the professional competencies of EP “Medicine” PC 2, 5, 6, 8, 12, 13, 18):

PC 2. Ability to determine the required list of laboratory and instrumental studies and evaluate their results.

PC 5. Ability to determine the nature of nutrition in the treatment of diseases.

PC 6. Ability to determine the principles and nature of disease treatment.

PC 8. Ability to determine tactics for providing emergency medical care.

PC 12. Ability to determine the tactics of physiological pregnancy, physiological childbirth and the postpartum period.

PC 13. Family planning and contraceptive counseling skills.

PC 18. Ability to keep medical records.

2.5. Results of studying:

- *Integrative final program learning outcomes*, the formation of which is facilitated by the discipline (corresponds to the program learning outcomes of EP “Medicine” PLO 1-4, 7, 8, 12, 13, 17, 24):

PLO 1. Know the methods of analysis, synthesis and further modern learning. Be able to analyze information, make informed decisions, be able to acquire modern knowledge. Establish appropriate connections to achieve goals. Be responsible for the timely acquisition of modern knowledge.

PLO 2. Have specialized conceptual knowledge acquired in the learning process. Be able to solve complex problems and problems that arise in professional activities. Clear and unambiguous communication of own conclusions, knowledge and explanations that substantiate them to specialists and non-specialists. Responsible for making decisions in difficult conditions.

PLO 3. Have in-depth knowledge of the structure of professional activity. Be able to carry out professional activities that require updating and integration of knowledge. Ability to effectively form a communication strategy in professional activities. To be responsible for professional development, ability to further professional training with a high level of autonomy.

PLO 4. Know the types and methods of adaptation, principles of action in a new situation. Be able to apply means of self-regulation, be able to adapt to new situations (circumstances) of life and activity. Establish appropriate connections to achieve results. Be responsible for the timely use of self-regulatory methods.

PLO 7. Have deep knowledge in the field of information and communication technologies used in professional activities. Be able to use information and communication technologies in the professional field, which requires updating and integration of knowledge. Use information and communication technologies in professional activities. Be responsible for the development of professional knowledge and skills.

PLO 8. Know the responsibilities and ways to accomplish the tasks. Be able to set goals and objectives to be persistent and conscientious in the performance of duties. Establish interpersonal relationships to effectively perform tasks and responsibilities. Responsible for the quality of the tasks.

PLO 12. Evaluate information about the diagnosis and conditions of the health care facility, its unit, using a standard procedure, using knowledge about the person, his organs and systems, based on the results of laboratory and instrumental studies.

PLO 13. In the conditions of the health care institution, its subdivision and among the attached population: be able to identify and record the leading clinical symptom or syndrome (according to list 1) by making an informed decision, using preliminary patient history, physical examination, knowledge of people, its organs and systems, adhering to the relevant ethical and legal norms. Be able to establish the most probable or syndromic diagnosis of the disease (according to list 2) by making an informed decision, by comparing with standards, using previous patient history and patient examination data, based on the leading clinical symptom or syndrome, using knowledge about the person bodies and systems, adhering to the relevant ethical and legal norms.

PLO 17. Determine the nature of treatment (conservative, operative) of the disease (according to list 2), in a health care facility, at the patient's home and at the stages of medical evacuation, including when, in the field on the basis of a preliminary clinical diagnosis, using knowledge about the person, his organs and systems, adhering to the relevant ethical and legal norms, by making an informed decision according to existing algorithms and standard schemes. Determine the principles of treatment of the disease (according to list 2), in a health care facility, at the patient's home and at the stages of medical evacuation, including when, in the field, on the basis of a preliminary clinical diagnosis, using knowledge about the person, his organs and systems, adhering to the relevant ethical and legal norms, by making an informed decision according to existing algorithms and standard schemes.

PLO 24. In a medical institution on the basis of anamnestic data, general examination and gynecological examination of a woman, using knowledge of a woman's reproductive organs, adhering to relevant ethical and legal norms, by making an informed decision, using a standard procedure: assess the patient and medical criteria; determine the patient's examination plan before choosing a method of contraception; provide family planning counseling; to select a modern method of contraception for different categories of the population.

As a result of studying the discipline the student must:

know:

- The main ways of pharmacological correction of diseases, disorders of organs and systems.
- Nomenclature and classification of medicines.
- Pharmacological characteristics * of basic drugs.
- Indications and contraindications to the use of drugs
- Manifestations of possible side effects of drugs, symptoms of overdose of potent and toxic drugs, methods of their prevention and principles of treatment.
- Rules for prescribing drugs in various dosage forms in accordance with modern legislation of Ukraine.

be able to:

- Prescribe and analyze prescriptions for drugs in various dosage forms in accordance with modern legislation of Ukraine.
- Determine the group affiliation of drugs according to modern classifications.

- Provide pharmacological characteristics* of drugs, logically link the mechanism of action with pharmacodynamics, pharmacodynamics with indications, and side effects with contraindications to their use.
- Calculate a single dose of the drug depending on the age, body weight or body surface area of the patient.
- To determine, depending on the pharmacokinetics of drugs, the frequency of drug administration, its daily, course dose in patients of different ages in accordance with comorbidities and the use of other drugs.
- Justify the adequate dosage form in accordance with the routes of administration.
- Predict the consequences of the interaction of drugs in their combined administration, drugs and food components, drugs and alcohol.
- Assess the benefit / risk ratio of drugs.
- Make judgments about the possibility of adverse drug reactions in order to prevent them.
- Identify the manifestations of possible side effects of drugs, symptoms of overdose of potent and toxic drugs, methods of prevention and principles of treatment.
- Create an algorithm to help patients with acute drug poisoning with the use of antidotes in each case.
- Analyze pharmacological information in modern reference books, scientific and professional periodicals.
- Provide a comparative description of drugs in terms of efficacy, safety, mechanism of action, indications for use, etc.

* Pharmacological characteristics include the group affiliation of the drug, its mechanism of action, pharmacological effects (main, side), indications and contraindications to use.

3. PROGRAM OF THE DISCIPLINE

Block 1. Medical prescription. General pharmacology. Drugs that affect the nervous system and metabolism

Names of blocks, sections and topics	Number of hours			
	total	including		
		lec.	prac.	ind.w.
<i>Section 1. Medical prescription. General pharmacology</i>				
Introduction to medical prescriptions. Solid dosage forms	4	-	2	2
Soft dosage forms	4	-	2	2
Liquid dosage forms	4	-	2	2
General pharmacology	8	2	2	4
<i>Total for section 1</i>	20	2	8	10
<i>Section 2. Drugs that affect the peripheral nervous system</i>				
Drugs that affect the transmission of excitation in cholinergic synapses	8	2	2	4
Drugs that affect the transmission of excitation in adrenergic synapses	8	2	2	4
<i>Total for section 2</i>	16	4	4	8
<i>Section 3. Drugs that affect the functions of the central nervous system. Psychotropic drugs</i>				
Drugs for general and local anesthesia	4	-	2	2
Analgesics	8	2	2	4

Names of blocks, sections and topics	Number of hours			
	total	including		
		lec.	prac.	ind.w.
Neuroleptics, tranquilizers, hypnotics and sedatives	8	2	2	4
Anticonvulsants. Drugs for the treatment of neurodegenerative diseases	4	-	2	2
Antidepressants, nootropic drugs, psychomotor stimulants and analeptics	8	2	2	4
Total for section 3	32	6	10	16
Section 4. Drugs that affect metabolism				
Hormonal drugs, their synthetic substitutes and antagonists	8	2	2	4
Anti-inflammatory, anti-allergic and immunotropic drugs	6	1	2	3
Water-soluble and fat-soluble vitamin preparations	4	-	2	2
Final control of assimilation of block 1 “Medical prescription. General pharmacology. Drugs that affect the nervous system and metabolism”	4	-	2	2
Total for section 4	22	3	8	11
Total for block 1:	90	15	30	45

Block 2. Drugs that affect the functions of executive organs and systems. Chemotherapeutic drugs. Antidotes

Names of blocks, sections and topics	Number of hours			
	total	including		
		lec.	prac.	ind.w.
Section 5. Drugs affecting the respiratory system, gastrointestinal tract, renal function and reproductive processes				
Drugs affecting the respiratory system	6	2	2	2
Drugs that affect the gastrointestinal tract	2	-	-	2
Drugs that affect kidney function and reproductive processes	4	-	2	2
Total for section 5	12	2	4	6
Section 6. Drugs that affect the functions of the blood and cardiovascular system				
Drugs that affect hematopoiesis and hemostasis	8	2	2	4
Antihypertensive drugs. Angioprotectors. Antianginal and hypolipidemic drugs	8	2	2	4
Antiarrhythmic drugs. Cardiotonic drugs. Cardiac glycosides	4	-	2	2
Total for section 6	20	4	6	10
Section 7. Chemotherapeutic drugs				
Antiseptics and disinfectants	2	-	-	2
Synthetic antimicrobial drugs	4	-	2	2
Antibiotics	5	2	2	1
Antimycotic, antiparasitic and antiprotozoal drugs	4	-	2	2
Antitubercular, antispirochetic, and antiviral drugs	3	-	2	1
Antitumor drugs	2	-	-	2
Total for section 7	20	2	8	10
Section 8. Antidotes. Plasma substitutes and drugs for parenteral nutrition				
Principles of treatment of acute drug poisoning. Antidotes, plasma	5	2	1	2

Names of blocks, sections and topics	Number of hours			
	total	including		
		lec.	prac.	ind.w.
substitutes and drugs for parenteral nutrition				
Control of assimilation of block 2 “Drugs that affect the functions of executive bodies and systems. Chemotherapeutic drugs. Antidotes”	3	-	1	2
<i>Total for section 8</i>	8	2	2	4
<i>Total hours for block 2</i>	60	10	20	30
Total for course:	150	25	50	75

3.2.1. Lecture topics

№	Name of topic	Number of hours
1	2	3
<i>Block 1. Medical prescription. General pharmacology. Drugs that affect the nervous system and metabolism</i>		
1.	General pharmacology	2
2.	Drugs that affect the transmission of excitation in cholinergic synapses	2
3.	Drugs that affect the transmission of excitation in adrenergic synapses	2
4.	Analgesics	2
5.	Neuroleptics, tranquilizers, hypnotics and sedatives	2
6.	Antidepressants, nootropic drugs, psychomotor stimulants	2
7.	Hormonal drugs, their synthetic substitutes and antagonists	2
8.	Anti-inflammatory, anti-allergic and immunotropic drugs	1
Total lecture hours for block 1:		15
<i>Block 2. Drugs that affect the functions of executive organs and systems. Chemotherapeutic drugs. Antidotes</i>		
9.	Drugs that affect the respiratory system	2
10.	Drugs that affect hematopoiesis and hemostasis	2
11.	Antihypertensive drugs. Angioprotectors. Antianginal and hypolipemic drugs	2
12.	Antibiotics	2
13.	Principles of treatment of acute drug poisoning. Antidotes	2
Total lecture hours for block 2:		10
Total lecture hours for course:		25

3.2.2. Topics of seminars (unforeseen)

3.2.3. Topics of practical classes

№	Name of topic	Number of hours
1	2	3
<i>Block 1. Medical prescription. General pharmacology. Drugs that affect the nervous system and metabolism</i>		
1.	Introduction to medical prescriptions. Solid dosage forms	2
2.	Soft dosage forms	2
3.	Liquid dosage forms	2
4.	General pharmacology	2

5.	Drugs that act on the transmission of excitation in cholinergic synapses	2
6.	Drugs that affect the transmission of excitation in adrenergic synapses	2
7.	Drugs for general and local anesthesia. Pharmacology of ethyl alcohol	2
8.	Analgesics	2
9.	Neuroleptics, tranquilizers, hypnotics and sedatives	2
10.	Anticonvulsants. Drugs for the treatment of neurodegenerative diseases	2
11.	Antidepressants, nootropic drugs, psychomotor stimulants and analeptics	2
12.	Hormonal drugs, their synthetic substitutes and antagonists	2
13.	Anti-inflammatory, anti-allergic and immunotropic drugs	2
14.	Water-soluble and fat-soluble vitamin preparations	2
15.	Final control of block 1, including:	
	Control of practical training	1
	Test control of theoretical training	1
Total hours of practical classes for block 1:		30
Block 2. Drugs that affect the functions of executive organs and systems. Chemotherapeutic drugs. Antidotes		
16.	Drugs that affect the respiratory system	2
17.	Drugs that affect kidney function and reproductive processes	2
18.	Drugs that affect hematopoiesis and hemostasis	2
19.	Antihypertensive drugs. Antianginal and hypolipidemic drugs	2
20.	Antiarrhythmic drugs. Cardiotonic drugs. Cardiac glycosides	2
21.	Synthetic antimicrobial drugs	2
22.	Antibiotics	2
23.	Antimycotic, antiparasitic and antiprotozoal drugs	2
24.	Antitubercular, antiviral, antispasmodic	2
25.	Principles of treatment of acute drug poisoning. Antidotes	1
	Final control of block 2, including:	1
	Control of practical training	
	Test control of theoretical training	
Total hours of practical classes for block 2:		20
Total hours of practical classes for course:		50

3.2.4. Topics of laboratory classes (not provided)

3.2.5. Independent work

№	Name of topic	Number of hours
1	2	3
Block 1. Medical prescription. General pharmacology. Drugs that affect the nervous system and metabolism		
1.	Preparation for practical classes – theoretical preparation and development of practical skills	25
2.	Independent elaboration of topics that are not included in the plan of classroom classes:	20
	History of pharmacology. The contribution of domestic scientists to the development of pharmacology	1.5
	Fundamentals of pharmacogenetics	1.5
	Toxicology of nicotine	1.5
	Remedies for anesthesia	1.5
	Antiepileptic and antiparkinsonian drugs	1.5

	Hypnotics	1.5
	Toxicology of ethyl alcohol. Remedies for alcoholism	1.5
	Sedatives	1.5
	Hypolipidemic drugs	1.5
	Antiarrhythmic drugs	2
	Cardiotonic drugs	1.5
	Medicines that regulate blood circulation to the brain	1.5
	Medicines used in gout	1.5
Total hours of independent work hours for block 1:		45
<i>Block 2. Drugs that affect the functions of executive organs and systems. Chemotherapeutic drugs. Antidotes</i>		
1.	Preparation for practical classes – theoretical preparation and development of practical skills	18
	Independent elaboration of topics that are not included in the plan of classroom classes:	12
	Phytonutrition and modern phytopreparations for the treatment of diseases of the respiratory system	1
	Probiotics, prebiotics and symbiotics	1
	Drugs that affect the metabolism of uric acid	1
	Prostate protectors	1
2.	Phlebotropic (venotropic) drugs	1
	Pharmacological endothelium protection	1
	Antiseptics for surgery, obstetrics, gynecology and dermatology	1
	Antibiotic resistance and ways to solve this problem	1
	New groups of antibiotics	1
	Drugs to correct complications of chemotherapy	1
	Medicines for the treatment of pediculosis and scabies	1
	Plasma substitutes and drugs for parenteral nutrition	1
Total hours of independent work hours for block 2:		30
Total hours of independent work hours for discipline		75

3.2.6. Tasks for independent work

The list of tasks for independent work of students is part of the methodological support of the discipline, and their content and form should correspond to the theme of independent work on the course “Pharmacology” and “Regulations on the organization of the educational process of Petro Mohyla Black Sea National University”.

Independent work of students is performed in the form of preparation for practical classes (preparation-summary of theoretical questions according to the thematic plan, performance of situational tasks, mastering skills according to the topic of the lesson, writing essays, creating electronic versions of diagrams and spreadsheets, creating multimedia presentations, animations, movies, models, participation in research, etc.).

3.2.7. Individual tasks

1. Report (abstract) on a practical lesson – 2 points.
2. Participation in the first round of the All-Ukrainian Olympiad in Pharmacology – 2 points.
3. Report (presentation in PowerPoint format) in a practical lesson – 4 points.
4. Creation of visual schemes of action of medicines in the form of tables, drawings and posters for practical classes and lectures in electronic version – 6 points.
5. Victory in the first round of the All-Ukrainian Olympiad in Pharmacology (I-III places) – 6 points.
6. Report at the meeting of the scientific circle of the department – 6 points.

7. Scientific publication (thesis) on pharmacology in the materials of scientific-practical conferences – 6 points.
8. Work in the student scientific society and report at scientific and practical conferences from the Department of Pharmacology – 8 points.
9. Scientific publication (article) on the basis of own research in pharmacology – 8 points.
10. Victory in the second round of the All-Ukrainian Olympiad in Pharmacology – 8 points.

4. The content of the discipline

4.1. Lecture plan

№	Name of topic
1	2
<i>Block 1. Medical prescription. General pharmacology. Drugs that affect the nervous system and metabolism</i>	
1.	<p>General pharmacology</p> <ol style="list-style-type: none"> 1. Pharmacology in the system of medical and biological sciences. 2. The main sections of pharmacology: theoretical, experimental, physicochemical, biochemical, physiological, clinical. 3. New directions of pharmacology development: pediatric, geriatric, radiation, immunopharmacology, psychopharmacology, pharmacogenetics, chronopharmacology. 4. Dose determination, types of doses: single, daily, course, threshold, shock, crushed, maintenance, prophylactic, medical, average and higher therapeutic, toxic and lethal. 5. The breadth of therapeutic action. Pharmacodynamics of drugs. 6. The concept of receptors, including specific, agonists, antagonists. Synergism, potentiation, antagonism of drugs. 7. Types of action of drugs. Types and methods of action of drugs. 8. Features of action of medicines at their repeated use. 9. The concept of material and functional accumulation. 10. Tolerance or addiction (as a kind of tachyphylaxis), dependence on the action of drugs (mental, physical). 11. The concept of withdrawal and return syndrome. 12. Medical and social aspects of the fight against drug addiction. 13. Combined action of drugs - synergism (additive, potentiated), antagonism. 14. Incompatibility of medicinal substances. 15. The concept of drug safety. Side effects of drugs. Types of side effects. Overdose is absolute and relative (toxic effects). Intolerance. Allergic reactions. Mutagenicity, teratogenicity, embryotoxicity, fetotoxicity, carcinogenicity.
2.	<p>Drugs that affect the transmission of excitation in cholinergic synapses</p> <ol style="list-style-type: none"> 1. Anatomical and physiological features of the autonomic nervous system. 2. General characteristics of the cholinergic system. 3. Classification of drugs that affect the transmission of excitation in cholinergic synapses. Indications for use. 4. Classification of anticholinesterase drugs. Features of action. Indications for use. Side and toxic effects of anticholinesterase drugs. The use of activators cholineste-times. 5. General characteristics of M-cholinoblocking agents. The effect of atropine on the eye, cardiovascular system, eye muscles, glands. Features of action on the CNS, the use of drugs of deadly nightshade. 6. Characteristics of H-cholinoblocking agents. Localization and mechanism of action of ganglioblocking agents and muscle relaxants. Mechanism of action of lepto- and pachycurarea. Indications for use. Side effect.
3.	<p>Drugs that affect the transmission of excitation in adrenergic synapses</p> <ol style="list-style-type: none"> 1. Agents that affect the transmission of excitation in adrenergic synapses. 2. Classification of direct-acting adrenomimetics by their effect on different types of

	<p>adrenoceptors. The main effects of adrenaline and noradrenaline, the effect on blood pressure.</p> <p>3. Adrenomimetics mainly indirect action, mechanism of action of ephedrine, application. Tachyphylaxis. Side effects of adrenomimetics, measures to eliminate it.</p> <p>4. Adrenoblocking agents, pharmacodynamics and use of alpha- and beta-blockers. Contraindication.</p> <p>5. Localization of action and main effects of sympatholytics: octadine and reserpine, their therapeutic use.</p>
4.	<p>Analgesics</p> <p>1. General characteristics of paid analgesics.</p> <p>2. Classification. Ways to eliminate pain. The concept of opiate receptors.</p> <p>3. Narcotic analgesics. Classification by chemical structure, origin and affinity for opiate receptors.</p> <p>4. Mechanism of action. Pharmacology of morphine hydrochloride. Features of the drug on the CNS.</p> <p>5. Comparative characteristics of drugs. Indications for the use of analgesics. Side effects.</p> <p>6. Acute poisoning by narcotic analgesics. Clinical manifestations and measures of care. Characteristics of nalorphine hydrochloride, naloxone, naltrexone.</p> <p>7. Drug dependence arising from opiate analgesics, clinical manifestations, the concept of withdrawal syndrome, methods of treatment. Drug addiction as a socio-biological problem.</p> <p>8. Non-opiate analgesics. Classification of non-opiate analgesics by chemical structure.</p> <p>9. General characteristics of the group. Mechanisms of analgesic, antipyretic action. Pharmacological and comparative characteristics of drugs.</p> <p>10. Side effects of non-opiate analgesics, ways of prevention.</p>
5.	<p>Neuroleptics, tranquilizers, hypnotics and sedatives</p> <p>1. Classification of psychotropic drugs.</p> <p>2. Antipsychotic effect of neuroleptics, sedative effect, effect on dopaminergic and adrenergic effects in the CNS.</p> <p>3. Comparative characteristics of neuroleptics. Side effects.</p> <p>4. Classification of tranquilizers. The mechanism of their action, influence on GABA-ergic processes, pharmacological effects and indications for use.</p> <p>5. Classification of sedatives. The effect of sedatives on the CNS, indications for use.</p> <p>6. Side effects of bromine salts and herbal preparations.</p> <p>7. Drugs to prevent mania. The mechanism of action of lithium salts is possible. Application.</p>
6.	<p>Antidepressants, nootropic drugs, psychomotor stimulants</p> <p>1. General characteristics of tricyclic antidepressants and MAO inhibitors, their effect on adrenergic, serotonergic and dopaminergic processes in the CNS, side effects.</p> <p>2. Characteristics of the psychostimulant effect and the effect on the cardiovascular system of caffeine, meridian and sidocarb, indications for use, side effects, the possibility of drug dependence.</p> <p>3. The effect of nootropic drugs on metabolic processes in the CNS. Comparative characteristics and mechanism of stimulating effect of analeptics on the CNS, effects on respiration and blood circulation.</p> <p>4. Adaptogens and their use. Rules for taking adaptogens. Questions about the side effects of adaptogens, the use of drugs by a healthy person.</p>
7.	<p>Hormonal drugs, their synthetic substitutes and antagonists</p> <p>1. General characteristics of hormonal drugs. Classification of hormonal drugs by origin. The mechanism of action of hormonal drugs. Indications for use.</p> <p>2. Hormonal drugs of the pituitary and hypothalamus.</p> <p>3. Hypoglycemic drugs. Classification. Pharmacokinetics, pharmacodynamics, indications and contraindications to insulin.</p> <p>4. Side effect.</p> <p>5. Use in hyperglycemic coma. Help with hypoglycemic coma.</p>

	<p>6. Synthetic antidiabetic drugs. Drugs for the treatment of hypoglycemia.</p> <p>7. Drugs used in diseases of the thyroid gland: thyroid hormones; antithyroid drugs. Pharmacology of iodine-containing drugs. Indications and contraindications to use, side effects.</p> <p>8. Hormonal drugs of the cortical layer of the adrenal glands. Pharmacological effects, indications, contraindications to use, dosage regimen of drugs for substitution therapy. Comparison. The concept of gluco- and mineralocorticoid activity. Side effects.</p>
8.	<p>Anti-inflammatory, anti-allergic and immunotropic drugs</p> <p>1. Classification of anti-inflammatory drugs. The main focus of the action. Pharmacology of non-steroidal anti-inflammatory drugs and comparative characteristics of drugs by the degree of inhibition of COX-1 and -2 and the severity of anti-inflammatory action. Side effects and measures to prevent them.</p> <p>2. Pharmacology of steroidal anti-inflammatory drugs and comparative characteristics of drugs. Indications, contraindications to use, dosage regimen. Side effects of glucocorticoids.</p> <p>3. Antiallergic drugs. The concept of histamine receptors. Classification and general characteristics of antiallergic drugs. Drugs used in immediate-type hypersensitivity. Help with anaphylactic shock. Drugs used in delayed-type hypersensitivity.</p> <p>4. Drugs that affect immune processes. General characteristics of agents that reduce tissue damage.</p>
<p>Block 2. Drugs that affect the functions of executive organs and systems. Chemotherapeutic drugs. Antidotes</p>	
9.	<p>Drugs that affect the respiratory system</p> <p>1. Broncholytic drugs. Classification of bronchodilators. Pharmacokinetics, pharmacodynamics, side effects.</p> <p>2. Use of desensitizing and antiallergic drugs. General characteristics of drugs.</p> <p>3. Respiratory stimulants. Classification of respiratory stimulants and pharmacological characteristics. Indications for use.</p> <p>4. Antitussive drugs. Classification of antitussives and general characteristics. Side effect.</p> <p>5. Expectorants and mucolytics. Classification and pharmacological characteristics of drugs. Side effects. Stimulants for surfactant synthesis. General characteristics of drugs.</p> <p>6. Emergency care for acute respiratory disorders (apnea, bronchospasm, pulmonary edema).</p>
10.	<p>Drugs that affect hematopoiesis and hemostasis</p> <p>1. Classification of drugs that affect hematopoiesis. General characteristics of drugs that affect hematopoiesis.</p> <p>2. Drugs that affect erythropoiesis. Stimulators of erythropoiesis. Classification and general characteristics of erythropoiesis stimulators. Indications for use. Drugs used in hypochromic anemia. Indications for use. Side effect.</p> <p>3. Acute iron poisoning and relief measures.</p> <p>4. Pharmacological characteristics of drugs used to treat hyperchromic anemia.</p> <p>5. Drugs that affect leukopoiesis. The mechanism of action of leukopoiesis stimulants. Indications for use.</p> <p>6. General characteristics of drugs that suppress leukopoiesis. Indications for use, side effects.</p> <p>7. Classification of drugs that affect hemostasis. Drugs that affect blood clotting, fibrinolysis on platelet aggregation.</p> <p>8. Classification of drugs used for the prevention and treatment of bleeding. Classification of coagulants. Indications for use.</p> <p>9. Classification of drugs used for the prevention and treatment of thrombosis. Classification of anticoagulants. Side effect. Heparin overdose, relief measures. Preparations of low molecular weight heparins.</p> <p>10. Antithrombotic agents: factor Xa inhibitors</p> <p>11. Indirect anticoagulants. Indications for use. Side effects of indirect anticoagulants. General characteristics of fibrinolytic drugs.</p>
11.	<p>Antihypertensive drugs. Angioprotectors</p>

	<ol style="list-style-type: none"> 1. Classification and general characteristics of drugs that affect the cardiovascular system. 2. Ways of pharmacological correction of high blood pressure. 3. Modern classification of antihypertensive drugs. Pharmacological characteristics of antihypertensive drugs of the main group. 4. Drugs of the additional group. 5. Principles of combination of antihypertensive drugs. Comparative pharmacological characteristics of these groups, the rate of development of the antihypertensive effect. 6. Medical care for hypertensive crisis. Angioprotectors. <p>Antianginal and hypolipemic drugs</p> <ol style="list-style-type: none"> 1. Classification and general pharmacological characteristics of antianginal drugs. Pharmacokinetics and pharmacodynamics, side effects. 2. Comparative pharmacological characteristics of drugs of the group of organic nitrates. 3. Mechanism of action of calcium channel blockers (calcium antagonists). Pharmacological characteristics. 4. Features of application in the treatment of patients with coronary heart disease β-blockers, vasodilators of myotropic action, reflex type of action and energy-saving drugs. Indications and contraindications to use, side effects. 5. The concept of the syndrome of "robbery". Emergency medical care for myocardial infarction.
12.	<p>Antibiotics</p> <ol style="list-style-type: none"> 1. The concept of antibiosis, antibiotics, the spectrum of antibiotics. 2. Principles of antibiotic therapy. Classification of antibiotics by chemical structure, spectrum and mechanism of action. 3. Group of penicillins. Classification. Mechanism, spectrum and duration of action. Ways of introduction. Pharmacological characteristics of penicillin drugs 4. Pharmacological characteristics of carbapenems and monobactams. Comparative characteristics of drugs, indications for use, side effects. 5. Measures to help with anaphylactic shock during the introduction of penicillin antibiotics. 6. Principles and purpose of combination of penicillin drugs with β-lactamase inhibitors: clavulanic acid, sulbactam, tazobactam. 7. Group of cephalosporins. Classification of drugs by route of administration and generations (generations). Mechanism and spectrum of action. Indications for use. 8. Comparative characteristics of drugs of the cephalosporin group. Side effect of cephalosporins. Mechanism and spectrum of action, indications for use, side effects. General characteristics, mechanism and spectrum of action, indications for use, side effects. 9. Pharmacological characteristics of macrolides. 10. Pharmacological characteristics of lincosamides. Mechanism of action, comparative characteristics, indications and contraindications to use, side effects. 11. Pharmacological characteristics of tetracyclines. 12. Pharmacology of aminoglycoside drugs. Indications for use. Side effect. Pharmacology of antibiotics of different chemical groups.
13.	<p>Principles of treatment of acute drug poisoning. Antidotes</p> <ol style="list-style-type: none"> 1. Basic principles of pharmacotherapy of acute drug poisoning. Causes of acute poisoning. 2. Symptoms of acute poisoning by drugs of different pharmacological groups. 3. Methods of active detoxification, use of emetics, laxatives, envelopes, astringents and adsorbents. 4. The use of active diuretics to remove toxic substances from the blood (forced diuresis), the use of hemodialysis, peritoneal dialysis, hyperbaric oxygenation, hemo- and lymphosorption. 5. The concept of antidotes. Types of antidote therapy. 6. Principles of symptomatic therapy of acute poisoning. Side effects of heavy metal salt preparations. Acute poisoning. Help with acute poisoning by salts of heavy metals, the principles of antidote therapy.

	7. Plasma replacement fluids. General characteristics of plasma substitutes. Pharmacodynamics and indications for the use of saline solutions. 8. Energy, antitoxic, osmotic action. Preparations for parenteral nutrition.
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4.2. Plan of practical classes

№	Name of topic
1	2
Block 1. Medical prescription. General pharmacology. Drugs that affect the nervous system and metabolism	
1.	Introduction to medical prescriptions. Solid dosage forms 1. Law of Ukraine "On Medicinal Products". 2. The concept of prescription, medicinal raw materials, substance, tool, form, drug. 3. Prescription: structure and rules of prescribing for adults and children, types of prescription forms. 4. The concept of trunk and official drugs. 5. Methods of prescribing dosage forms in prescriptions. 6. The choice of dosage forms for certain clinical situations. 7. Solid dosage forms. Features of prescribing and application.
2.	Soft dosage forms 1. Soft dosage forms. 2. Requirements for mild dosage forms. 3. Rules of prescription and features of application.
3.	Liquid dosage forms 1. Solutions for injections. Requirements for injectable solutions, rules of discharge; routes of administration. Methods of sterilization of injection solutions. Features of application in dentistry. 2. Dosage of liquid dosage forms. General characteristics of infusions, tinctures, emulsions, extracts. 3. Forms of spelling of potions, their characteristics and composition. 4. Syrups, aromatic waters and mucus, as constituent ingredients of potions, their dosage. 5. Novogalenic drugs, their dosage and prescription. Medical fees. Methods of application.
4.	General pharmacology 1. Pharmacokinetics and pharmacodynamics of drugs. 2. Factors influencing the pharmacokinetics and pharmacodynamics of drugs. 3. Changing the action of drugs when they are re-introduced. 4. Medical and social aspects of the fight against drug addiction. 5. Combined medication. 6. Side and toxic effects of drugs. Teratogenicity, embryotoxicity.
5.	Drugs that act on the transmission of excitation in cholinergic synapses 1. Anatomical and physiological properties of the autonomic nervous system. 2. Classification of drugs that affect the autonomic nervous system. 3. Drugs that affect the function of cholinergic nerves. 4. Classification of drugs that affect the function of cholinergic nerves. 5. Pharmacological effects that occur when excited and suppressed cholinergic receptors. 6. Cholinomimetic drugs: m-n-cholinomimetic drugs. 7. Anticholinesterase drugs and reactivators cholinesterase. Classification of anticholinesterase drugs. Mechanism of action, pharmacological effects, indications for use, side effects. Comparative characteristics of anticholinesterase drugs (neostigminumethyl sulfate, galantamine hydrobromide, pyridostigmine bromide). Features of action of organophosphorus compounds. 8. Acute poisoning by organophosphorus compounds and relief. Pharmacology of FOS reactivators (alloxim, dipyrroxime). M-Cholinomimetics. Pharmacological characteristics of

	<p>pilocarpine hydrochloride.</p> <p>9. Effects on the eyes, smooth muscles of internal organs, gland secretion, cardiovascular and urogenital systems. Indications for use. Acute muscarine poisoning. Relief measures, antidote therapy.</p> <p>10. N-Cholinomimetics (cytisine, nicotine). Mechanism of action. Pharmacological effects, indications for use, side effects. Pharmacological effects of nicotine. Smoking as a medical and social problem. Drugs that alleviate the symptoms of withdrawal syndrome when quitting smoking. Side effects.</p> <p>11. Choline-blocking drugs. M,N-Cholinoblockers (tri-hexyphenidyl). M-cholinoblocking drugs. Pharmacological characteristics of atropine sulfate. Indications for use.</p> <p>12. Acute poisoning by atropine and plants containing alkaloids with M-cholinoblocking properties. Relief measures. Indications for use. Side effects.</p> <p>13. N-Cholinoblockers (ganglioblockers, muscle relaxants). Classification of ganglioblockers (hexamethonium bromide, hygronium). Mechanism of action. Pharmacological effects, indications for use, side effects. Classification of muscle relaxants. Pharmacokinetics, pharmacodynamics, laxatives, depolarizing action. Indications for use, side effects.</p>
6.	<p>Drugs that affect the transmission of excitation in adrenergic synapses</p> <p>1. Drugs that affect adrenergic innervation. Modern ideas about adrenergic receptors, their types and localization.</p> <p>2. Classification of drugs that affect adrenergic innervation. Adrenomimetic drugs.</p> <p>3. Pharmacological characteristics of adrenomimetics. Pharmacokinetics, pharmacodynamics of epinephrine hydrochloride. Indications for use.</p> <p>4. Comparative characteristics of adrenomimetics (norepinephrine hydrotartrate, ephedrine hydrochloride, phenylephrine, naphazoline, xylometazoline, oxymetazoline, clonidine, salbutamol, fenoterol, hexoprenaline, dobutamine).</p> <p>5. Antiadrenergic drugs. Adrenoblocking drugs.</p> <p>6. Features of α-blockers (prazosin, doxazosin, tamsulosin), mechanism of action and pharmacological effects of β-blockers.</p> <p>7. Comparative characteristics of propranolol, atenolol, metoprolol, bisoprolol, carvedilol.</p> <p>8. Sympatholytics (reserpine, methyldopa). Mechanism of action and indications for use, side effects.</p> <p>9. Dopaminotropic, serotoninotropic, histaminotropic and GABAergic drugs (dopamine hydrochloride, sumatriptan). General ideas.</p>
7.	<p>Medicines for general and local anesthesia. Pharmacology of ethyl alcohol</p> <p>1. Medicines for local anesthesia. Classification by chemical structure and use for different types of anesthesia.</p> <p>2. Requirements for drugs of the group of local anesthetics. Pharmacology of esters (procaine, benzocaine) and substituted amides (articaine, lidocaine, bupivacaine, mepivacaine).</p> <p>3. Comparative characteristics of local anesthetics and complex drugs based on them (ultracaineDS). Indications for use.</p> <p>4. Purpose and possibilities of combination with adrenomimetics.</p> <p>5. Side effects of local anesthetics, measures for its prevention and treatment.</p> <p>6. Organic and inorganic astringent drugs. Mechanism of action, indications for use. Pharmacological characteristics of tannin, bismuth subcitrate, phytopreparations containing surfactants, herbs St. John's wort, sage leaves, chamomile flowers.</p> <p>7. Complex drugs based on them. General characteristics of enveloping means. Mechanism of action, indications for use (starch mucus, flax seeds).</p> <p>8. Adsorbent drugs. Classification of adsorbents. Mechanism of action. Indications for use. Coal preparations (activated carbon).</p> <p>9. Synthetic sorbents (enterosgel). Principles of hemo- and enterosorption.</p> <p>10. Drugs that irritate the end of sensitive nerves (menthol, ammonia solution). Mechanism of action. Effects on skin and mucous membranes. Indications for use.</p>

	<p>11. General characteristics of anesthesia. See anesthesia. Classification of drugs for anesthesia. Requirements for anesthetics. Theories of anesthesia. Comparative characteristics of means for inhalation anesthesia (ether for anesthesia, halothane, isoflurane, sevoflurane, dinitrogen oxide, xenon). Side effect. The concept of premedication, introductory, basic, combined anesthesia.</p>
8.	<p>Analgesics</p> <ol style="list-style-type: none"> 1. Analgesic drugs. General characteristics of paid analgesics (morphine hydrochloride, codeine phosphate, trimeperidine, fentanyl, tramadol, butorphanol, buprenorphine, nalbuphine). 2. Classification by chemical structure, origin and affinity for opiate receptors. Mechanism of action. Pharmacology of morphine hydrochloride. Features of the drug on the CNS. Comparative characteristics of drugs. 3. Indications for the use of analgesics. Side effects. 4. Acute poisoning by narcotic analgesics. Clinical manifestations and measures of care. 5. Characteristics of nalorphine hydrochloride, naloxone, naltrexone. 6. Drug dependence arising from opiate analgesics, clinical manifestations, the concept of withdrawal syndrome, treatment methods. 7. Drug addiction as a socio-biological problem. 8. Non-opiate analgesics. Classification of non-opiate analgesics by chemical structure. General characteristics of the group. Mechanisms of analgesic, antipyretic action. 9. Pharmacological and comparative characteristics of drugs (metamizole sodium, paracetamol, dexketoprofen). Side effects of unpaid analgesics, ways of prevention.
9.	<p>Neuroleptics, tranquilizers, hypnotics and sedatives</p> <ol style="list-style-type: none"> 1. Psychotropic drugs. Classification of psychotropic drugs. 2. General characteristics of neuroleptics, classification by chemical structure. General characteristics. The mechanism of antipsychotic action of neuroleptics. 3. Pharmacological effects of chlorpromazine, fluphenazine decanate, droperidol, haloperidol, sulpiride, clozapine, risperidone, olanzapine. 4. Comparative characteristics, indications for use. Side effects of neuroleptics. Combined use with drugs of other pharmacological groups. The concept of neuroleptanalgesia. 5. Tranquilizers. Classification of tranquilizers. The mechanism of tranquilizing action, the concept of benzodiazepine receptors. 6. Pharmacological and comparative characteristics of diazepam, clonazepam, phenazepam, nitrazepam. 7. Daytime tranquilizers (gidazepam). Indications and contraindications to the use of tranquilizers, their side effects. Drug dependence. Combined use with drugs of other pharmacological groups. The concept of ataralgesia. 8. Anxiolytics of non-benzodiazepine structure (mebicar, afobazole). Acute tranquilizer poisoning, relief measures. 9. Benzodiazepine receptor antagonists (flumazenil). Hypnotics. Modern ideas about the nature of sleep. The main types of insomnia. 10. Classification of hypnotics by chemical structure and their general characteristics. Possible mechanisms of action. Comparative characteristics of hypnotics of different groups (phenobarbital, nitrazepam, doxylamine, zopiclone, zolpidem, zaleplon, suvorexant, melatonin). 11. Indications for use, side effects (withdrawal syndrome, aftereffects, drug dependence). Acute barbiturate poisoning, relief measures.
10.	<p>Anticonvulsants. Drugs for the treatment of neurodegenerative diseases</p> <ol style="list-style-type: none"> 1. Seizures as symptoms of various pathological conditions. The use of drugs of different pharmacological groups to eliminate seizures (tranquilizers, muscle relaxants, hypnotics, narcotic drugs, myotropic antispasmodics). 2. Antiepileptic drugs (phenobarbital, phenytoin, carbamazepine, clonazepam, topiramate, sodium valproate, lamotrigine, levetiracetam, gabapentin). 3. Classification of antiepileptic drugs according to the indication. 4. Comparative characteristics, side effects of antiepileptic drugs.

	<p>5. Antiparkinsonian drugs (levodopa / carbidopa, selegiline, amantadine, ropinerol, pramipexole, pyridone, trihexyphenidyl). Classification, basic mechanisms of action. Use in clinical practice. Medicines for the treatment of muscle spasticity (baclofen, midokalm, benzodiazepines, GABAergic drugs). General characteristics.</p> <p>6. Drugs that can be used in Alzheimer's disease, multiple sclerosis and amyotrophic lateral sclerosis. Central cholinesterase blockers (donepezil, rivastigmine, galantamine), central m, n-cholinomimetics (choline alfoscerate), NMDA receptor inhibitors (memantine hydrochloride) and metabolotropic drugs (glycine, L-lysine escinate).</p>
11.	<p>Antidepressants, nootropic drugs, psychomotor stimulants and analeptics</p> <p>1. General characteristics of tricyclic antidepressants and MAO inhibitors, their effect on adrenergic, serotonergic and dopaminergic processes in the CNS, side effects.</p> <p>2. Characteristics of the psychostimulant effect and the effect on the cardiovascular system of caffeine, meridian and synocarb, indications for use, side effects, the possibility of drug dependence.</p> <p>3. The effect of nootropic drugs on metabolic processes in the CNS. Comparative characteristics and mechanism of stimulating effect of analeptics on the CNS, effects on respiration and blood circulation.</p> <p>4. Adaptogens and their use. Rules for taking adaptogens. Questions about the side effects of adaptogens, the use of drugs by a healthy person.</p>
12.	<p>Hormonal drugs, their synthetic substitutes and antagonists</p> <p>1. General characteristics of hormonal drugs. Classification of hormonal drugs by origin. The mechanism of action of hormonal drugs. Indications for use.</p> <p>2. Hormonal drugs of the pituitary and hypothalamus.</p> <p>3. Hypoglycemic drugs. Classification. Pharmacokinetics, pharmacodynamics, indications and contraindications to insulin. Classification of natural insulins by expiration date. Pharmacology of actropide, humulin, insulin glargine. Combined insulins. Side effect. Use in hyperglycemic coma. Help with hypoglycemic coma. Help with hypoglycemic coma. Synthetic antidiabetic drugs. The drug for the treatment of hypoglycemia is glucagon.</p> <p>4. Drugs used in diseases of the thyroid gland: thyroid hormones; antithyroid drugs. Pharmacology of iodine-containing drugs. Indications and contraindications to use, side effects.</p> <p>5. Hormonal drugs of the cortical layer of the adrenal glands. Pharmacological effects, indications, contraindications to use, dosage regimen of drugs for substitution therapy. Comparison. The concept of gluco- and mineralocorticoid activity. Side effects. Pharmacology of deoxycortone (deoxycorticosterone acetate). Indications for use.</p> <p>6. Preparations of sex hormones. General characteristics of female sex hormone preparations. Mechanism of action and indications for the use of estrogenic and progestogenic drugs depending on age-related hormonal changes in women.</p> <p>7. Antagonists of estrogenic and progestogen hormones. Preparations of male sex hormones.</p> <p>8. Pharmacological characteristics of testosterone propionate, methyltestosterone. Indications for use, side effects. Androgen hormone antagonists.</p> <p>9. Pharmacology of anabolic steroids. Mechanism of action, indications for use. Side effects of anabolic steroids.</p>
13.	<p>Anti-inflammatory, anti-allergic and immunotropic drugs</p> <p>1. Classification of anti-inflammatory drugs. The main focus of the action. Pharmacology of non-steroidal anti-inflammatory drugs and comparative characteristics of drugs by the degree of inhibition of COX-1 and -2 and the severity of anti-inflammatory action. Side effects and measures to prevent them.</p> <p>2. Pharmacology of steroidal anti-inflammatory drugs and comparative characteristics of drugs (hydrocortisone acetate, prednisolone, dexamethasone, triamcinolone, betamethasone, flumethasone nivalate, sinaflan, beclomethasone dipropionate). Indications, contraindications to use, dosage regimen. Side effects of glucocorticoids.</p> <p>3. Antiallergic drugs. The concept of histamine receptors. Classification and general</p>

	<p>characteristics of antiallergic drugs. Drugs used in immediate-type hypersensitivity. Features of application. Pharmacology of antihistamines. Principles of drug classification. Comparative characteristics, side effects. Pharmacokinetics, pharmacodynamics, indications for the use of cromolyn sodium, ketotifen.</p> <p>4. Help with anaphylactic shock.</p> <p>5. Drugs used in delayed-type hypersensitivity.</p> <p>6. Drugs that affect the immune process. General characteristics of drugs that reduce tissue damage (steroidal and nonsteroidal anti-inflammatory drugs).</p> <p>7. Drugs that affect immunity. Immunomodulators. Pharmacology of thymus preparations, leukopoiesis stimulants, interferons and vaccines.</p> <p>8. Immunosuppressive drugs. Classification and general characteristics, indications for use, side effects.</p> <p>9. Pharmacology of immunosuppressants.</p>
14.	<p>Water-soluble and fat-soluble vitamin preparations</p> <p>1. Vitamin therapy and its types. Classification of vitamin preparations.</p> <p>2. General characteristics of water-soluble vitamins. Pharmacology of thiamine bromide, riboflavin, pyridoxine, nicotinic acid, cyanocobalamin, folic acid, metafolin, ascorbic acid, calcium pangamate, calcium pantothenate. Indications for use, side effects. The concept of bioflavonoids, coenzyme preparations.</p> <p>3. General characteristics of fat-soluble vitamin preparations. Pharmacology of retinol acetate, indications for use. The concept of retinoids, their pharmacological properties and indications for use (tretinoin, isotretinoin, etretinate). Pharmacology of tocopherol acetate. Pharmacology of phyloquinones and menaquinones.</p> <p>4. Pharmacological properties of menadione (vitamin K3). Pharmacological properties and application of phytomenadione. Indications and contraindications to use. Pharmacology of vitamin D preparations - native vitamins, structural analogues of vitamin D2, active metabolites of vitamin D. Side effects of fat-soluble vitamins. Multivitamins.</p> <p>5. The concept of antivitamins.</p>
15.	<p>Final control of block 1</p> <p>Control of practical training</p> <p>Test control of theoretical training</p>
<p>Block 2. Drugs that affect the functions of executive organs and systems. Chemotherapeutic drugs.</p> <p>Antidotes</p>	
16.	<p>Drugs that affect the respiratory system</p> <p>1. Broncholytic drugs. Classification of bronchodilators. Pharmacology of adrenomimetics (salbutamol, fenoterol, formoterol, salmeterol); M-cholinoblockers (ipratropium bromide, tiotropium bromide); myotropic bronchodilators (theophylline, aminophylline); combined drugs. Pharmacokinetics, pharmacodynamics, side effects.</p> <p>2. Use of desensitizing and antiallergic drugs. General characteristics of topical anti-inflammatory drugs (beclomethasone, budesonide, fluticasone); combined drugs (seretide); mast cell stabilizers (cromoglycic acid, nedocromil, ketotifen), leukotriene receptor blockers (montelukast); drugs for systemic use in obstructive airways diseases (fenspiride), monoclonal antibody drugs (omalizumab), antihistamines and antileukotriene drugs.</p> <p>3. Respiratory stimulants. Classification of respiratory stimulants and pharmacological characteristics of caffeine citrate, sulfocamphocaine. Indications for use.</p> <p>4. Antitussive drugs. Classification of antitussives and general characteristics (codeine phosphate, glaucine, butamirate). Side effect.</p> <p>5. Expectorants and mucolytics. Classification of expectorants and mucolytics by mechanism of action and pharmacological characteristics of drugs (preparations of marshmallow, thermopsis, trypsin crystalline, mucaltin, acetylcysteine, guaifenesin). Side effects.</p> <p>6. Stimulators of surfactant synthesis (bromhexine, ambroxol). Pulmonary surfactants. General characteristics of drugs. Emergency care for acute respiratory disorders (apnea, bronchospasm,</p>

	pulmonary edema).
17.	<p>Drugs that affect kidney function and reproductive processes</p> <ol style="list-style-type: none"> 1. Diuretics. Classification of diuretics by chemical structure, localization, activity and mechanism of action. Pharmacokinetics and pharmacodynamics of furosemide, torasemide, acetazolamide, hydrochlorothiazide, indapamide. Indications for use, side effects. 2. Comparative characteristics of potassium-sparing diuretics (spironolactone, eplerenone, triamterene). 3. The concept of forced diuresis. 4. Osmotic diuretics (mannitol). Indications for use. Side effect. Medicinal plants that have a diuretic effect (phytopreparations, artichoke extract, horsetail herb, orthosiphon leaves). 5. The principle of combined use of diuretics. 6. Anti-gout drugs. Drugs that affect the metabolism and excretion of uric acid (allopurinol). 7. Classification of drugs that affect the myometrium. General characteristics of drugs that stimulate the contractile activity of the myometrium. Prostaglandin drugs (dinoprost, dinoprostone), hormonal drugs (oxytocin, desaminoxytocin). 8. Drugs used to stop uterine bleeding. Pharmacological characteristics of uterine horn alkaloids (ergometrine maleate) and oxytocin receptor stimulators (carbetocin). Indications for use. 9. Drugs that reduce the tone and contractile activity of the myometrium, relax the cervix: tocopherol acetate, progesterone; m-cholinoblockers (atropine sulfate); β_2 - adrenomimetics (fenoterol, hexoprenaline); oxytocin receptor antagonists (atosiban); antispasmodics, magnesium sulfate.
18.	<p>Drugs that affect hematopoiesis and hemostasis</p> <ol style="list-style-type: none"> 1. Classification of drugs that affect hematopoiesis. General characteristics of drugs that affect hematopoiesis. Drugs that affect erythropoiesis. Stimulators of erythropoiesis. 2. Classification and general characteristics of erythropoiesis stimulators. Indications for use. Drugs used in hypochromic anemia. Pharmacokinetics, pharmacodynamics of iron (iron (II) sulfate, iron (III) hydroxide polymaltose, iron (III) carboxymaltose). Combined drugs (ferroplekt). 3. Preparations – erythropoietins (epoetin-alpha). Indications for use. Side effect. 4. Acute iron poisoning and relief measures. Pharmacological characteristics of drugs used to treat hyperchromic anemia. 5. Pharmacokinetics, pharmacodynamics of cyanocobalamin and folic acid. 6. Drugs that affect leukopoiesis. Mechanism of action of leukopoiesis stimulants (sodium nucleinate, methyluracil, filgrastim). Indications for use. 7. General characteristics of drugs that suppress leukopoiesis (mercaptapurine, methotrexate). Indications for use, side effects. Classification of drugs that affect hemostasis. 8. Drugs that affect blood clotting, fibrinolysis on platelet aggregation. 9. Classification of drugs used for the prevention and treatment of bleeding. 10. Classification of coagulants. Pharmacokinetics, pharmacodynamics of menadione. Indications for use. Pharmacology of hemostatic agents of other groups (aminocaproic acid, tranexamic acid, aprotinin, eptacogolf, ethamsylate, calcium chloride, thrombin, revul). 11. Classification of drugs used for the prevention and treatment of thrombosis. 12. Classification of anticoagulants. Pharmacokinetics, pharmacodynamics of heparin. Indications and contraindications to use. Side effect. 13. Heparin overdose, relief measures (protamine sulfate). 14. Preparations of low molecular weight heparins (fraxiparin). Antithrombotic agents: factor Xa inhibitors (rivaroxaban) and direct thrombin inhibitors (dabigatran etexilate). 15. Indirect anticoagulants (warfarin). Indications for use. Side effects of indirect anticoagulants. General characteristics of fibrinolytic drugs. 16. Pharmacology of fibrinolysin, alteplase. Indications for use. Side effect. General characteristics and mechanisms of action of agents that reduce platelet aggregation (acetylsalicylic acid, dipyridamole, clopidogrel, pentoxifylline).

19.	<p>Antihypertensive drugs. Antianginal and hypolipidemic drugs</p> <ol style="list-style-type: none"> 1. Classification and general characteristics of drugs that affect the cardiovascular system. 2. Ways of pharmacological correction of high blood pressure. 3. Modern classification of antihypertensive drugs. 4. Pharmacological characteristics of antihypertensive drugs of the main group. Pharmacology of β-blockers (propranolol, atenolol, metoprolol, bisoprolol, carvedilol); ACE inhibitors (captopril, enalapril, lisinopril); angiotensin II receptor blockers (losartan, telmisartan, valsartan); calcium antagonists (nifedipine, amlodipine); diuretics (indapamide, furosemide, torasemide, hydrochlorothiazide, spironolactone). 5. Drugs of the additional group. Pharmacological characteristics of central α_2-adrenomimetics (clonidine, methyldopa); imidazoline receptor agonists (moxonidine), α_1-blockers (prazosin, doxazosin); sympatholytics (reserpine); peripheral vasodilators (sodium nitroprusside, magnesium sulfate, hydralazine). 6. Principles of combination of antihypertensive drugs. 7. Comparative pharmacological characteristics of these groups, the rate of development of the antihypertensive effect. Medical care for hypertensive crisis. 8. Hypolipidemic drugs. General pharmacological characteristics of lipid-lowering drugs, direction of action. 9. Classification of lipid-lowering drugs by mechanism of action. Pharmacokinetics and pharmacodynamics of statins (lovastatin, simvastatin, atorvastatin, rosuvastatin). 10. Comparative characteristics of drugs of other groups in the treatment of hyperlipidemia: fibrates (fenofibrate), niacin group (nicotinic acid), bile acid sequestrants (cholestyramine), cholesterol absorption inhibitors (ezetimibe), lipid modifiers (human monoclonal antibodies alirocumab), ethyl ester of omega-3 acids. Mechanisms of action. Indications for use and side effects.
20.	<p>Antiarrhythmic drugs. Cardiotonic drugs. Cardiac glycosides</p> <ol style="list-style-type: none"> 1. Antiarrhythmic drugs. Classification of antiarrhythmic drugs according to indications for use and mechanism of action. Pharmacokinetics and pharmacodynamics of antiarrhythmic drugs with membrane stabilizing action (quinidine sulfate, procainamide, lidocaine hydrochloride, flecainide, phenytoin, etatsizin, propafenone). 2. Comparative characteristics of drugs. Indications for use. Beta-blockers (propranolol, atenolol, metoprolol, bisoprolol), potassium blockers (amiodarone, dronedarone), calcium channels (verapamil) and if-channels (ivabradine) in the treatment of cardiac arrhythmias. 3. The mechanism of antiarrhythmic action of potassium preparations (potassium chloride, potassium asparagine and magnesium). Drugs for the correction of bradycardia (m-cholinoblockers, adrenomimetic drugs). 4. Cardiotonic drugs. Classification of cardiotonic drugs. Pharmacokinetics and pharmacodynamics of cardiac glycosides. Comparative characteristics of strophanthin, corglycone, digoxin. Indications and contraindications to use. Side effects of cardiac glycosides. 5. Acute and chronic poisoning by cardiac glycosides. Relief measures and prevention. Pharmacological characteristics of non-glycoside cardiotonic drugs (dobutamine, dopamine, levosimendan). Indications for use.
21.	<p>Synthetic antimicrobial drugs</p> <ol style="list-style-type: none"> 1. Synthetic antimicrobials. Sulfanilamide drugs. Pharmacokinetics and pharmacodynamics of sulfonamides. Spectrum of antimicrobial action, sensitivity of microorganisms to drugs of this group. Indications for use. Side effects and ways to prevent it. 2. Combination of sulfonamides with trimethoprim (cotrimoxazole). 3. Derivatives of quinolone I - IV generation. Classification, mechanism of action, indications for use, side effects. Characteristics of drugs (nitroxoline). Feature of application in medical practice of fluoroquinolone derivatives (ofloxacin, ciprofloxacin, levofloxacin, moxifloxacin). 4. Derivatives of nitrofurantoin. Mechanism of action, indications for use, routes of administration, side effects (furacillin, furazolidone, furagin, nitrofurantoin).

	5. Synthetic antimicrobial drugs of different chemical structure (hydroxymethylquinoxaline dioxide, dioxycol, metronidazole, linezolid).
22.	<p>Antibiotics</p> <ol style="list-style-type: none"> 1. The concept of antibiosis, antibiotics, the spectrum of antibiotics. 2. Principles of antibiotic therapy. Classification of antibiotics by chemical structure, spectrum and mechanism of action. 3. Group of penicillins. Classification. Mechanism, spectrum and duration of action. Ways of introduction. Pharmacological characteristics of drugs of the penicillin group (benzylpenicillin sodium salt, benzathine benzylpenicillin, bicillin-5, oxacillin sodium salt, ampicillin, amoxicillin, phenoxymethylpenicillin). 4. Pharmacological characteristics of carbapenems (meropenem) and monobactams (aztreonam). 5. Measures to help with anaphylactic shock during the introduction of penicillin antibiotics. 6. Principles and purpose of combination of penicillin drugs with β-lactamase inhibitors: clavulanic acid, sulbactam, tazobactam. 7. Group of cephalosporins. Classification of drugs by route of administration and generations (generations). Mechanism and spectrum of action. Indications for use. Comparative characteristics of drugs of the cephalosporin group (cefazolin, cephalexin, cefuroxime, ceftriaxone, cefpirom). Side effect of cephalosporins. Mechanism and spectrum of action, indications for use, side effects. General characteristics, mechanism and spectrum of action, indications for use, side effects. 8. Pharmacological characteristics of macrolides (erythromycin, spiramycin, josamycin, roxithromycin, clarithromycin, azithromycin). Pharmacological characteristics of lincosamides (lincomycin hydrochloride, clindamycin). Mechanism of action, comparative characteristics, indications and contraindications to use, side effects. 9. Pharmacological characteristics of tetracyclines (tetracycline, doxycycline hydrochloride), antimicrobial activity, classification, side effects and contraindications. Pharmacological correction and prevention of complications with the use of tetracyclines. 10. Preparations of the nitrobenzene group (chloramphenicol). Mechanism and spectrum of action, indications for use, side effects. 11. Cyclic polypeptides (polymyxins) (colistimethate sodium). Spectrum of action, indications for use. 12. Pharmacology of aminoglycoside drugs (streptomycin sulfate, gentamicin sulfate, amikacin sulfate, tobramycin). Pharmacology of glycopeptide preparations (vancomycin, teicoplanin). 13. Comparative characteristics, mechanism of action, indications and contraindications to use, side effects. Pharmacology of fusidine sodium. Indications for use. Side effect. 14. Pharmacology of antibiotics of different chemical groups (mupirocin).
23.	<p>Antifungal, anthelmintic and antiprotozoal drugs</p> <ol style="list-style-type: none"> 1. Antifungal drugs. Classification of antifungal drugs by origin and purpose. Pharmacokinetics, pharmacodynamics of polyenes (nystatin, amphotericin B, natamycin), imidazoles (ketoconazole, clotrimazole, miconazole), triazoles (fluconazole, itraconazole), allylamines (terbinafine). 2. Antifungal drugs of different groups (dequalinium chloride). Indications for use. Side effect. 3. Basic principles of malaria prevention and treatment. Classification of antimalarial drugs. Mechanism of action. Pharmacological characteristics of chloroquine, primaquine, quinine, pyremethamine, fancidar. Indications and contraindications to use, side effects. Drug therapy of malarial coma. Antiprotozoal drugs (metronidazole, tinidazole). 4. Anthelmintic drugs. Classification of anthelmintic drugs. Feature of application at various types of helminthiasis. Pharmacological characteristics of drugs used for the treatment of nematodes (levamisole, pyrantel, piperazine adipinate, diethylcarbamazine), trematodes (praziquantel); cestodes (niclosamide). Anthelmintics with a broad spectrum of action: mebendazole, albendazole.

24.	<p>Antitubercular, antiviral, antispirochetic</p> <p>1. Anti-tuberculosis drugs. Basic principles of treatment and prevention of tuberculosis. Classification of drugs used to treat tuberculosis. Pharmacokinetics, pharmacodynamics of isonicotinic acid hydrazide derivatives (isoniazid). Side effects that occur with long-term use of anti-TB drugs and ways to prevent them. Antibiotic drugs in the treatment of tuberculosis (rifampicin, streptomycin sulfate, kanamycin, cycloserine, amikacin). Side effects.</p> <p>2. Antiviral drugs. Classification of antiviral drugs by mechanism of action and indications for use. Pharmacological characteristics of drugs used for the prevention and treatment of influenza (rimantadine, oseltamivir, interferons). Features of application.</p> <p>3. Medicines used for herpes infections (acyclovir, valacyclovir, ganciclovir). Pharmacology of interferons (interferon alpha 2b). Inducers of interferon (cycloferon, amizon, kagocel, proteflazid). Possibilities of using antiviral drugs in the complex treatment of AIDS patients (zidovudine, abacavir).</p> <p>4. Antisyphilitic drugs. General characteristics of antisyphilitic drugs. Principles of syphilis treatment. Classification of antisyphilitic drugs. Features of the use of antibiotics (penicillins, macrolides, cephalosporins), bismuth drugs (bioquinol) in the treatment of syphilis.</p>
25.	<p>Principles of treatment of acute drug poisoning. Antidotes</p> <p>1. Basic principles of pharmacotherapy of acute drug poisoning. Causes of acute poisoning. Symptoms of acute poisoning by drugs of different pharmacological groups.</p> <p>2. Methods of active detoxification, use of emetics, laxatives, envelopes, astringents and adsorbents.</p> <p>3. The use of active diuretics to remove toxic substances from the blood (forced diuresis), the use of hemodialysis, peritoneal dialysis, hyperbaric oxygenation, hemo- and lymphosorption.</p> <p>4. The concept of antidotes. Types of antidote therapy. Pharmacology of dimercaprol, acetylcysteine, thetacin-calcium, penicillamine, deferoxamine, cholinesterase reactivators.</p> <p>5. Principles of symptomatic therapy of acute poisoning. Side effects of heavy metal salt preparations. Acute poisoning. Help with acute poisoning by salts of heavy metals, the principles of antidote therapy.</p> <p>6. Plasma replacement fluids. General characteristics of plasma substitutes. Pharmacodynamics and indications for use of saline solutions (isotonic sodium chloride solution, Ringer-Locke solution, trisalt), alkaline solutions (sodium bicarbonate, trisamine), sugars (glucose), gelatin solution, preparations containing human blood components (albumin) synthetic drugs (rheopolyglucin, neohemodesis, refortan).</p> <p>7. Energy, antitoxic, osmotic action of dextrose (glucose), indications for the use of isotonic and hypertonic glucose solution. Preparations for parenteral nutrition (lipofundin).</p> <p>Final control of block 2</p> <p>1. Control of practical training</p> <p>2. Test control of theoretical training</p>

4.3. Ensuring the educational process

Tools:

Visual: demonstration of multimedia materials, drug brochures according to the topic of practical training, collection of drugs.

Practical: workshop for independent and classroom work of the student, prescription forms.

The educational process is organized according to the credit transfer system in accordance with the requirements of the Bologna process.

Types of educational activities of students according to the curriculum are:

- a) lectures,
- b) practical classes,
- c) independent work of students.

In the lecture course it is necessary to cover the problematic issues of the relevant sections of pharmacology – history of pharmacology, modern achievements of pharmacological science, dependence of drugs on chemical structure and other factors depending on drugs and organism, features of their pharmacokinetics and pharmacodynamics, modern mechanisms of action, indications for use, side effects. effects, symptoms of overdose, help with poisoning.

Training sessions according to the method of their organization are practical, because they provide the following organizational structure:

1. Preparatory stage (organizational, setting educational goals and their motivation, control of the input level of knowledge).

2. The main stage (formation of professional skills and abilities to determine the general principles of pharmacokinetics, pharmacodynamics, prescribing, solving typical pharmacotherapeutic problems and test tasks, etc.).

3. The final stage (control of the final level of knowledge and skills, solving atypical problems). Summing up the general results. Tasks for the next lessons.

Plan and organizational structure of the lesson on “Pharmacology”

№	Stages of the lesson	Duration	Teaching aids	Equip-ment
1.	Preparatory stage	30 min		
1.1.	Organizational issues	5 min		
1.2.	Checking the tasks setted for independent preparation for classes	10 min	Textbook, manual, lecture notes	
1.3	Monitoring and evaluation of the initial level of students' preparation in pharmacology	15 min	Methodical developments of the department (tests on pharmacology of incoming control by type KROK, prescribing)	
2.	The main stage	35 min		
2.1.	Formation of professional skills and abilities (adjustment of prescriptions, control of the student's determination of group affiliation of drugs, the main indications for the appointment of drugs) of possible side effects of drugs and their correction. Solving pharmacotherapeutic problems, registration of the protocol.	20 min	Textbook, manual, tables, collection of drugs, lecture notes	Projector multimedia, laptop
2.2.	Solving situational problems and their evaluation	15 min	Textbook, manual, tables, lecture notes	
3.	The final stage	15 min		
3.1.	Control of the final level of training	10 min	Methodical developments of the department	
3.2.	General assessment of students' learning activities	5 min	Criteria for assessing students' knowledge	

At each practical lesson, students must keep a short protocol in which to write recipes, record the results of work and answers to situational problems.

During lectures and practical classes it is necessary to use audiovisual teaching aids: collections of medicines, tables, slides, educational films, computer equipment, etc.; during conducting experiments on animals – to take into account the international requirements of bioethics.

SOFTWARE

The integration of the processes of planning, management and control of knowledge acquisition in “Pharmacology” is due to the methodological support of the educational process:

1. Work program on the discipline.
2. Working thematic plans of lectures, practical classes and independent work.
3. Methodical developments, abstracts (abstracts, presentations) of lectures.
4. Methodical instructions for students to practical classes.
5. Methodical instructions for independent work of students.
6. Instructional and methodical materials for current and final control of knowledge (bases of test tasks, list of tasks for control of practical skills and theoretical knowledge in practical classes and tickets to the exam).
7. Educational literature used in the study of the discipline.
8. Tables.
9. Collections of drugs.

5. Final control

5.1. A list of practical skills and knowledge that a student must master in the process of studying the discipline

LIST OF DRUGS FOR FINAL CONTROL, PRESCRIPTION OF WHICH ARE PRACTICAL SKILLS

BLOCK 1. MEDICAL PRESCRIPTION. GENERAL PHARMACOLOGY. MEDICINES AFFECTING THE NERVOUS SYSTEM AND MOTION

- | | | |
|----------------------------------|----------------------|------------------------------|
| 1. Lidocaine | 21. Metoprolol | 44. Levodopa / carbidopa |
| 2. Ultracaine | 22. Bisoprolol | 45. Caffeine sodium benzoate |
| 3. Bismuth subcitrate | 23. Carvedilol | 46. Piracetam |
| 4. Activated carbon | 24. Atenolol | 47. Nicergoline |
| 5. Enterosgel | 25. Reserpine | 48. Nimodipine |
| 6. Pilocarpine hydrochloride | 26. Methyldopa | 49. Amitriptyline |
| 7. Neostigmine methyl sulfate | 27. Ketamine | 50. Fluoxetine |
| 8. Pyridostigmine bromide | 28. Propofol | 51. Salbutamine |
| 9. Atropine sulfate | 29. Ethyl alcohol | 52. Venlafaxine |
| 10. Tiotropium bromide | 30. Chlorpromazine | 53. Morphine hydrochloride |
| 11. Pirenzepine | 31. Droperidol | 54. Trimeperidine |
| 12. Prifinium bromide | 32. Haloperidol | 55. Fentanyl |
| 13. Suxamethonium | 33. Risperidone | 56. Codeine phosphate |
| 14. Epinephrine hydrochloride | 34. Olanzapine | 57. Tramadol |
| 15. Norepinephrine hydrotartrate | 35. Diazepam | 58. Naloxone |
| 16. Phenylephrine | 36. Hidazepam | 59. Acetyl-salicylic acid |
| 17. Dobutamine | 37. Nitrazepam | 60. Paracetamol |
| 18. Salbutamol | 38. Zopiclone | 61. Ketoprofen |
| 19. Doxazosin | 39. Doxylamine | 62. Metamizole sodium |
| 20. Propranolol | 40. Phenobarbital | 63. Diclofenac sodium |
| | 41. Sodium valproate | 64. Ibuprofen |
| | 42. Carbamazepine | 65. Naproxen |
| | 43. Lamotrigine | |

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|-------------------------|------------------------------------|----------------------------------|
| 66. Celecoxib | 81. Carbetocin | 95. Levonorgestrel |
| 67. Meloxicam | 82. L-Thyroxine | 96. Dydrogesterone |
| 68. Diphenhydramine | 83. Thiamazol | 97. Mifepristone |
| 69. Chloropyramine | 84. Insulin | 98. Retinol acetate |
| 70. Loratadine | 85. Glibenclamide | 99. Ergocalciferol |
| 71. Levocetirizine | 86. Glimepiride | 100. Tocopherol acetate |
| 72. Fenspiride | 87. Metformin | 101. Pyridoxine
hydrochloride |
| 73. Ketotifen | 88. Prednisolone | 102. Ascorbic acid |
| 74. Interferon α | 89. Methylprednisolone | 103. Cyanocobalamin |
| 75. Methyluracil | 90. Dexamethasone | 104. Thiamine chloride |
| 76. Montelukast | 91. Budesonide | 105. Folic acid |
| 77. Omalizumab | 92. Mometasone furoate | 106. Nicotinic acid |
| 78. Adalimumab | 93. Betamethasone | |
| 79. Azathioprine | 94. Beclomethasone
dipropionate | |
| 80. Oxytocin | | |

**BLOCK 2. MEDICINES AFFECTING THE FUNCTIONS OF EXECUTIVE BODIES
AND SYSTEMS. CHEMOTHERAPEUTIC MEDICINES. ANTIDOTES**

- | | | |
|---|--------------------------|----------------------------|
| 1. Glaucine | 25. Mannitol | 52. Nifedipine |
| 2. Ambroxol | 26. Allopurinol | 53. Diltiazem |
| 3. Acetylcysteine | 27. Tolterodine | 54. Clonidine |
| 4. Carbocysteine | 28. Sildenafil | 55. Magnesium sulfate |
| 5. Guaifenesin | 29. Yohimbine | 56. Sodium nitroprusside |
| 6. Salmeterol | 30. Dutasteride | 57. Glycerol trinitrate |
| 7. Famotidine | 31. Maltose iron complex | 58. Isosorbide dinitrate |
| 8. Omeprazole | 32. Iron sulfate | 59. Atorvastatin |
| 9. Pantoprazole | 33. Menadion | 60. Rosuvastatin |
| 10. Aluminum hydroxide /
magnesium hydroxide /
benzocaine | 34. Calcium chloride | 61. Fenofibrate |
| 11. Calcium carbonate | 35. Etamzilate | 62. Ivabradine |
| 12. Pancreatin | 36. Aminocaproic acid | 63. Amiodarone |
| 13. Aprotinin | 37. Tranexamic acid | 64. Propafenone |
| 14. Lactulose | 38. Heparin | 65. Digoxin |
| 15. Bisacodyl | 39. Enoxaparin | 66. Korglikon |
| 16. Sodium picosulfate | 40. Rivaroxaban | 67. Dopamine hydrochloride |
| 17. Loperamide | 41. Warfarin | 68. Hydrogen peroxide |
| 18. Domperidone | 42. Clopidogrel | 69. Potassium permanganate |
| 19. Drotaverine
hydrochloride | 43. Alteplase | 70. Iodine solution |
| 20. Hydrochlorothiazide | 44. Lisinopril | 71. Chlorhexidine |
| 21. Indapamide | 45. Ramipril | 72. Cotrimoxazole |
| 22. Furosemide | 46. Enalapril | 73. Ciprofloxacin |
| 23. Spironolactone | 47. Captopril | 74. Levofloxacin |
| 24. Eplerenone | 48. Losartan | 75. Ofloxacin |
| | 49. Valsartan | 76. Nitrofurantoin |
| | 50. Amlodipine | 77. Nifuroxazide |
| | 51. Verapamil | 78. Linezolid |

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|-----------------------------------|------------------------|---|
| 79. Benzylpenicillin sodium salt | 92. Tetracycline | 108. Mebendazole |
| 80. Amoxicillin | 93. Doxycycline | 109. Albendazole |
| 81. Amoxicillin / clavulanic acid | 94. Chloramphenicol | 110. Unithiol |
| 82. Ceftazidime | 95. Gentamicin sulfate | 111. Potassium/ Magnesium Asparagine |
| 83. Ceftriaxone | 96. Amikacin sulfate | 112. Gelatin solution for infusions |
| 84. Cefuroxime | 97. Tobramycin | 113. Hydroxyethyl starch solution for infusions |
| 85. Cefazolin | 98. Vancomycin | 114. Dipyrroxime |
| 86. Cephalexin | 99. Fluconazole | 115. Methotrexate |
| 87. Meropenem | 100. Nystatin | 116. Cyclophosphamide |
| 88. Azithromycin | 101. Isoniazid | 117. Cisplatin |
| 89. Clarithromycin | 102. Rifampicin | 118. Paclitaxel |
| 90. Lincomycin hydrochloride | 103. Acyclovir | 119. Tamoxifen |
| 91. Clindamycin | 104. Oseltamivir | |
| | 105. Zidovudine | |
| | 106. Hingamine | |
| | 107. Metronidazole | |

5.2. The list of questions submitted for final control

BLOCK 1. MEDICAL PRESCRIPTION. GENERAL PHARMACOLOGY.

MEDICINES THAT AFFECT THE NERVOUS SYSTEM AND MOTION

Section I. Medical prescription. General pharmacology

1. The concept of medical prescription. Define the terms: drug substance, drug, dosage form, drug.
2. Recipe. General rules for prescribing, forms of prescription forms. Rules for prescribing medicines containing potent, poisonous and narcotic substances.
3. Dosage forms. Types of dosage forms, features of manufacture and prescription. Requirements for injectable dosage forms.
4. Basic principles and methods of testing new drugs. Preclinical and clinical studies (phases I - IV). The concept of placebo. Functions of the State Pharmacological Center of the Ministry of Health of Ukraine. Law of Ukraine "On Medicinal Products".
5. The concept of pharmacokinetics of drugs. Ways of introduction and removal of drugs from the body, features of absorption and distribution in the body, the main types of biotransformation.
6. Age features of pharmacokinetics. The concept of basic pharmacokinetic parameters (absorption rate constant, half-life, steady-state concentration, drug clearance).
7. Pharmacodynamics of drugs. Definition of the concept of dose, types of doses.
8. The concept of receptors (agonists, antagonists). Types, types and methods of action of drugs.
9. Dependence of pharmacological effect on the properties of drugs (chemical structure, physicochemical properties, their doses and frequency of application).
10. Dependence of the pharmacological effect on the age and sex of the patient. Features of the child's body's response to the drug. Principles of drug dosing for children and the elderly.
11. The value of climatic and anthropogenic factors for the pharmacological action of the drug. Dependence of action of drugs on physiological features of an organism and pathological conditions.
12. Features of action of medicines at their repeated use. The concept of material and functional accumulation, tolerance or habituation, mental and physical dependence. The concept of withdrawal and return syndromes. Combined action of drugs (synergism and antagonism).
13. The concept of drug safety. Side effects of drugs. Types of side effects. Intolerance. Idiosyncrasy. Allergic reactions. Mutagenicity, teratogenicity, embryotoxicity, fetotoxicity, carcinogenicity.

Section 2. Drugs that affect the peripheral nervous system

14. Principles of classification of drugs that affect the autonomic nervous system. Principles of classification of drugs that affect the cholinergic nervous system. M- and H-cholinomimetic drugs.
15. Principles of classification of anticholinesterase drugs. Mechanism of action, pharmacological effects, indications for use, side effects. Features of action of organophosphorus compounds. Acute organic phosphate compounds poisoning and relief. Pharmacology of organic phosphate compounds reactivators.
16. Principles of classification and pharmacological characteristics of M-cholinomimetics. Influence on organs and systems. Indications for use. Acute muscarine poisoning. Relief measures, antidote therapy.
17. Drugs that affect H-cholinoreceptors. Pharmacological effects of nicotine. Smoking as a medical and social problem. Medicines used to combat smoking.

18. Principles of classification of M-cholinoblocking drugs. Pharmacological characteristics of atropine sulfate. Indications for use. Acute poisoning by atropine and atropine-containing plants. Relief measures.

19. General characteristics of H-cholinoblockers. Classification of ganglioblockers. Mechanism of action. Pharmacological effects, indications for use, side effects. Principles of classification of muscle relaxants. Pharmacokinetics, pharmacodynamics of tubacurarine chloride. Indications for use, side effects.

20. Principles of classification of drugs that affect adrenergic innervation. Pharmacological characteristics of adrenomimetics. Pharmacokinetics, pharmacodynamics of adrenaline hydrochloride. Indications for use. Comparative characteristics of adrenomimetics. Side effect.

21. Principles of classification of antiadrenergic drugs. Features of α -blockers, mechanism of action and indications for use. Pharmacological effects of β -blockers. Comparative characteristics of drugs. The concept of internal sympathomimetic activity.

Section 3. Drugs that affect the function of the central nervous system. Psychotropic drugs.

22. Principles of classification of local anesthetics, mechanism of action, comparative characteristics of drugs. Indications for use, side effects.

23. Pharmacology of astringent drugs. Mechanism of action, indications for use. Pharmacological characteristics of drugs.

24. General characteristics of enveloping drugs. Mechanism of action, indications for the use of drugs. Principles of classification of adsorbents. Mechanism of action. Indications for use. Coal preparations and synthetic sorbents.

25. Principles of classification of drugs for anesthesia. History of the discovery of drugs for anesthesia. See anesthesia. Requirements for anesthetics. Theories of anesthesia.

26. Principles of classification of drugs for inhalation anesthesia. Comparative characteristics of drugs, side effects. Combined use of anesthetics with drugs of other pharmacological groups.

27. Principles of classification of drugs for non-inhalation anesthesia. Comparative characteristics of drugs. The concept of premedication, introductory, basic, combined anesthesia.

28. Pharmacology and toxicology of ethyl alcohol, use in clinical practice. Acute and chronic alcohol poisoning, relief measures. The principle of treatment of alcoholism.

29. Opiate analgesics. Classification by chemical structure, origin and affinity for opiate receptors. Mechanism of action. Pharmacology of morphine hydrochloride. Features of the drug on the CNS. Comparative characteristics of opiate analgesics. Indications for use. Side effects.

30. Acute poisoning by opiate analgesics. Clinical manifestations and measures of care.

31. Drug dependence arising from opiate analgesics, clinical manifestations. The concept of withdrawal syndrome, methods of treatment.

32. Non-opiate analgesics. Principles of classification, general characteristics of the group. Mechanisms of action. Pharmacological characteristics of drugs. Comparative characteristics of non-opiate analgesic drugs, side effects.

33. Principles of classification of psychotropic drugs. General characteristics. Neuroleptics. Principles of classification. The mechanism of antipsychotic action of neuroleptics.

34. Comparative characteristics of neuroleptics, indications for use, side effects of neuroleptics. Combined use with drugs of other pharmacological groups. The concept of neuroleptanalgesia.

35. Pharmacology of tranquilizers. Classification. The mechanism of tranquilizing action, the concept of benzodiazepine receptors. Comparative characteristics of tranquilizer drugs.

36. Indications and contraindications to the use of tranquilizers, side effects. Drug dependence. Combined use of tranquilizers with drugs of other pharmacological groups. The concept of ataralgia.

37. Principles of classification of hypnotics. General characteristics of hypnotics, possible mechanisms of action. Comparative characteristics of hypnotics of different groups. Indications for use, side effects. Acute barbiturate poisoning, relief measures.

38. Principles of classification of sedatives. Pharmacology of bromides. Indications for use. Side effects. Bromism - clinical signs, treatment and prevention. Sedative drugs of plant origin.

39. Pharmacology of normothymics. Pharmacokinetics and pharmacodynamics, indications for use. Side effects. Acute lithium poisoning.

40. Antiepileptic drugs. Principles of classification, comparative characteristics, side effects of antiepileptic drugs.

41. Antiparkinsonian drugs. Classification. Basic mechanisms of action. Use in clinical practice.

42. Psychomotor stimulants. General characteristics of the group of psychostimulants. Caffeine sodium benzoate. Pharmacokinetics and pharmacodynamics, indications for use, side effects.

43. Pharmacology of antidepressants. Classification of antidepressants by mechanism of action and chemical structure. Comparison. Side effects of antidepressants.

44. Classification of nootropic drugs. Possible mechanisms of action. Indications for use. Pharmacological characteristics of drugs.

45. Adaptogens and actoprotectors. Indications for use. The main properties of drugs, comparative characteristics.

Section 4. Drugs that affect metabolism

46. Hormonal drugs of the hypothalamus and pituitary gland. The mechanism of action of corticotropin, indications for use, side effects. Synthetic analogues of corticotropin.

47. Pharmacological characteristics of gonadotropic hormonal drugs. Pharmacodynamics of drugs of the posterior pituitary gland. Indications for use.

48. Pharmacology of hormonal drugs of the thyroid gland. Antithyroid drugs. Indications and contraindications to use, side effects.

49. Hypoglycemic drugs. Classification of hypoglycemic agents. Pharmacokinetics, pharmacodynamics, indications and contraindications to insulin. Side effect. Features of use in hyperglycemic coma.

50. Insulin overdose, help with hypoglycemic coma. Prolonged-acting insulin preparations.

51. Synthetic antidiabetic drugs. Classification, mechanism of action, indications for use. Comparative characteristics, side effects.

52. Hormonal preparations of glucocorticoids. Pharmacological effects, indications, contraindications to use, dosage regimen. Comparison. Side effects of glucocorticoids.

53. Sex hormones. Classification of sex hormones. General characteristics of female sex hormones.

54. Mechanism of action and indications for the use of estrogens, antiestrogenic drugs, progestogens, antigestagens.

55. Contraceptive drugs. Classification, principles of combination, indications and contraindications for use, side effects. Comparative characteristics of contraceptives.

56. Preparations of male sex hormones. Pharmacological characteristics. Indications for use, side effects. Androgen hormone antagonists.

57. Antiallergic drugs. Classification and general characteristics of antiallergic drugs.

58. Drugs used in immediate-type hypersensitivity. Pharmacology of antihistamines – blockers of histamine H₁-receptors (diphenhydramine, suprastin, fencarol, diazoline, loratadine, diprazine, desloratidine).

59. Principles of care for anaphylactic shock. Drugs used in delayed-type hypersensitivity. Indications for the use of cromolyn sodium, ketotifen.

60. Pharmacology of immunosuppressants (cytostatic drugs, glucocorticoids).

61. Drugs that affect immunity. Classification of immune stimulants.

62. Pharmacology of thymus preparations (thymalin), leukopoiesis stimulants (sodium nucleinate, methyluracil), interferons and vaccines.

63. Immunosuppressive drugs (antimetabolites, alkylating compounds, glucocorticoids, enzyme preparations). Indications for use, side effects.

64. Pharmacotherapy with vitamin preparations and its types. Classification of vitamin preparations by solubility and biological role.

65. Characteristics of water-soluble vitamin preparations. Indications for use, side effects. The concept of bioflavonoids, coenzyme preparations.

66. General characteristics of fat-soluble vitamin preparations. Indications and contraindications to use. Side effects of fat-soluble vitamin preparations.

67. Multivitamin preparations. The concept of antivitamin.

68. Pharmacological characteristics of enzyme and anti-enzyme drugs. Mechanism of action and indications for the use of peptidases, proteases, nucleases, hyaluronidase drugs and enzyme inhibitors.

69. Pharmacological characteristics of macro- and microelement preparations. Sodium preparations. Pharmacodynamics and indications for use. Potassium preparations. Pharmacodynamics, indications for use.

70. Pharmacological characteristics of macro- and microelement preparations. Magnesium preparations. Pharmacokinetics, pharmacodynamics. Dependence of the effect on the route of administration. Indications for use. Calcium preparations. Pharmacological effects, indications for use, routes of administration.

BLOCK 2. MEDICINES AFFECTING THE FUNCTIONS OF EXECUTIVE BODIES AND SYSTEMS. CHEMOTHERAPEUTIC MEDICINES. ANTIDOTES

Section 5. Drugs affecting the respiratory system, gastrointestinal tract, renal function and reproductive processes

1. Antitussive drugs. Classification, characteristics of drugs. Side effect.

2. expectorants. Classification. Pharmacokinetics and pharmacodynamics, side effects of expectorants.

3. Stimulators of surfactant synthesis. General characteristics of stimulants of surfactant synthesis.

4. Classification of bronchodilators. General characteristics of drugs.

5. Medicines used for pulmonary edema. Tactics of care for pulmonary edema, the choice of drugs.

6. Classification of drugs that affect appetite. General pharmacological characteristics of drugs.

7. Vomiting drugs. Mechanism of action, and features of application. Pharmacological characteristics of antiemetics. Indications for use, side effects.

8. Classification of drugs used in disorders of the gastric glands. General pharmacological characteristics of drugs that stimulate the secretion of gastric glands and are used for diagnosis and replacement therapy.

9. Classification and general pharmacological characteristics of drugs that inhibit the secretion of gastric glands. Pharmacological treatments for gastric ulcer, duodenal ulcer and hyperacid gastritis.

10. Pharmacological characteristics of histamine H₂-receptor blockers, M-cholinoblockers and proton pump blockers. The concept of gastroprotectors. General pharmacological characteristics of drugs.

11. Drugs that affect the excretory function of the pancreas. Indications for use.

12. Cholagogues. Classification. General characteristics . Indications for use.

13. Hepatoprotectors and cholelitholytic drugs. Indications for use.

14. Classification of laxatives. Pharmacokinetics, pharmacodynamics of drugs, indications for use. General characteristics of antidiarrheal agents.

15. Classification of diuretics. Pharmacokinetics and pharmacodynamics, indications for use, side effects.

16. Classification of anti-gout drugs. General characteristics of drugs, side effects.

17. Classification and pharmacological characteristics of drugs that affect the activity of the myometrium (uterotonics, tocolytics).

18. Pharmacological characteristics of drugs that affect reproductive processes.

Section 6. Drugs that affect the functions of the blood and cardiovascular system

19. Classification of drugs that affect hematopoiesis and hemostasis.

20. Drugs that stimulate erythropoiesis. Pharmacokinetics, pharmacodynamics, indications for use, side effects.

21. Drugs that affect leukopoiesis. The mechanism of action of leukopoiesis stimulants. Indications for use. Drugs that suppress leukopoiesis. Indications for use, side effects.

22. Classification of drugs used for the prevention and treatment of thrombosis. General characteristics. Classification of anticoagulants. Pharmacokinetics, pharmacodynamics of drugs, indications and contraindications for use. Side effect.

23. General characteristics of fibrinolytic drugs. Indications for use. Side effect.

24. Classification of coagulants. Pharmacokinetics, pharmacodynamics, indications for the use of coagulant drugs.

25. Plasma replacement fluids. General characteristics of plasma substitutes. Pharmacodynamics and indications for use.

26. Classification of enzyme preparations. Mechanism of action and indications for use. Combined enzyme preparations. Indications for their use.

27. General characteristics of enzyme inhibitors. Classification. Indications and contraindications to use.

28. Modern clinical classification of antihypertensive drugs. Pharmacological characteristics of antihypertensive drugs of the main and additional groups.

29. Principles of combination of antihypertensive drugs. Comparative pharmacological characteristics of these groups, the rate of development of the antihypertensive effect.

30. Medical care for hypertensive crisis.

31. Hypolipidemic drugs. General pharmacological characteristics of lipid-lowering drugs, direction of action.

32. The concept of angioprotectors. Pharmacokinetics and pharmacodynamics of drugs.

33. Classification of antiarrhythmic drugs. Pharmacological characteristics. antiarrhythmic drugs. Comparative characteristics, indications for the use of antiarrhythmic drugs.

34. Classification of cardiotoxic drugs. Pharmacokinetics and pharmacodynamics, indications and contraindications to the use of cardiac glycosides. Side effects of cardiac glycosides. Acute and chronic cardiac glycoside poisoning, care and prevention.

35. Pharmacological characteristics of non-glycosidic cardiotoxic drugs. Indications for use.

36. Classification and general pharmacological characteristics of antianginal drugs. Pharmacokinetics and pharmacodynamics of nitroglycerin, side effects.

37. Mechanism of action and characteristics of calcium channel blockers (calcium antagonists). Pharmacological characteristics of drugs. Features of use in the treatment of patients with coronary heart disease β -blockers.

38. Vasodilators of myotropic action, reflex type of action and energy-supplying means. Indications and contraindications to use, side effects.

39. Principles of complex therapy of myocardial infarction. General characteristics of pharmacological groups.

Section 7. Antimicrobial, antiviral, antifungal, antiparasitic, antiprotozoal and antitumor drugs

40. Requirements for modern antiseptics. Classification and pharmacological characteristics of antiseptic drugs.

41. Mechanism of action of halogens and halogen-containing compounds. Indications for use, side effects. Acute poisoning and relief measures.

42. Mechanism of action, indications for the use of oxidants. Comparative characteristics of drugs.

43. Preparations of acids, alkalis. Local and resorptive action of acids and alkalis. Antiseptic action of acid and alkali preparations. Indications for use. Acute poisoning by acids and alkalis. Relief measures.

44. Pharmacology of preparations of salts of heavy metals. Mechanism of action. Side effects of heavy metal salt preparations. Acute poisoning. Help with acute poisoning by salts of heavy metals, the principles of antidote therapy.

45. Pharmacology of antiseptics of aromatic series. The mechanism of action of drugs of the phenol group. Side effects. Acute phenol poisoning, help.

46. The mechanism of action of nitrofurans derivatives, indications and contraindications for use. Comparative characteristics of drugs.

47. The mechanism of antimicrobial action of dye preparations. Pharmacological characteristics of drugs. Indications for use.

48. Antiseptics - derivatives of the aliphatic series. Pharmacokinetics, pharmacodynamics of formaldehyde. Side effect.

49. Pharmacology of surfactants. Mechanism of action, indications for the use of detergents.

50. Sulfanilamide drugs. Classification. Pharmacokinetics and pharmacodynamics of sulfonamides. Indications for use. Side effects and ways to prevent it. Comparative characteristics of drugs. Combined preparations of sulfonamides.

51. Synthetic antimicrobial drugs. Quinoline derivatives. Classification, mechanism of action, indications for use, side effects. Characteristics of drugs. Peculiarity of fluoroquinolone derivatives application in medical practice.

52. The concept of antibiosis, antibiotics, the spectrum of antibiotics. Principles of antibiotic therapy.

53. Classifications of antibiotics by chemical structure, spectrum and mechanism of action.

54. Classification and pharmacological characteristics of penicillin antibiotics. Mechanism, spectrum and duration of action.

55. Classification and pharmacological characteristics of cephalosporin antibiotics. Mechanism and spectrum of action of drugs. Indications for use. Side effect.

56. Antibiotics of macrolides and azalides. General characteristics, mechanism and spectrum of action, indications for use, side effects.

58. Chloramphenicol antibiotics. Mechanism of action and spectrum of action, indications for use, side effects.

59. Pharmacology of aminoglycoside drugs, classification. Comparative characteristics, mechanism of action, indications and contraindications for use, side effects.

60. Antibiotics of the group of cyclic polypeptides. Mechanism and spectrum of action, indications for use, routes of administration, side effects.

61. Antifungal (antifungal) drugs. Classification.

62. Pharmacological characteristics of antibiotics of polyene structure and antifungal drugs of other groups. Indications for use, side effects.

63. Antiviral drugs. Classification.

64. Pharmacological characteristics of drugs prescribed to patients with influenza. Features of application.

65. Medicines used for herpes infection.

66. Possibilities of using antiviral drugs in the complex treatment of AIDS patients.

67. Classification of antisyphilitic drugs. General characteristics of antisyphilitic drugs.

68. Classification of drugs used to treat tuberculosis. Pharmacokinetics, pharmacodynamics of isonicotinic acid hydrazide derivatives. Side effects that occur with prolonged use and ways to prevent them.

69. Pharmacological characteristics of rifampicin. Features of long application. Pharmacological characteristics of anti-TB drugs of different chemical groups. Side effects.

70. Classification of antiprotozoal drugs. Antimalarial drugs. Basic principles of malaria prevention and treatment. Classification of antimalarial drugs. Mechanism of action.

71. Drugs used to treat trichomoniasis. Pharmacokinetics, pharmacodynamics of metronidazole. Indications for use and side effects.

72. Classification of anti-amoebic drugs. Pharmacological characteristics of drugs. Drugs for the treatment of patients with giardiasis.

73. Drugs used to treat patients with toxoplasmosis.

74. Anthelmintic drugs. Classification of anthelmintic drugs. Features of application at different types of helminthiasis.

75. Pharmacological characteristics of drugs used to treat intestinal helminthiasis. Drugs used in extraintestinal helminthiasis.

76. Antitumor (antiblastoma) drugs. Classification and general characteristics of antitumor drugs.

Section 8. Antidotes. Plasma substitutes and drugs for parenteral nutrition

77. Causes and symptoms of acute poisoning by drugs of different pharmacological groups. Methods of active detoxification.

78. The concept of antidotes. Types of antidote therapy. Pharmacological characteristics of the main antidotes.

79. Principles of symptomatic therapy of acute poisoning. Plasma replacement fluids. General characteristics of plasma substitutes. Pharmacodynamics and indications for use.

80. Basic principles of pharmacotherapy of acute emergencies. Preparations for parenteral nutrition.

TYPICAL PROBLEMS FOR SOLUTION

1. The patient was treated in the cardiology department for decompensated chronic heart failure. He was prescribed digitoxin at a dose of 0.0001 g from the first day of hospitalization, but he noticed improvement only a week later. The doctor explained the slow onset of the effect of the drug:

- A. Persistent binding of digitoxin to plasma proteins
- B. Insufficient dose of digitoxin
- C. Insufficient absorption of the drug in the intestine
- D. Increased diuresis
- E. Insufficient carbohydrates in the diet

2. The patient was prescribed drug A. After a few days, the effect of the drug decreased significantly and to obtain the initial effect, you need to increase the dose of the substance. Give the name of this type of drug change.

- A. Addiction
- B. Tachyphylaxis
- C. Drug dependence
- D. Cumulation
- E. Idiosyncrasy

3. After administration of the drug in the experimental animal decreased salivation, dilated pupils, and the subsequent injection of acetylcholine into a vein, the heart rate did not change significantly. Enter the name of this substance:

- A. Atropine
- B. Adrenaline
- C. Anaprilin
- D. Proserine

4. A patient with chronic bronchitis uses ephedrine for a long time. What is the mechanism of action of this drug?

- A. Stimulation of norepinephrine release into the synaptic cleft
- B. Blocking the release of norepinephrine into the synaptic cleft
- C. Stimulation of alpha-adrenoceptors
- D. Blockade of bronchial beta-adrenoceptors
- E. Direct effect on bronchial muscles

5. In a psychiatric clinic with long-term treatment, the patient developed symptoms of parkinsonism. What drug was administered to the patient

- A. Aminazine

- B. Mesapam
- C. Sodium bromide
- D. Lithium carbonate
- E. Nialamide

6. A patient under anesthesia for traumatic shock was injected under the skin with a solution of morphine hydrochloride. What is the mechanism of analgesic action of this drug?

- A. Interaction with opioid receptors
- B. Blockade of peripheral sensitive receptors
- C. Change in the emotional color of pain
- D. Violation of the conduction of impulses through the afferent nerves
- E. Inhibition of the formation of pain mediators in peripheral tissues

7. To prevent an attack of bronchial asthma, the doctor prescribed the patient sodium cromolyn. Which of the following mechanisms is characteristic of this tool?

- A. Stabilization of mast cell membranes
- B. Binding of free histamine
- C. Blockade of histamine receptors
- D. Decreased concentration of immunoglobulins
- E. Inactivation of histamine

5.3.1. Example of final control work on block 1

Variant № 0

1. Solving problems Krock-1 (50 points)

1. A patient with signs of organophosphorus insecticide poisoning was taken to the hospital's admission department. What drug should be used as a first aid kit?

- A. Glucose
- B. Aminazine
- C. Panangin
- D. Unithiol
- E. Alloxim

2. A 65-year-old man was admitted to the neurology department with a diagnosis of post-stroke syndrome. Which drug is most appropriate to prescribe to the patient to accelerate recovery?

- A. Isonitrosine.
- B. Ipratropium bromide
- C. Dipyroxime.
- D. Galantamine hydrochloride
- E. Aceclidine.

3. In order to restore breathing in carbon monoxide poisoning, an analeptic reflex agent from the group of H-cholinomimetics was administered to the patient. What remedy was prescribed?

- A. Atropine sulfate
- B. Lobelin hydrochloride
- C. Epinephrine hydrochloride
- D. Mezaton
- E. Pentamine

4. A patient with complaints of dry mouth, photophobia and visual disturbances was taken to the admission department. The skin is hyperemic, dry, dilated pupils, tachycardia. At the subsequent inspection the diagnosis was established: poisoning by alkaloids of the beauty. Which of the drugs should be used?

- A. Armin

- B. Diazepam
- C. Pilocarpine
- D. Proserine
- E. Alloxim.

5. A patient with glaucoma asked the pharmacist of the pharmacy to give her eye drops of atropine sulfate, but she was told that this drug should not be used. Why is atropine contraindicated in glaucoma?

- A. Causes accommodation paralysis.
- B. Increases intraocular pressure.
- C. Dilates the pupils.
- D. Reduces vision distance.
- E. Suppresses eye reflexes.

Total 50 questions.

2. Arrange the drugs according to the pharmacological group (5 points):

A. M-cholinomimetics -	1. Diazepam	A. -
B. Anticholinesterase drugs -	2. Pyridostigmine bromide	B. -
C. M-cholinoblockers -	3. Tiotropium bromide	C. -
D. α -adrenoblockers -	4. Nicergoline	D. -
E. β -adrenoblockers -	5. Norepinephrine hydrotartrate	E. -
F. α, β -adrenomimetic -	6. Acyclidine	F. -
G. α -adrenomimetic -	7. Amitriptyline	G. -
H. β -adrenomimetic -	8. Doxazosin	H. -
I. Muscle relaxants -	9. Tramadol	I. -
J. Neuroleptics -	10. Mercazolyl	J. -
K. Tranquilizers -	11. Dithiline	K. -
L. Antidepressants -	12. Haloperidol	L. -
M. Nootropic drugs -	13. Fenoterol	M. -
N. Narcotic analgesics	14. Atenolol	N. -
O. Antithyroid drugs -	15. Naphazoline	O. -

3. Дайте визначення (5 балів):

Pharmacokinetics is

Idiosyncrasy is

Stage 1 pharmacokinetics studies ...

4. Specify the pharmacodynamic effects of cholinoblockers (5 points).

5. Specify the side effects of narcotic analgesics (5 points).

6. Write in the form of a prescription (10 points):

1. Phenylephrine
2. Dobutamine
3. Salbutamol
4. Doxazosin
5. Propranolol

5.3.2. Example of final control work on block 2

Variant № 0

1. Solving problems Krock-1

1. The patient has rheumatism with frequent exacerbations. What antibiotic should be taken to prevent the disease?

- A. Bicillin-5
- B. Streptomycin sulfate
- C. Isoniazid
- D. PASA
- E. Rifampicin

2. A patient with a diagnosis of streptococcal pneumonia is prescribed a drug from the group of semi-synthetic penicillins. What is this drug?

- A. Ampicillin
- B. Gentamicin sulfate
- C. Benzylpenicillin sodium salt
- D. Erythromycin
- E. Tetracycline

3. The patient has coronary thrombosis. It is necessary to introduce a drug that restores their patency. Which of the following substances has the necessary properties?

- A. Pentoxifylline
- B. Heparin
- C. Phenylin
- D. Streptokinase
- E. Acetylsalicylic acid

4. A pregnant woman's blood test revealed megaloblasts and a high color index. Diagnosed with megaloblastic anemia. What remedy should be prescribed to the patient?

- A. Cyanocobalamin
- B. Pyridoxine
- C. Ascorbic acid
- D. Nicotinic acid
- E. Coamide

5. The patient should be prescribed a sulfonamide drug, which should be the most resistant to acetylation in the body.

- A. Sulfapyridazine
- B. Sulfadimezin
- C. Norsulfazole
- D. Urosulfan
- E. Sulfadimethoxine

Total 20 questions.

2. Write in the form of a prescription (10 points:

- 1. Pancreatin
- 2. Aprotinin
- 3. Isosorbide dinitrate
- 4. Atorvastatin
- 5. Acyclovir

5.3.3. "0" version of the exam ticket (final control of the course material)

Petro Mohyla Black Sea National University
Medical institute

Department of pharmacy, pharmacology, medical, bioorganic and biological chemistry

Level of higher education: Master

Field of knowledge: 22 "Health"

Specialty: 222 "Medicine"

Discipline: "Pharmacology"

EXAMINATION QUESTION № 0

Write as a prescription:

1. Nifedipine (phenygidine) (4 points)
2. Atropine sulfate (4 points)
3. Naloxone (4 points)
4. Libexin (4 points)
5. Rifampicin (4 points)

Explain the questions:

1. Principles of classification of drugs that affect the cholinergic nervous system. M- and H-cholinomimetic drugs. (15 points).
2. The mechanism of action of corticotropin, indications for use, side effects. Synthetic analogues of corticotropin. (15 points).
3. Tetracycline antibiotics. Pharmacokinetics, mechanism and spectrum of action, indications and contraindications for use, side effects and their prevention. (15 points).
4. Causes and symptoms of acute poisoning by drugs of different pharmacological groups. Methods of active detoxification. (15 points)

Approved at the meeting of the Department of Pharmacy, Pharmacology, Medical, Bioorganic and Biological Chemistry, protocol №__ of _____, 20__.

Head of the Department
The teacher who carries out
knowledge control

_____ **Ogloblina M.V.**

_____ **Larycheva O.M.**

6. Evaluation criteria and tools for diagnosing learning outcomes

Current control is carried out at each practical lesson in accordance with the specific objectives of each topic.

Students' learning activities are monitored in practical classes during the current control in accordance with specific goals and during the individual work of the teacher with the student. When assessing students' learning activities, it is necessary to give preference to standardized methods of control: testing, structured written work, structured according to the procedure of control of practical skills in conditions close to real ones.

The following means of diagnosing the level of preparation of students are used: tests, solving situational problems, prescribing, determining the affiliation of drugs to the pharmacological group according to the international classification, possible indicators for use.

The student can work out the missed topics or reassign them to a positive assessment of the teacher during his consultations (individual work with students), thus gaining a number of points not less than the minimum to be admitted to the final module control.

The control of students' independent work, which is provided in the topic along with the classroom work, is carried out during the current control of the topic in the relevant classroom. Topics that are submitted only for independent work and are not included in the topics of classroom classes are controlled during the final test and exam.

The final test is carried out at the end of the study of all topics of the block at the last test of the semester.

Intermediate final control (certification) and final control (exam) are allowed to students who have attended all the lectures provided by the curriculum, classroom classes, performed in full independent work and in the process of training they scored the number of points, not less than the minimum – **70 points**.

6.1. Distribution of points received by students

In the autumn semester, a positive assessment in each practical session can be from 4 to 8 points. A score below 4 points means “unsatisfactory”, the lesson is not credited and is subject to practice in the prescribed manner. At the final test for block 1, the student can get a maximum of 80 points. The final test is considered credited if the student scored at least 50 points.

In the spring semester, a positive assessment in a practical session can be from 4 to 8 points. A score below 4 points means “unsatisfactory”, the lesson is not credited and is subject to practice in the prescribed manner. At the final test for block 2, the student can get a maximum of 30 points. The final test is considered credited if the student scored at least 20 points.

6.2. Assessment of student performance

Type of activity (task)	Maximum number of points
Block 1	
Topic 1	8
Topic 2	8
Topic 3	8
Topic 4	8
Topic 5	8
Topic 6	8
Topic 7	8
Topic 8	8
Topic 9	8
Topic 10	8
Topic 11	8
Topic 12	8

Topic 13	8
Topic 14	8
Topic 15	8
Total for block 1	120
Final control work on blocks 1 (certification)	80
Total for block 1	200
Block 2	
Topic 1	8
Topic 2	8
Topic 3	8
Topic 4	8
Topic 5	8
Topic 6	8
Topic 7	8
Topic 8	8
Topic 9	8
Topic 10	8
Total	80
Individual tasks	10
Final control work on block 2 (certification)	30
Total for block 2	120
Exam	80
Total for block 2 and exam	200

CRITERIA FOR EVALUATION OF A PRACTICAL LESSON IN THE DISCIPLINE “PHARMACOLOGY”

1. The maximum number of points for a practical lesson – **8 points**.
2. The student must come with a completed written homework (extracurricular student work) in the form of a protocol (incoming knowledge control). Completed written task – **1 point**; partially fulfilled – **0.5 points**, not fulfilled – **0 points**.
3. Knowledge control (written form), duration 15 minutes:
 - 1) The correct answer to the test tasks (type Krock-1) **0-3 points**, a total of 10 tasks.
 - 2) Practical skills in prescribing medicines by their group affiliation (2 prescriptions) **0-2 points**, **1 point** for each correctly written prescription, **0.5 points** – in case of incomplete answer, **0 points** – in the absence answers.

Total for written control $4 + 3 = 7$ points
4. During the main stage of the lesson the student must take an active part in the discussion of the topic of the practical lesson. Answer questions, supplement the answers of other students (intermediate control of knowledge).
5. Performing individual work on the topic of practical training (presentation of the latest drugs, translation into English of information about drugs, writing an abstract and report on the lesson, participation in writing an article, research work, staging an educational experiment, participation in filming film). Additionally, the student can receive from 1 to 10 points per semester (in the 2nd semester).

The total number of points for a practical lesson is $1 + 7 = 8$ points.

6.3. Criteria for assessing knowledge

Score 8 points, 71-80 points in the final test in the autumn semester (28-30 points in the spring semester and an additional 10 points for individual work) and 71-80 points in the exam on the ECTS scale and 5 on the national scale) the student's answer is evaluated if it demonstrates a deep knowledge of all theoretical principles and the ability to apply theoretical material for practical analysis and has no inaccuracies.

Score of 6-7 points, 61-70 points in the final test in the autumn semester (25-27 points for the final test in the spring semester and an additional 8 points for individual work) and 61-70 points on the exam (B and C on the ECTS scale and 4 on the national scale) the answer is evaluated if it shows knowledge of all theoretical principles, the ability to apply them in practice, but some fundamental inaccuracies are allowed.

Score 4-5 points, 50-60 points in the final test in the fall semester (20-24 points in the final test in the spring semester and an additional 6 points for individual work) and 50-60 points on the exam (D and E on the ECTS scale and 3 on the national scale) the student's answer is evaluated provided that he knows the main theoretical provisions and can use them in practice.

7. Recommended sources of information

7.1. Main:

1. Pharmacology : textbook for English-speaking Students of the Higher Medical Education institutions in Ministry of Health of Ukraine = Фармакологія : підручник для англ. студ. мед. закладів вищої освіти : [англ. мовою] / I. B. Samura, I. F. Belenichev, A. V. Nerush ; Zaporizhzhia State Medical University. – Vinnytsia : Nova Knyha, 2020. – 362 p.

7.2. Additional:

1. Pharmacology – Cito! : Textbook // Edited by S.M. Drogovoz. - Kharkiv, 2016. – 192 p.
2. Pharmacology at your palms: reference book / Drogovoz S.M., Kutsenko T.A. – Kharkiv: NphaU, 2016. – 80 p.
3. Pharmacology : textbook for students of medical higher educational institutions [of the 4th level of accreditation with english as the language of instruction] / V. M. Bobyrov, T. O. Devyatkina, O. M. Vazhnicha, V. M. Khristyuk ; The ministry of public health care of Ukraine, UMSA. - 3rd. ed.,updat. Vinnytsya : Nova Knyha, 2015. 517 p.
4. Stefanov O., Kucher V. Pharmacology with general prescription: text-book for English-speaking students, 2nd edition. – K., 2007. – 318 p.
5. Ganziy T.V. Study Guide to Basic Pharmacology. – Kharkiv: Fakt, 2005. –264 p.
6. Firdaus M. Review of Pharmacology, 7th edition. – Karachi:Riaz Medical Publishers, 2007.– 190 p.
7. Katzung B.G. Basic and Clinical Pharmacology, 9th edition. – New-York: Lange, 2004. – 1202 p.
8. Laurence D.R., Bennet P.N., Brown M.G. Clinical Pharmacology, 8th edition. – London: Churchill Livingstone Elsevier, 1998. –710 p.
9. Lippincott’s Illustrated Reviews: Pharmacology, 4th Edition / Ed.: R.Finkel, M.A. Clark, L.X. Cubeddu. –Lippincott Williams Wilkins, 2008. – 560 p.
10. Lullman H, Albrcht Z., Klaus M, Detlef B. Color Atlas of Pharmacology.– Stuttgart – New-York: Thieme, 2000. – 386 p.
11. Rang H.P., Dale M.M., Ritter J.M., Moore P.K. Rang’s and Dale’s Pharmacology, 6th edition. – London: Churchill-Livingstone Elsevier, 2007. – 830 p.
12. Stringer J.L. Basic Concepts in Pharmacology. A students survival guide, 2nd edition. – McGrawHill International Edition, 2001. – 286 p.

7.3. Information resources:

<https://compendium.com.ua/> - directiry of medicines №1 in Ukraine
<https://moodle3.chmnu.edu.ua/>

**LIST OF DRUGS RECOMMENDED FOR STUDY TO TAKE THE LICENSE EXAM
KROCK-1**

- | | | |
|---|---|---------------------------------------|
| 1. Lidocaine | 38. Ambroxol | 74. Pyridoxine |
| 2. Ultracaine | 39. Acetylcysteine | 75. Ascorbic acid |
| 3. Atropine sulfate | 40. Glaucine | 76. Tocopherol acetate |
| 4. Neostigmine methyl sulfate (Prozerin) | 41. Digoxin | 77. Ergocalciferol |
| 5. Pilocarpine hydrochloride | 42. Dobutamine | 78. Levothyroxine |
| 6. Suxamethonium (Diti-lin) | 43. Korglikon | 79. Insulin |
| 7. Tiotropium bromide | 44. Glycerol trinitrate (Nitroglycerin) | 80. Glibenclamide |
| 8. Adrenaline hydrochloride (Epinephrine hydrochloride) | 45. Verapamil | 81. Metformin |
| 9. Phenylephrine (Mezaton) | 46. Amiodarone | 82. Prednisolone |
| 10. Salbutamol | 47. Lisinopril | 83. Fluticasone |
| 11. Doxazosin | 48. Enalapril | 84. Pancreatin |
| 12. Propranolol (Anaprilin) | 49. Magnesium sulfate | 85. Aprotinin (Contrikal) |
| 13. Metoprolol | 50. Atorvastatin | 86. Diphenhydramine (Diphenhydramine) |
| 14. Reserpine | 51. Amlodipine | 87. Loratadine |
| 15. Ketamine | 52. Losartan | 88. Iodine solution |
| 16. Morphine hydrochloride | 53. Famotidine | 89. Chlorhexidine |
| 17. Trimeperidine (Pomedol) | 54. Omeprazole | 90. Potassium permanganate |
| 18. Fentanyl | 55. Loperamide | 91. Unithiol |
| 19. Naloxone | 56. Drotaverine | 92. Benzylpenicillin sodium salt |
| 20. Acetylsalicylic acid | 57. Sodium picosulfate (Regulax, Gutta-percha) | 93. Amoxicillin + clavulanic acid |
| 21. Diclofenac sodium | 58. Aluminum / magnesium hydrochloride (Almagel) | 94. Doxycycline |
| 22. Paracetamol | 59. Bisacodyl | 95. Azithromycin |
| 23. Celecoxib | 60. Hydrochlorothiazide | 96. Ciprofloxacin |
| 24. Meloxicam | 61. Furosemide | 97. Lincomycin hydrochloride |
| 25. Chlorpromazine (Aminazine) | 62. Spironolactone | 98. Fluconazole |
| 26. Droperidol | 63. Potassium and magnesium asparagine (Asparkam) | 99. Isoniazid |
| 27. Diazepam | 64. Allopurinol | 100. Rifampicin |
| 28. Nitrazepam | 65. Oxytocin | 101. Interferon α |
| 29. Doxylamine (Donormil) | 66. Iron polymaltose | 102. Acyclovir |
| 30. Phenobarbital | 67. Heparin | 103. Hingamine |
| 31. Sodium valproate | 68. Warfarin | 104. Metronidazole |
| 32. Levodopa + Carbidopa | 69. Menadione (Vikasol) | 105. Mebendazole |
| 33. Lamotrigine | 70. Calcium chloride | 106. Albendazole |
| 34. Caffeine benzoate | 71. Clopidogrel | 107. Methotrexate |
| 35. Piracetam | 72. Cyanocobalamin | 108. Tamoxifen |
| 36. Amitriptyline | 73. Retinol acetate | |
| 37. Fluoxetine | | |