APPROVED
by the decision of the Academic Council of the USU
Institute of Medicine, Ecology and Physical Culture
«22» June 2020, № 10/220
Chairman _____ Midlenko V. I.
«22» June 2020

EDUCATIONAL PLAN

Subject:	Pharmacology
Faculty	Medical faculty
Course	3
Department	Department of General and clinical pharmacology with Microbiology course

Speciality: **31.05.01. «General medicine»**
Specialization: **Management of pharmaceutical activities**
Form of education: **Full-time education**

Date of introducing in the instruction process at USU: « 1 » of September 2020.
The program was updated at the meeting of the department: №11 of 27.05. 20 21.
The program was updated at the meeting of the department: №10 of 27.05. 20 22.
The program was updated at the meeting of the department: №__ of ___ 20___.
The program was updated at the meeting of the department: №__ of ___ 20___.

Information about the authors:

Initials	Abbreviation of the department	Degree, scientific rank
Mazurova O. V.	Department of General and clinical pharmacology with Microbiology course	Associate professor
Sapozhnikov A.N.		Senior lecturer

AGREED	AGREED
Head of the department of General and clinical pharmacology with Microbiology course	Head of the department of Hospital therapy
/ Markevich M.P. «_____»_____20_____г.	/ Vize-Khripunova M.A. «_____»_____20_____г.

1. The purpose and objectives of the development of the discipline:

The purpose of the development of discipline "Pharmacology" - teaching students the basic laws of pharmacological regulation of functions of living systems (cell, tissue, organ, physiological system, body) with the help of certain pharmacological groups of drugs based on the assimilation of data on pharmacodynamics and pharmacokinetics, the study of drugs in pharmacological groups and the ability to prescribe drugs in prescriptions for certain pathological conditions to obtain skills of application of the to know obtained by the future doctor

Course objectives:

1) to teach students the development of General principles of design of the recipes and preparation of prescription prescription.
2) to teach students to write in the recipes of various dosage forms.
3) teach students to prescribe drugs in prescriptions for certain conditions, based on the characteristics of the pharmacokinetics and pharmacodynamics of drugs.
4) to familiarize students with the effect of drugs on the totality of their pharmacological effects, mechanism of localization of action and pharmacokinetics.
5) to teach students to evaluate the possibility of using drugs for purposes of drug therapy on the basis of assumptions about their properties.

2. PLACE OF DISCIPLINE IN THE STRUCTURE:

Discipline "Pharmacology" (B1.B 21) is referred to professional cycle of specialty «General medicine», studied in the 3rd year 5 and 6 semesters. Discipline is mastered in English. The development of the discipline is based on the to know and skills formed by previous disciplines and practices:

History of medicine: to know: prominent medicine recreates a significant range of highly effective drugs to treat most diseases; skills: to analyse and assess the contribution of prominent national figures in medicine and pharmacology in the treatment and prevention of various diseases; skills: proficient tool for education of patriotism and civil responsibility in terms of treatment.

Bioethics: to know: the doctrine of health, the choice of drugs including innovative, rules and principles of selection of original and generic drugs, the rights of the patient and the doctor; skills: to protect the civil rights of doctors and patients; skills: moral and ethical reasoning;

Psychology and pedagogy: to know: the connection between psychology and pharmacology found expression in the term psychopharmacology, a section of pharmacology that

studies substances that act particularly clearly on the psyche of the child, the mechanism of their action on the nervous system and through it on the psyche. It is obvious that in some direction this problem can be considered as part of medical psychology, studying the relationship of somatics and psyche, individual characteristics of the psyche depending on age; skills: build and maintain working relationships with other members of the team and patients; skills: public speaking, conducting discussions and round tables, skills of informing patients in accordance with the requirements of the rules of "informed consent»;

Latin: to know: necessary to understand General medical and pharmaceutical terminology, prescriptions for medicines; skills: necessary to understand the grammatical structure of recipes and its individual components; skills: necessary to read and write the Latin part of a typical recipe;

Physics, mathematics: to know: the basic principles of computer science, mathematical analysis of the results; skills: use computer technology in the educational process; skills: working with electrical appliances, magnifying equipment, use of Internet resources.

Medical Informatics: to know: biomedical information (data, their storage, transmission and processing, use to solve problems or make decisions), as well as patterns and methods of obtaining, storing, processing and using to know in medical science and practice in order to expand the horizons and possibilities of to know, prevention and treatment of diseases to improve the health of patients; skills: contrasting views of empirical research and the results of scientific research on the Internet for professional activities; statistical processing of experimental data.

Chemistry, biochemistry: to know: structures of organic and inorganic compounds and components of biological systems, functional groups of basic chemical compounds, typical chemical reactions; skills: correct assessment of integrative indicators of homeostasis, possible interaction of chemical compounds in the mixture; skills: calculation and preparation of solutions of different concentrations.

Biology: to know: basic laws of genetics, structure and functional features of cells under normal conditions, mechanisms of cell differentiation of various morphofunctional organization, apoptosis and necrosis; biology of helminths and protozoa; skills: use the laws of genetics, as well as to know of typical reactions of cells to damage in the assessment of hereditary and acquired forms of pathology, including the individual- specific features of response to drugs, assessment of violations of the structure and function of cells.

Human anatomy: to know: about the structure of the body, the structural relationship of individual organs and systems; skills: relate the topography of internal organs with the projection on

the surface of the human body in a clinical study of the patient; skills: determine the projection of internal organs on the surface of the patient's body.

Histology, embryology, Cytology: to know: basic data for the development of new and improvement of known routes of administration of drugs, to know of microstructures makes it possible to study the pharmacodynamics and mechanism of action of drugs at the molecular, subcellular, cellular, tissue, organ and organism levels; ability: to analyze the interaction of drugs with cells in tissue systems; skills: to analyze the molecular mechanisms of interaction of drugs with cells and tissues.

Normal physiology: to know: basics of the structure and functioning of organs, functional systems of the body, their regulation and self-regulation under the influence of the external environment in the norm; skills: evaluation of blood analysis, immune status, hemostasis and fibrinolysis, hormonal balance, functional state of the heart (ECG), the state of hemostasis and fibrinolysis in accordance with the generally accepted integrative indicators of the norm; skills: interpretation of the results of normal instrumental and laboratory methods.

Microbiology: to know: biology of pathogenic and opportunistic pathogens of human diseases (bacterial, fungal, viral); skills: to assess the spectrum of the most likely pathogens of different localization, to interpret the data of bacteriological studies, to analyze the results of determining the sensitivity of microorganisms to antibiotics; skills: work with a microscope, culture and identification of the pathogen, determining the sensitivity to antibiotics.

The study of the discipline "Pharmacology" allows students to gain the necessary to know and skills in the development of disciplines: "Faculty therapy, occupational diseases", "Pediatrics", "hospital therapy", "Modern imaging techniques in medicine", "Diabetology and emergency endocrinology", "Obstetrics and gynecology", "Clinical pharmacology", "Gastroenterology".

3. A LIST OF INTENDED LEARNING OUTCOMES ON DISCIPLINE (MODULE), CORRELATED WITH THE PLANNED RESULTS OF EDUCATIONAL PROGRAMS

The study of the discipline "Pharmacology" in the framework of the development of the educational program is aimed at the formation of students of the following professional competencies:

Code and name of the implemented competence	**List of planned learning outcomes in the discipline (module), correlated with indicators of competence achievement**
GPC-8 (Readiness for medical use of medicinal preparations and other substances and their combinations at the decision professional tasks)	**to know**: Classification and main characteristics of drugs, pharmacodynamics and pharmacokinetics, indications and contraindications to application of medicines; Pharmaceutical forge and pharmacological incompatibility; Side effects; The General principles of registration of recipes and drawing up prescription prescriptions of medicines. **to be able to:** Analyze the effect of drugs on their totality pharmacological properties and the possibility of their use for therapeutic treatment depending on age; Prescribe medicines under certain conditions; diseases and pathological processes, based on the characteristics of their pharmacodynamics. Mickey and pharmacokinetic's. Evaluate the possibility of using drugs for pharmacotherapy. Calculate the parameters of the individual dosage regimen of drugs, taking into account age and individual features of the patient. Analyze the effect of drugs on their totality pharmacological properties and the possibility of their use for therapeutic treatment depending on age. Prescribe medicines under certain conditions. diseases and pathological processes, based on the characteristics of their pharmacodynamics. Evaluate the possibility of using drugs for pharmacotherapy. Calculate the parameters of the individual dosage regimen of drugs, taking into account age and individual features of the patient. **to have skills in:** The ability to prescribe drugs in the treatment, rehabilitation, prevention of various diseases and pathological processes'. Methods of drug poisoning therapy; Assessment of the possibility of toxic effects of drugs; The ability to prescribe drugs in different dosage forms, depending on the age of the patient. Skills of dose calculation (load, support, course), volumes of drugs in liquid medicine governmental forms, the speed of the drip infusions. The

	ability to prescribe drugs in the treatment, rehabilitation, prevention of various diseases and pathological processes. Methods of drug poisoning therapy; Assessment of the possibility of toxic effects of drugs; The ability to prescribe drugs in different dosage forms, depending on the age of the patient. Skills of dose calculation (load, support, course), volumes of drugs in liquid medicine-governmental forms, the speed of the drip infusions.

4. Volume of the subject

4.1. Volume of the subject in credit points (total): 7 credit points.

4.2. On types of academic workload (in hours): 252 hour

Type of academic work	**Number of hours (full-time form of study)**		
	Total according to the plan	**semesters**	
		Semester № 5 18 weeks	**semester № 6 17 weeks**
1	2	3	4
Contact work of students with the teacher	140/100%*	72/100%*	68 /100%*
Practical classes:			
Lectures	35	18	17
Seminars	105	54	51
Laboratory work		-	-
Independent work	76	54	22
Current control (number and type: Colloquium, recipe		Survey, test control, delivery of skills according to recipes, solving situational	Survey, test control, delivery of skills according to recipes, solving

skills, abstract)		problems, business games, colloquium	situational problems, business games, colloquium
Types of intermediate certification (exam, test)	Credit, exam: 36	Credit	Exam: 36
Total hours on discipline	252	126	126

* If it is necessary to use partially or exclusively remote educational technologies in the educational process, the table shows the number of hours of work of teaching staff with students for conducting classes in a remote format using e-learning.

4.3 The content of the discipline (module.) Allocation of hours by subject and type of study:

Full-time education.

Name sections and topics	**Total**	**Types of training sessions**				
		Classroom classes		**Classes in an interactive form**	**Independent work**	**Form of current knowledge control**
		Lectures	**Seminars**			
1	**2**	**3**	**4**	**5**	**6**	**7**
Section 1. Introduction to pharmacology. General pharmacology. General recipe.						
1. Introduction to pharmacology. General questions of pharmacokinetics.	10	2	3	1	4	Questioning, testing, essay writing
2. General questions of pharmacodynamics.	5		3		2	Questioning, testing, essay writing
3. Introduction to the	6		3	1	2	Questioning,

general recipe. Solid medicinal forms.						write prescriptions
4. Liquid medicinal forms. Soft medicinal forms.	7		3	1	4	Questioning, testing, essay writing, write prescriptions
5. Colloquium «Introduction to pharmacology. General pharmacology. General recipe».	7		3		4	Questioning, testing, essay writing, write prescriptions, essay writing, colloquium
Section 2. Drugs acting on autonomic nervous system.						
6. Drugs, which influence on afferent innervation.	6		3	1	2	Questioning, testing, essay writing, write prescriptions, essay writing, solving situational problems
7. Cholinomimetic means. Cholinoblocking agents. Anticholinesterase drugs.	11	4	3	1	4	Questioning, testing, essay writing, write prescriptions, essay writing,
8.Adrenomimetic drugs. Adrenoblocking agents.	10	2	3	1	4	Questioning, testing, essay writing, write prescriptions,

						essay writing,
9. Colloquium « Drugs affecting the peripheral nervous system».	7		3		4	Questioning, testing, essay writing, write prescriptions, essay writing, colloquium.
Section 3. Drugs acting on the central nervous system.						
10. Means for anesthesia. Ethyl alcohol.	5		3		2	Questioning, testing, essay writing, write prescriptions, essay writing,
11.Hypnotics. Antiepileptic means. Antiparkinsonic drugs.	8	2	3	1	2	Questioning, testing, essay writing, write prescriptions, essay writing,
12.Sedatives. Anxiolytics (Tranquilizers). Neuroleptic drugs. Drugs used in manic states.	8	2	3	1	2	Questioning, testing, essay writing, write prescriptions, essay writing,
13. Antidepressants. Analeptics. Psychostimulant drugs.	9	2	3		4	Questioning, testing, essay writing, write prescriptions, essay writing,

14. Narcotic analgesics.	5		3		2	Questioning, testing, essay writing, write prescriptions, essay writing,
15. Colloquium «Drugs acting on the central nervous system».	5		3		2	Questioning, testing, essay writing, write prescriptions, essay writing, colloquium
Section 4. Means influencing functions of Executive bodies.						
16. Means affecting the cerebral circulation. Antimigraine means.	7		3		4	Questioning, testing, essay writing, write prescriptions, essay writing
17. Cardiotonic agents. Antiarrythmic drugs.	9	2	3		4	Questioning, testing, essay writing, write prescriptions, essay writing
18.Antianginal drugs.Antiatherosclerotic means.	8	2	3	1	2	Questioning, testing, essay writing, write prescriptions, essay writing
SEMESTER № 6						

19. Hypotensive and hypertensive drugs.	7	2	3	1	2	Questioning, testing, essay writing, write prescriptions, essay writing
20. Drugs affecting the function of the respiratory organs.	6	2	3		1	Questioning, testing, essay writing, write prescriptions, essay writing
21. Diuretics, drugs affecting myometrium.	6	2	3		1	Questioning, testing, essay writing, write prescriptions, essay writing
22. Drugs affecting the function of the digestive organs .	6	2	3		1	Questioning, testing, essay writing, write prescriptions, essay writing
23. Colloquium «Drugs regulating functions of organs».	4		3		1	Questioning, testing, essay writing, write prescriptions, essay writing, colloquium
Section 5. « Agents with a predominant effect on tissue metabolism and immune processes. Agents affecting the blood system».						
24. Drugs affecting the blood system.	8	2	3	1	2	Questioning, testing, essay writing, write prescriptions,

						essay writing
25. Vitamins and enzymes.	4		3		1	Questioning, testing, essay writing, write prescriptions, essay writing
26. Hormones (hypothalamic and pituitary hormonal drugs, epiphysis, thyroid, parathyroid, pancreatic hormones).	6		3	1	2	Questioning, testing, essay writing, write prescriptions, essay writing
27. Hormonal drugs (sex gormones, adrenocorticotropic hormones).	6		3	1	2	Questioning, testing, essay writing, write prescriptions, essay writing
28. Drugs affecting the immune system. Antiallergic drugs. Anti-inflamatory drugs.	7	2	3	1	1	Questioning, testing, essay writing, write prescriptions, essay writing
29. Colloquium «Drugs that control metabolic processes. Drugs affecting hemopoiesis».	4		3		1	Questioning, testing, essay writing, write prescriptions, essay writing, colloquium
Section 6. Antimicrobial drugs. Chemotherapy of neoplastic diseases.						

30. Antiseptics and disinfectants. Sulfonamides. Synthetic antibacterial agents.	7	2	3	1	1	Questioning, testing, essay writing, write prescriptions, essay writing
31. Antibiotics.		2	3	1	1	Questioning, testing, essay writing, write prescriptions, essay writing
32. Antituberculosis, antiprotozoal, antifungal, antiviral, antihelminthic drugs.	5		3	1	1	Questioning, testing, essay writing, write prescriptions, essay writing
33. Chemotherap of neoplastic diseases	5		3		2	Questioning, testing, essay writing, write prescriptions, essay writing
34.Colloquium «Antimicrobial drugs. Chemotherap of neoplastic diseases».	4		3		1	Questioning, testing, essay writing, write prescriptions, essay writing, colloquium
Section 7. Basic principles of treatment of acute poisoning by pharmacological substances.						

35. Basic principles of treatment of acute poisoning by pharmacological substances Preparations regulating acid-alkaline metabolism. Salts of alkaline and alkaline earth metals.	6	1	3	1	1	Questioning, testing, essay writing, write prescriptions, essay writing
Exam	36					
Total	252+ 36 Ex =288	35	105	18	76	
Credit unit	7					

Interactive forms of classes - 18 hours.

5. COURSE CONTENT.

Title topic	Content
Section 1. Section 1. Introduction to pharmacology. General pharmacology. General recipe.	
1. Introduction to pharmacology. General questions of pharmacokinetics.	Subject and objectives of pharmacology. History of pharmacology. Principles of research of new drugs. Methods of finding drugs. Methods of testing drugs. Ways of introducing drugs into the body. Interaction of drugs with cells, tissues. Test methods of new drugs. Pharmacokinetics of drugs: absorption of drugs from the gastrointestinal tract, blood transport, distribution in organs and tissues, biotransformation, excretion. The concept of elimination, the half-life of drugs, clearance, bioavailability. Pharmacological value lipo - and hydrophilic drugs, the blood.
2. General questions of	Types of action on the body drugs. Adverse effects of

pharmacodynamics.	drugs. The main, side and toxic effects of drugs. Dependence of the action of drugs on the route of administration, dose, age, physiological state of the body, the duration of the course of their use. Types of doses. Dependence of pharmacological effect on dose and concentration. The breadth of therapeutic action of drugs. The concept of biological standardization. Dependence of manifestations of side effects of drugs on age. Features side effects of drugs on the fetus and newborn. The combined effect of drugs. Phenomena with repeated administration of drugs. The interaction of drugs in their joint application. Drugs that cause drug dependence. General ideas about drug and substance abuse. The concept of idiosyncrasy.
3.Introduction to the general recipe. Solid medicinal forms.	The concept of a medicinal substance, medicinal raw materials, drug. Pharmacopoeia, its content and purpose. Official, main, metered, abbreviated and expanded prescription. Recipe and its structure. Forms prescription forms. General rules of registration of recipes. The drug lists. Rules for storage of pharmaceuticals. Pharmacy and its structure. Solid dosage forms: tablets, powders, granules, pills, capsules, films, aerosols, fees. Rules of their discharge, appointment.
4.Liquid medicinal forms. Soft medicinal forms.	Prescribing solutions for oral administration, calculation of doses, methods of prescribing drugs in medicines, emulsions, suspensions, mucus. Requirements for dosage forms for injection and prescription prescriptions. Characteristics of liquid dosage forms obtained from herbal medicinal raw materials (infusions, tinctures, extracts, decoctions). Rules for prescribing tinctures, extracts, infusions and decoctions. Novogalenovye and herbal medicines. Types of soft dosage forms. General characteristics of ointments. Ointment bases, their importance for the action of

	drugs. Officinal and Magistral ointments. Expanded and abbreviated forms of prescribing ointments. Pharmaceutical and therapeutic characteristics of pastes. Features of writing pastes. Liniments their composition, features of application. Suppositories as types of dosage forms. Characteristics of the components. Form of prescription.Features prescribing solutions for oral administration, calculation of doses, methods of prescribing drugs in medicines, emulsions, suspensions, mucus. Requirements for dosage forms for injection and prescription prescriptions. Characteristics of liquid dosage forms obtained from herbal medicinal raw materials (infusions, tinctures, extracts, decoctions). Rules for prescribing tinctures, extracts, infusions and decoctions. Novogalenovye and herbal medicines. Types of soft dosage forms. General characteristics of ointments. Ointment bases, their importance for the action of drugs. Officinal and Magistral ointments. Expanded and abbreviated forms of prescribing ointments. Pharmaceutical and therapeutic characteristics of pastes. Features of writing pastes. Liniments their composition, features of application. Suppositories as types of dosage forms. Characteristics of the components. Form of prescription.
5. Colloquium «Introduction to pharmacology. General pharmacology. General recipe».	The concept of a medicinal substance, medicinal raw materials, dosage form, drug, drug. Novogalenovye and herbal medicines. Pharmacopoeia, its content and purpose. Officinal, main, metered, abbreviated and detailed recipe. Recipe and its structure. Forms prescription forms. Solid dosage forms, the rules of their prescription. Features prescribing solutions for oral administration. Requirements for dosage forms for injection and prescription prescriptions. Characteristics of liquid dosage forms obtained from herbal

	medicinal raw materials (infusions, tinctures, extracts, decoctions). Rules for prescribing tinctures, extracts, infusions and decoctions. Methods of prescribing drugs in medicines, emulsions, suspensions. Types of soft dosage forms. General characteristics of ointments. Ointment bases. Officinal and Magistral ointments. Expanded and abbreviated forms of prescribing ointments. Pharmaceutical and therapeutic characteristics of pastes. Features of writing pastes. Suppositories as types of dosage forms. Characteristics of the components. Form of prescription. Concepts of patches and transdermal therapeutic system. Liniments: composition, features, application.
Section 2. Drugs acting on the autonomic nervous system.	
6. Mechanisms of termination of transmitter action.	Agents that block and protect sensitive nerve endings (local anesthetics, enveloping, astringent, adsorbing). Drugs, stimulating the sensory nerve endings (irritant, bitter, laxative, cholagogue, emetic, expectorant).
7. Cholinergic system and drugs. Anticholinergic drugs. Anticholinesterase drugs**.**	Anatomical and physiological features of the autonomic nervous system. Classification of nerve fibers and receptors depending on the chemical nature of mediators. Structure and functions of cholinergic synapse. Classification and topography of cholinergic structures. Cholinomimetic agents. Anticholinesterase agents. Reactivator cholinesterase. Muscle relaxants peripheral action. Classification, application. Side effect.
8. Adrenergic system and drugs. Antiadrenergic drugs (adrenergic receptor antagonist)	Classification and localization of adrenoreactive structures. Classification of drugs acting on adrenergic mediation. Preparations. Indications for use. Side effect.
9. Colloquium «Drugs acting on the autonomic nervous	Agents that block the sensory nerve endings (local anesthetics, coating, absorbent, astringent). Drugs, stimulating

system».	the sensory nerve endings (restrain, bitter, laxative, emetic, expectorant). Anatomical and physiological features of the autonomic nervous system. Classification of nerve fibers and receptors depending on the chemical nature of mediators. Structure and functions of cholinergic synapse. Classification and topography of cholinergic structures. Cholinergic means: cholinomimetics. Anticholinesterase agents. Reactivator cholinesterase, blockers of M - and N - cholinergic receptors, ganglionic. Muscle relaxants peripheral action. Classification, application. Side effect. Classification and localization of adrenoreactive structures. Classification of drugs acting on adrenergic mediation: adrenomimetic and adrenoceptor blocking means. Preparations. Indications for use. Side effect.
Section 3. Drugs acting on central nervous system.	
10. Means to narcosis. Ethyl alcohol.	Inhalation anesthesia, its advantages and disadvantages. Characteristics of drugs used for inhalation anesthesia and non-inhalation anesthesia. Advantages and disadvantages. Actions of ethyl alcohol on the body. Treatment of alcoholism, help with acute poisoning.
11. Hypnotics. Antiepileptic means. Antiparkinsonic drugs.	Features of physiology and pathology of sleep. Pharmacodynamics of hypnotics. Classification of hypnotics depending on their chemical structure and duration of action.Characteristics of drugs. Symptoms and help with Hypnoticspoisoning. Anticonvulsants and antiparkinsonian agents. Principles of application. Side effect.
12. Sedatives. Anxiolytics (Tranquilizers). Neuroleptic drugs. Drugs used in manic states.	Pharmacology of sedatives. Drugs, indications for use. Pharmacodynamics and classification of tranquilizers by chemical structure, indications for use, side effects. Comparative characteristics of pharmacodynamics of different

	subgroups of tranquilizers. The classification of antipsychotics according to their chemical structure. Comparative characteristics of pharmacodynamics of neuroleptics of different groups. Indications for the use of neuroleptics, prevention and treatment of side effects arising from the use of neuroleptics. Remedies for the treatment of mania.
13. Antidepressants. Analeptics. Psychostimulant drugs.	Classification, pharmacodynamics and indications for antidepressant use. Side effects arising from the use of antidepressants. Classification of psychostimulants. Preparations. Classification, pharmacodynamics and indications for the use of psychomotor stimulants. Features of pharmacodynamics of psychometabolic stimulants, indications for use. Pharmacodynamics and features of the use of General ionizing agents. Pharmacodynamics, classification, analeptic drugs, indications for use.
14. Narcotic analgesics.	Classification of narcotic and non-narcotic analgesics. Narcotic analgesics, features of analgesic action of drugs of this group. Symptoms and help with drug poisoning. Principles of drug therapy.
15. Colloquium «Drugs acting on the central nervous system».	Classification of drugs for anesthesia, depending on the ways of introducing them into the body. Inhalation anesthesia, its advantages and disadvantages. Characteristics of drugs used for inhalation anesthesia and non-inhalation anesthesia. Advantages and disadvantages. Pharmacodynamics of hypnotics. Classification of hypnotics depending on their chemical structure and duration of action. Preparations. The effect of ethyl alcohol on the body. Symptoms and help with acute ethanol poisoning. Drugs for the treatment of chronic alcoholism. Anticonvulsants and antiparkinsonian agents.

	Side effect. Psycholeptics: neuroleptics, tranquilizers, sedatives, drugs for the treatment of manias. Pharmacology of sedatives. Drugs, indications for use. Pharmacodynamics and classification of tranquilizers by chemical structure, indications for use, side effects. Comparative characteristics of pharmacodynamics of different subgroups of tranquilizers. The classification of antipsychotics according to their chemical structure. Comparative characteristics of pharmacodynamics of neuroleptics of different groups. Indications for the use of neuroleptics, prevention and treatment of side effects arising from the use of neuroleptics. Classification, pharmacodynamics and indications for antidepressant use. Side effects arising from the use of antidepressants. Classification of psychostimulants. Classification, pharmacodynamics and indications for the use of psychomotor stimulants. Features of pharmacodynamics of psychometabolic stimulants, indications for use. Pharmacodynamics and features of the use of General ionizing agents. Pharmacodynamics, classification, analeptic drugs, indications for use. Classification of analgesics. Narcotic analgesics, features of analgesic action of drugs of this group.Preparations. Non-narcotic analgesics, especially their analgesic action. The mechanism of analgesic, anti-inflammatory and antipyretic action of non-narcotic analgesics. Classification, features of effects of each group of these substances. Preparations.
Section 4. Means influencing functions of Executive bodies.	
16. Means affecting the cerebral circulation.	Principles of action of drugs that increase cerebral blood flow, antiplatelet agents, neuroprotective drugs.

Antimigraine means.	Principles of migraine pharmacotherapy. Means for relief and prevention of migraine attacks.
17. Cardiotonic agents. Antiarrythmic drugs.	Classification of cardiotonic agents. Pharmacology of cardiac glycosides and cardiotonics of non-glycosidic nature. Indications and contraindications for their use. Symptoms and help with cardiac glycosides intoxication. Conditions affecting its development. Classification of antiarrhythmic drugs. Indications for use. Methods for evaluating the effectiveness and safety. Prevention, diagnosis and correction of adverse reactions. Possible drug interactions with their combined appointment and in combination with drugs of other groups.
18. Antianginal drugs. Antiatherosclerotic means.	Classification of drugs used for the treatment of coronary heart disease. Mechanism of action. Means used for relief of angina attacks and for treatment. Tactics of treatment of acute myocardial infarction. The problem of atherosclerosis. The role of lipid peroxidation inhibitors (antioxidants) in the prevention of ischemia. Classification of lipid-lowering agents. Antioxidants, antihypoxants. Mechanism of action, indications for use.
6 semester	
19. Hypotensive and hypertensive drugs.	Classification of hyper-and antihypertensive agents. Preparations. The mechanism and nature of the antihypertensive action of clonidine and metildofy, ganglioblokatorov, simpatolitics, β-blockers, α-blockers. Characteristics of antihypertensive action of myotropic drugs and calcium channel blocking agents. Antihypertensive effect of substances affecting the renin-angiotensin system and water-salt metabolism.

20. Drugs affecting the function of the respiratory organs.	Classification of agents affecting the respiratory system. Pharmacology of expectorants. Principles of bronchial asthma therapy. Drugs used in pulmonary edema, respiratory distress syndrome. Principles of action of drugs used in pulmonary edema. Choice of drugs. Anti-foaming effect of ethyl alcohol. Medicinal surfactants. Principle of operation. Application.
21. Diuretics, drugs affecting myometrium.	Classification of diuretics. Carbonic anhydrase inhibitors. Osmodioretics. Loop diuretics. Diuretics acting on the cortical segment of the Henle loop. Potassium-sparing diuretics. Medicinal herb. Choice of diuretics, dosing regimen and method of administration. Drugs used to enhance labor. Tocolytics. Means used for uterine bleeding. Pharmacological properties of prostaglandin preparations. Features of the action of ergot preparations.
22. Drugs affecting the function of the digestive organs.	Means, affecting appetite. Drugs that reduce digestive secretion. Antacids. Antiemetic drugs. Indications for use. Choleretic and cholekinetic. Hepatoprotectors. Cholelitolitic drugs and means of changing the motility of the gastrointestinal tract. Antispasmodics, laxatives. Means used in pancreatitis. Enzyme and anti-enzyme preparations, sorbents.
23. Colloquium «Drugs regulating functions of organs».	Principles of action of drugs that increase cerebral blood flow, antiplatelet agents, neuroprotective drugs. Principles of migraine pharmacotherapy. Means for relief and prevention of migraine attacks. Classification of cardiotonic agents. Pharmacology of cardiac glycosides and cardiotonics of non-glycosidic nature. Indications and contraindications for their use. Symptoms and help with cardiac glycosides intoxication. Conditions affecting its development. Classification of antiarrhythmic drugs. Indications for

	use. Methods for evaluating the effectiveness and safety. Prevention, diagnosis and correction of adverse reactions. Possible drug interactions with their combined appointment and in combination with drugs of other groups. Classification of drugs used for the treatment of coronary heart disease. Mechanism of action. Means used for relief of angina attacks and for treatment. Tactics of treatment of acute myocardial infarction. The problem of atherosclerosis. The role of lipid peroxidation inhibitors (antioxidants) in the prevention of ischemia. Classification of lipid-lowering agents. Antioxidants, antihypoxants. Mechanism of action, indications for use. Classification of hyper and antihypertensive agents. Preparations. The mechanism and nature of the antihypertensive action of clonidine and metildofy, ganglioblockers, simpatolitics, β-blockers, α-blockers. Characteristics of antihypertensive action of myotropic drugs and calcium channel blocking agents. Antihypertensive effect of substances affecting the renin-angiotensin system and water-salt metabolism. Classification of agents affecting the respiratory system. Pharmacology of expectorants. Principles of bronchial asthma therapy. Drugs used in pulmonary edema, respiratory distress syndrome. Principles of action of drugs used in pulmonary edema. Choice of drugs. Anti-foaming effect of ethyl alcohol. Medicinal surfactants. Principle of operation. Application. Classification of diuretics. Carbonic anhydrase inhibitors. Osmodioretiki. Loop diuretics. Diuretics acting on the cortical segment of the Henle loop. Potassium-sparing diuretics. Medicinal herb. Choice of diuretics, dosing regimen and method of administration. Drugs used to enhance labor.

	Tocolytics. Means used for uterine bleeding. Pharmacological properties of prostaglandin preparations. Features of the action of ergot preparations. Means, affecting appetite. Drugs that reduce digestive secretion. Antacids. Antiemetic drugs. Indications for use. Choleretic and cholekinetic. Hepatoprotectors. Cholelitolitic drugs and means of changing the motility of the gastrointestinal tract. Antispasmodics, laxatives. Means used in pancreatitis. Enzyme and anti-enzyme preparations, sorbents.
Section 5. « Agents with a predominant effect on tissue metabolism and immune processes. Agents affecting the blood system».	
24. Drugs affecting the blood system.	Classification of drugs affecting blood clotting, fibrinolysis, hematopoiesis and platelet aggregation. The biological role of iron in the body, its pharmacological effect on the process of hematopoiesis. Iron preparations, indications for their use. Drugs used for the treatment of hyperchromic anemia. Indications for use of drugs that affect blood clotting. Symptoms, care and prevention of anticoagulant overdose
25. Vitamins and enzymes.	The biological role of vitamins in the life of the body. Sources of vitamins. The cause of vitamin deficiency. Classification of vitamins by clinical use. Pharmacological properties of individual vitamins, application in medical practice. Pharmacology of enzyme and anti-enzyme preparations: classification, mechanism of action, drugs, indications for their use.
26. Hormones (hypothalamic and pituitary hormonal drugs, epiphysis, thyroid, parathyroid, pancreatic	Problems of hormonal regulation of organ and tissue functions. Principles of hormonal drugs application. Hormonal preparations of the hypothalamus and pituitary hormones. Hormonal drugs that regulate the function of the

hormones).	thyroid, parathyroid and pancreas. Classification of insulin by duration of action. Complications of insulin therapy. Characteristics of synthetic hypoglycemic agents.
27. Hormonal drugs (sex gormones, adrenocorticotropic hormones).	Sex hormone drugs, anabolics. Sex hormone antagonists. Contraceptive. Preparations of adrenal hormones: pharmacological effects, indications for use. Side effects of glucocorticoids, features of application.
28. Drugs affecting the immune system. Antiallergic drugs. Anti-inflamatory drugs.	Classification of agents that affect immune processes. Preparations. Classification, pharmacodynamics and indications for the use of antiallergic agents. Classification drugs, pharmacodynamics and indications for the use of Immunostimulants. Classification, drugs, pharmacodynamics and indications for use, side effects of antiallergic agents, especially the use of different groups. Non-narcotic analgesics, especially their analgesic action. The mechanism of analgesic, anti-inflammatory and antipyretic action of non-narcotic analgesics. Classification, features of effects of each group of these substances. Preparations.
29. Colloquium «Drugs that control metabolic processes. Drugs affecting hemopoiesis».	Classification of drugs affecting blood clotting, fibrinolysis, hematopoiesis and platelet aggregation. The biological role of iron in the body, its pharmacological effect on the process of hematopoiesis. Iron preparations, indications for their use. Drugs used for the treatment of hyperchromic anemia. Indications for the use of drugs that affect blood clotting. Symptoms, help and prevention of overdose anticoagulants. The biological role of vitamins in the life of the body. Sources of vitamins. The cause of vitamin deficiency. Classification of vitamins by clinical use. Pharmacological properties of individual vitamins, application in medical practice. Pharmacology of enzyme and

	anti-enzyme preparations: classification, mechanism of action, drugs, indications for their use. Problems of hormonal regulation of organ and tissue functions. Principles of hormonal drugs application. Hormonal preparations of the hypothalamus and pituitary hormones. Hormonal drugs that regulate the function of the thyroid, parathyroid and pancreas. Classification of insulin by duration of action. Complications of insulin therapy. Characteristics of synthetic hypoglycemic agents. Sex hormone drugs, anabolics. Sex hormone antagonists. Contraceptive. Preparations of adrenal hormones: pharmacological effects, indications for use. Side effects of glucocorticoids, peculiarities of application. Classification of agents that affect immune processes. Preparations. Classification, pharmacodynamics and indications for the use of antiallergic agents. Classification drugs, pharmacodynamics and indications for the use of Immunostimulants. Classification, drugs, pharmacodynamics and indications for use, side effects of antiallergic agents, especially the use of different groups. Non-narcotic analgesics, especially their analgesic action. The mechanism of analgesic, anti-inflammatory and antipyretic action of non-narcotic analgesics. Classification, features of effects of each group of these substances. Preparations.Classification of drugs affecting blood clotting, fibrinolysis, hematopoiesis and platelet aggregation. The biological role of iron in the body, its pharmacological effect on the process of hematopoiesis. Iron preparations, indications for their use. Drugs used for the treatment of hyperchromic anemia. Indications for the use of drugs that affect blood clotting. Symptoms, help and prevention of

	overdose anticoagulants. The biological role of vitamins in the life of the body. Sources of vitamins. The cause of vitamin deficiency. Classification of vitamins by clinical use. Pharmacological properties of individual vitamins, application in medical practice. Pharmacology of enzyme and anti-enzyme preparations: classification, mechanism of action, drugs, indications for their use. Problems of hormonal regulation of organ and tissue functions. Principles of hormonal drugs application. Hormonal preparations of the hypothalamus and pituitary hormones. Hormonal drugs that regulate the function of the thyroid, parathyroid and pancreas. Classification of insulin by duration of action. Complications of insulin therapy. Characteristics of synthetic hypoglycemic agents. Sex hormone drugs, anabolics. Sex hormone antagonists. Contraceptive. Preparations of adrenal hormones: pharmacological effects, indications for use. Side effects of glucocorticoids, peculiarities of application. Classification of agents that affect immune processes. Preparations. Classification, pharmacodynamics and indications for the use of antiallergic agents. Classification drugs, pharmacodynamics and indications for the use of Immunostimulants. Classification, drugs, pharmacodynamics and indications for use, side effects of antiallergic agents, especially the use of different groups. Non-narcotic analgesics, especially their analgesic action. The mechanism of analgesic, anti-inflammatory and antipyretic action of non-narcotic analgesics. Classification, features of effects of each group of these substances.

	Preparations.
Section 6. Antimicrobial drugs. Chemotherapy of neoplastic diseases.	
30. Antiseptics and disinfectants. Sulfonamides. Synthetic antibacterial agents.	Principles of rational choice and determination of antimicrobial dosing regimen depending on the type of pathogen, its sensitivity, localization of inflammation, mechanism and spectrum of antimicrobial action, peculiarities of microbial resistance formation, peculiarities of antimicrobial activity in gastrointestinal tract pathology, organs of metabolism and excretion. Methods for evaluating the effectiveness and safety of antimicrobials. Diagnosis, correction and prevention of adverse reactions. Principles of chemotherapy. Classification of sulfonamide preparations, characteristics of pharmacodynamics and pharmacokinetics. Indications and contraindications for the use of sulfonamides. Side effects, their prevention and treatment. Spectrum, mechanism and type of antimicrobial action, indications for use, side effects of chemotherapeutic agents of different chemical structure: nitrofuran derivatives, derivatives of 8-oxyquinoline, naphthyridine and quinoxaline, fluoroquinolones.
31. Antibiotics.	Classification of antibiotics. Mechanisms and types of antimicrobial action of antibiotics. Characteristics of penicillins, macrolides, cephalosporins, of carbopenems, aminoglycosides, tetracyclines, polymyxins, of levomicetina. Side effects, their correction and prevention.
32. Antituberculosis, antiprotozoal, antifungal, antiviral, antihelminthic drugs.	Features of tuberculosis chemotherapy. Classification of anti-TB drugs. Preparations. Pharmacology of antibiotics used to treat tuberculosis. Classification, mechanism, spectrum and type of action of antifungal agents. Indications for use. Pharmacology of antiviral drugs. Pharmacology of anthelmintic agents. Classification and mechanism of their

	action. Principles of clinical application. Pharmacology of Antiprotozoal drugs: antimalarial medicines for the treatment of giardiasis, trichomoniasis, amebiasis, and toxoplasmosis. Modern possibilities and prospects of chemotherapy of malignant neoplasms. Principles of chemotherapy of tumor diseases. Requirements for antitumor agents. Classification of anticancer agents. Preparations.
33. Colloquium «Antimicrobial drugs. Chemotherapy of neoplastic diseases».	Principles of rational choice and determination of antimicrobial dosing regimen depending on the type of pathogen, its sensitivity, localization of inflammation, mechanism and spectrum of antimicrobial action, peculiarities of microbial resistance formation, peculiarities of antimicrobial activity in gastrointestinal tract pathology, organs of metabolism and excretion. Methods for evaluating the effectiveness and safety of antimicrobials. Diagnosis, correction and prevention of adverse reactions. Principles of chemotherapy. Classification of sulfonamide preparations, characteristics of pharmacodynamics and pharmacokinetics. Indications and contraindications for the use of sulfonamides. Side effects, their prevention and treatment. Spectrum, mechanism and type of antimicrobial action, indications for use, side effects of chemotherapeutic agents of different chemical structure: nitrofuran derivatives, derivatives of 8-oxyquinoline, naphthyridine and quinoxaline, fluoroquinolones. Classification of antibiotics. Mechanisms and types of antimicrobial action of antibiotics. Characteristics of penicillins, macrolides, cephalosporins, of carbopenems, aminoglycosides, tetracyclines, polymyxins, of levomicetina. Side effects, their correction and prevention. Features of tuberculosis chemotherapy. Classification

	of anti-TB drugs. Preparations. Pharmacology of antibiotics used to treat tuberculosis. Classification, mechanism, spectrum and type of action of antifungal agents. Indications for use. Pharmacology of antiviral drugs. Pharmacology of anthelmintic agents. Classification and mechanism of their action. Principles of clinical application. Pharmacology of Antiprotozoal drugs: antimalarial medicines for the treatment of giardiasis, trichomoniasis, amebiasis, and toxoplasmosis. Modern possibilities and prospects of chemotherapy of malignant neoplasms. Principles of chemotherapy of tumor diseases. Requirements for antitumor agents. Classification of anticancer agents. Preparations.
Section 8. Basic principles of treatment of acute poisoning by pharmacological substances.	
34. Basic principles of treatment of acute poisoning by pharmacological substances Preparations regulating acid-alkaline metabolism. Salts of alkaline and alkaline earth metals.	The concept of etiotropic and pathogenetic therapy of acute drug poisoning. Measures aimed at removing the poison from the gastrointestinal tract and poison adsorbed in tissues. Pathogenetic therapy of acute poisoning. Pharmacology of drugs regulating acid-base metabolism. Salts of sodium, potassium, calcium and magnesium. Application. Antagonism between calcium and magnesium ions.
The final lesson.	
35. The final lesson to test the practical skills of students	Prescribing. Solving situational problems.

1. TOPICS OF WORKSHOPS AND SEMINAR CLASSES*

Section 1. Introduction to pharmacology. The general recipe.

Topic 1. Introduction to pharmacology. General questions of pharmacokinetics.

Questions.

1. The subject and objectives of pharmacology, its place among other medical disciplines.
2. The main stages of development of pharmacology.
3. Principles of research and methods of testing new drugs.
4. The concept of pharmacokinetics, the main stages of the pharmacokinetic process.
5. Mechanisms of absorption of drugs. Factors affecting absorption.
6. The concept of bioavailability of drugs.
7. Methods enteral route of administration of drugs.
8. Methods of parenteral route of administration of drugs.
9. Comparative characteristics of drug administration routes.
10. Distribution of drugs in the body. Biological barrier. Deposit.
11. Chemical transformations of drugs in the body, their value.
12. Ways of excretion of drugs from the body.
13. Concept of elimination rate constant, drug half-life and clearance.
14. Pharmacological significance of lipophilicity and hydrophilicity of drugs.

Topic 2. General questions of pharmacodynamics.

Questions

1. The concept of pharmacodynamics.
2. Types of action of drugs.
3. The concept of specific receptors, agonists and antagonists.
4. Types of doses: medium and higher therapeutic, single, daily, course, toxic. Dependence of pharmacological effect on dose and concentration. The breadth of therapeutic action.
5. Repeated use of drugs: addiction, cumulation, drug dependence, tachyphylaxis.
6. Dependence of pharmacological effect on the route of administration, sex, age, pathological state of the organism, duration of treatment. The role of genetic factors. Chronopharmacology.
7. Types and results of drug interactions.
8. Mechanisms of pharmacodynamic interaction of drugs.
9. The main types of drug therapy.
10. The concept of the main and side effects of drugs.
11. Toxic effects of drugs: types and manifestations.

12. The concept of idiosyncrasy.
13. The concept of biological standardization.

Topic 3. Introduction to the general recipe. Solid medicinal forms.

Questions

1. The concept of the General recipe.
2. The concept of pharmaceutical raw materials, drug substance, medicinal product, pharmaceutical form and medicinal product.
3. Types of dosage forms.
4. Sources of medicinal raw materials. Principles.
5. Purpose and content of the State Pharmacopoeia.
6. Officinal and main, metered, underdosed, abbreviated and expanded prescriptions. The concept of lists A and B.
7. Rules of storage of poisonous and potent drugs.
8. Pharmacy and its structure.
9. Recipe and its structure.
10. Forms prescription forms. The design of the seals.
11. General rules of registration of recipes.
12. Designation of the number of drugs in the prescription.
13. Rules of registration of the signature.
14. Additional designations in the recipe. Possible reductions in recipes.
15. General characteristics of powders.
16. Classification of powders by composition, dosing, method of application.
17. Rules for prescribing dosed and undosed powders, permissible weight of powders, form-forming substances, form of packaging.
18. General characteristics of tablets as dosage form.
19. Rules for prescribing pills.
20. General characteristics of pills as a dosage form. Write prescriptions for pills.
21. The concept of granules. Rules for prescribing pellets.
22. Capsules, its varieties (starch, gelatin, deladurantaye, microcapsules, of meduli, spansule).Write prescriptions for medicinal preparations in capsules. The fees prescribed in recipes.
23. General characteristics of aerosols. Rules of their prescriptions.

Topic 4. Liquid medicinal forms. Soft medicinal forms.

Questions

1.The definition of solutions, their components; the characteristics of the solvents.

2. Methods of application of solutions.

3. Methods of prescribing solutions.

4. The concept of official solutions.

5. Features prescribing solutions for parenteral administration (dosage forms for injection).

6. General characteristics of tinctures. Rules of writing out the recipes.

7. General characteristics of extracts (liquid, thick, dry). Rules of writing out the recipes.

8. Prescribing infusions and decoctions in the recipe.

9. General characteristics of emulsions: definition, classification, emulsifiers.

10. Rules of prescription emulsion.

11. The concept of suspensions, the rules of prescribing suspensions.

12. Properties of mucus and their application, the rules of prescribing.

13. The concept of novogalenovyh drugs, their difference from galenic.

14. General characteristics of mixtures, difference from solution.Specifics of prescription medicines in recipes.

15. Aerosol dosage forms and their practical significance.

16. The concept of ointments as dosage forms. Ointment bases and their properties. Classification of ointments by composition, method of application.

17. Methods of prescribing official and main ointments.Features prescriptions for eye ointments.

18. Pastes and their difference from ointments.Features prescriptions for pasta.

19. Liniments, their components, features of action and application.

20.Suppositories, their components, types, weight.The nature of the action of drugs prescribed in suppositories.

21. Vaginal suppositories, their features in comparison with rectal.Rules for prescribing rectal and vaginal suppositories.

22. Rules of prescription in the prescription of officinal suppositories.

Topic 5. Colloquium «Introduction to pharmacology. General pharmacology. General recipe».

Questions

1. The subject and objectives of pharmacology, its place among other medical disciplines.

2. The main stages of development of pharmacology. Well-known domestic pharmacologists.
3. Principles of research of new medicines.
4. Pharmacopoeia, its content and significance for the doctor.
5. Recipe. Forms prescription forms. Components of the recipe. Rules of designation of quantities of medicines. Additional inscriptions on the recipe. The abbreviations used for prescriptions. Main and official recipe books. Classification of dosage forms depending on the state of aggregation and their comparative characteristics.
6. Rules for storage, accounting, use of drugs.
7. Solid dosage forms. Principles of powder classification. Comparative characteristics of powders, tablets, pills, capsules. The concept of as microdrops and granules.
8. Rules for prescribing powders, pills, tablets, capsules and granules.
9. Mild dosage forms. Characteristics of ointment bases. Classification of ointments according to their application. Comparative characteristics of ointments, pastes, liniments. The practical significance of the suppository.
10. The rules of writing prescriptions for ointments, pastes, liniments and suppositories.
11. Liquid dosage forms. Classification of liquid dosage forms and their practical purpose.
12. Rules for prescribing solutions for external and internal use; oil solutions, dosed in drops, emulsions. Methods of designation in recipes of concentrations of solutions.
13. The concept of galenovyh and novogalenovyh preparations.
14. Comparative characteristics of infusions and decoctions, tinctures and extracts, methods of production.
15. Rules of prescription for infusions, decoctions, tinctures, extracts, medicines.
16. Dosage forms for injection and their practical purpose. Requirements for dosage forms for injection.
17. Rules for prescribing dosage forms for injection.
18. Aerosol dosage forms and their practical purpose.
19. The value of the signature for effective and safe drug therapy.
20. The concept of pharmacokinetics, the main stages of the pharmacokinetic process.
21. Mechanisms of absorption of drugs. Factors affecting absorption.
22. The concept of bioavailability of drugs.
23. Methods enteral route of administration of drugs.
24. Methods of parenteral route of administration of drugs.

25. Comparative characteristics of ways of introduction of medicinal substances.
26. Distribution of drugs in the body. Biological barrier. Deposit.
27. Chemical transformations of drugs in the body (biotransformation, metabolism), their value.
28. Ways of excretion of drugs from the body.
29. Concept of elimination rate constant, half-life period and clearance.
30. Pharmacological significance of lipophilicity and hydrophilicity of drugs.
31. The concept of pharmacodynamics.
32. Types of action of drugs.
33. The concept of specific receptors, agonists and antagonists.
34. Dependence of pharmacological effect on physico-chemical properties of drugs.
35. Types of doses: medium and higher therapeutic, single, daily, course, toxic. Dependence of pharmacological effect on dose and concentration. The breadth of therapeutic action.
36. Repeated use of drugs: addiction, cumulation, drug dependence, tachyphylaxis.
37. Dependence of pharmacological effect on sex, age, pathological state of the organism. The role of genetic factors. Chronopharmacology.
38. Types and results of drug interactions.
39. The mechanisms of pharmacodynamic interactions of drugs.
40. The main types of drug therapy.
41. The concept of the main and side effects of drugs.
42. Toxic effects of drugs: types and manifestations.
43. The concept of idiosyncrasy.
44. The concept of biological standardization.

Section 2. Drugs acting on the autonomic nervous system.

Topic 6. Mechanisms of termination of transmitter action.

Questions

1. The concept of afferent innervation.
2. Local anesthetic drugs: classification, pharmacodynamics. Conditions affecting the manifestation of the analgesic effect of this group of drugs. Comparative characteristics of local anesthetics and their use for different types of anesthesia.
3. The principle of operation and classification of substances that protect sensitive nerve endings: astringents, enveloping and adsorbing agents. Indications for the use of drugs in medical practice.

4. Classification of agents that irritate sensitive nerve endings, at the point of application (localization of action).

5. Mechanism of action, irritating receptors visible mucous membranes and skin (essential oils, mint, mustard; ammonia, menthol, validol, turpentine) effects, indications for use.

6. Classification and pharmacology of expectorants and emetics. Contraindications to the use.

7. Classification, mechanism of action and indications for use of laxatives.

8. Pharmacology of choleretics and bitterness.

Topic 7. Cholinergic system and drugs. Anticholinergic drugs. Anticholinesterase drugs.

Questions

1 Features of efferent innervation as opposed to afferent innervation.

2. The notion of a cholinergic synapse, the neurotransmitter synthesis and its inactivation in the body. Classification and topographic location of cholinergic structures of the autonomic nervous system.

3. Classification of agents affecting the transmission of excitation in cholinergic synapses.

4. Selective M - and N-cholinomimetics: drugs, pharmacodynamics, indications, side effects and contraindications to their use.

5. Toxic effect of nicotine. The use of N- cholinomimetics to facilitate withdrawal from smoking.

6.Pharmacology of nonselective M, N-cholinomimetics: drugs, pharmacodynamics, indications, side effects and contraindications to their use.

7. Pharmacology of anticholinesterase agents and cholinesterase reactivators.

8. Comparative characteristics of pharmacological properties of anticholinesterase agents and M-cholinomimetics.

9. Poisoning by M-cholinomimetics and organophosphorus compounds.

10. M- cholinoblockers: classification, drugs, pharmacodynamics, indications and contraindications. Acute poisoning by this group of drugs, measures of assistance.

11. Classification, mechanism of action, pharmacological effects of ganglionblockers. Indications for use ganglionblockers, side effects.

12. Muscle relaxants: classification, pharmacodynamics and indications for use. Side effects.

Topic 8. Adrenergic system and drugs. Antiadrenergic drugs (adrenergic receptor antagonist).

Questions

1. The concept of adrenergic synapse, mediator, especially biosynthesis and inactivation of the mediator. Topographic location of adrenergic synapses.
2. Types and subtypes of adrenergic receptors.
3. Classification of agents acting on adrenergic synapses.
4. Pharmacology, α-adrenomimetics: mechanism of action, pharmacological effects, side effects, indications and contraindications.
5. Classification, drugs, pharmacodynamics, side effects, indications and contraindications to the use of α-adrenomimetics.
6. Classification, drugs, pharmacodynamics, side effects, indications and contraindications to the use of α1 - and α2- adrenomimetics.
7. Pharmacodynamics, indications, contraindications for use and side effects of indirect adrenomimetics (sympathomimetics).
8. Classification, drugs, pharmacodynamics, side effects, indications and contraindications to the use of α-blockers.
9. Classification, drugs, pharmacodynamics, side effects, indications and contraindications to the use of α-blockers.
10. Pharmacological effects of α-blockers, indications for use.
11. Drugs, pharmacodynamics, side effects, indications and contraindications to the use of sympatholytics.
12. Pharmacology of drugs affecting dopamine receptors.

Topic 9. Colloquium «Drugs acting on the autonomic nervous system».

Questions

1. Anatomical, physiological and biochemical features of afferent and efferent autonomic nervous system, their influence on the functions of internal organs.
2. Pharmacology of drugs that prevent the action of irritating factors on sensitive nerve endings.
3. The mechanism of action, purpose and indications for use of agents that irritate the receptors of the skin and mucous membranes.
4. Classification and pharmacology of expectorants and emetics. Contraindications to the use.
5. Classification, mechanism of action and indications for use of laxatives.

6. Pharmacology of choleretics and bitterness.
7. Drug regulation of motor and secretory functions of the gastrointestinal tract.
8. Mechanisms of action of various mediating agents, causing a decrease in intraocular pressure.
9. Possibilities of pharmacological regulation of heart functions by means of mediator means of different types of action.
10. Mechanism of action and features of antihypertensive effect of ganglioblockers, sympatholytics, α-and β-blockers.
11. Pharmacology of β-blockers, their application for the treatment of hypertension, coronary heart disease, cardiac arrhythmias.
12. Mechanisms of broncholytic effect of expectorants, M-cholinergic blockers, ganglioblockers, β-adrenomimetics, α-and β-adrenomimetics of direct and indirect action.
13. Comparative characteristics of pharmacodynamics of M-cholinomimetic and anticholinesterase agents. Poisoning with these preparations and assistance measures.
14. Comparative characteristics of pharmacodynamics and indications for the use of antiadrenergic agents (sympatholics, α - and β-blockers).
15. Comparative characteristics of pharmacodynamics of muscle relaxants.
16. Mechanisms of action of various mediator means possessing antispasmodic activity.
17. Regulation of uterine contractile activity by means of means affecting efferent innervation.
18. Pharmacology of drugs affecting dopamine receptors.

Section 3. Drugs acting on central nervous system.

Topic 10. Means to narcosis. Ethyl alcohol.

Questions

1. History of discovery and application of drugs for anesthesia (W. Morton).
2. Stages of anesthesia, their General characteristics.
3. The mechanism of occurrence, manifestation and prevention of excitation stage.
4. Possible complications of each stage of anesthesia, their prevention and treatment.
5. Mechanisms of action of drugs for anesthesia. The concept of the breadth of narcotic action.
6. Classification of drugs for anesthesia, depending on the ways of introducing them into the body.

7. Inhalation anesthesia, its advantages and disadvantages. Factors contributing to the absorption and elimination of inhalants for anesthesia.
8. Comparative characteristics of drugs for inhalation anesthesia (activity, rate of development of anesthesia, analgesic and muscle-relaxing properties, aftereffect, effect on the cardiovascular system, inflammability).
9. Advantages and disadvantages of non-inhalation anesthesia.
10. Features of the action of drugs for non-inhalation anesthesia, their comparative assessment (the rate of development of anesthesia, analgesic and muscle-relaxing properties, duration of action, aftereffect).
11. Agents that increase myocardial sensitivity to catecholamines. Danger of their use.
12. Prevention of side effects arising from the use of drugs for anesthesia.
13. The concept of combined, basic, mixed and potentiated anesthesia.
14. Ethyl alcohol, its local and resorptive action. The use of ethyl alcohol in medical practice. Acute alcohol poisoning. Treatment of this condition. Principles of pharmacotherapy of chronic alcoholism.

Topic 11. Hypnotics. Antiepileptic means. Antiparkinsonic drugs.

Questions

1. Features of physiology and pathology of sleep.
2. Classification of hypnotics depending on their chemical structure and duration of action.
3. Influence of hypnotics on the structure of sleep. Mechanisms of hypnotic action.
4. Requirements for sleeping pills. Principles of their clinical application. Problems arising from the use of hypnotics.
5. Acute and chronic poisoning with hypnotics, the principles of their pharmacotherapy. Antagonists of hypnotics benzodiazepine series (flumazenil).
6. Classification, drugs, pharmacodynamics, principles of application, indications and contraindications, side effects of antiepileptic drugs.
7. Comparative evaluation of the effectiveness of individual drugs in various forms of epilepsy.
8. A medicine used for the relief of status Epilepticus.
9. Basic principles of pharmacotherapy of Parkinson's disease and Parkinson's syndrome. Classification of antiparkinsonian drugs according to their mechanism of action.

10. Pharmacokinetics, mechanisms of action, indications and contraindications to the use of antiparkinsonian drugs that stimulate dopaminergic processes (levodopa, bromocriptine).
11. Comparative evaluation of the effectiveness of antiparkinsonian drugs of different groups.
12. The main side effects of antiparkinsonian drugs.
13. The use of DOPA-decarboxylase inhibitors (carbidopa, benserazide), peripheral dopamine receptor blockers (domperidone), COMT inhibitors (tolcapone), "atypical" neuroleptics (clozapine) to reduce the side effects of levodopa.

Topic 12. Sedatives. Anxiolytics (Tranquilizers). Neuroleptic drugs. Drugs used in manic states.

Questions

1. Achievements and actual problems of modern psychopharmacology. Contribution of domestic scientists to the development of this branch of pharmacology.
2. Sedatives: drugs, their mechanisms of action, indications for use. Chronic bromide poisoning, relief measures.
3. Classification, pharmacodynamics of different groups, indications, contraindications, side effects of tranquilizers (anxiolytics), the possibility of drug dependence.
4. The mechanism of action of anxiolytics with weak sedative and hypnotic effect.
5. Features of action of substances of different chemical structure with anxiolytic effect (buspiron).
6. Classification of neuroleptics. The concept of" typical "and" atypical " antipsychotic drugs.
7. Comparative characteristics of pharmacodynamics of different groups of neuroleptics.
8. Potentiation of the action of drugs for anesthesia and analgesics.
9. Indications for the use of neuroleptics. Prevention and treatment of side effects arising from the use of neuroleptics.
10. Comparative characteristics of pharmacodynamics of sedatives, tranquilizers and neuroleptics.
11. Drugs for the treatment of mania, the main side effects of lithium salts.

Topic 13. Antidepressants. Analeptics. Psychostimulant drugs.

Questions

1. Classification of antidepressants.

2. Pharmacodynamics, indications for use and side effects of antidepressants of each group.
3. The effect of antidepressants on □ - adrenoreceptors, M-cholinergic receptors and histamine receptors; effects arising in this case.
4. Pharmacology of psychomotor stimulants: classification, drugs, basic principles of the mechanism of action, pharmacological effects, indications for use and their side effects.
5. Classification, features of pharmacodynamics of psychometabolic stimulants, indications for use.
6. Comparative characteristics of psychomotor and psychometabolic stimulants.
7. General ionizing agents: drugs, pharmacodynamics and indications for use.
8. Analeptics: classification, drugs, mechanisms of stimulating action on the Central nervous system, the effect on breathing and blood circulation, indications for use and side effects of analeptics.

Topic 14. Narcotic analgesics.

Questions

1. The concept of nociceptive and antinociceptive systems. Classification of opioid receptors and their role in the human body. Endogenous ligands of opioid receptors.
2. Classification of painkillers.
3. Narcotic analgesics: classification, features of analgesic action of drugs of this group.
4. Pharmacodynamics of morphine.
5. The influence of morphine on the psycho-emotional sphere. Modern ideas about the mechanisms of euphoria and drug addiction to narcotic analgesics.
6. Indications, contraindications and side effects of morphine.
7. Features of pharmacodynamics of omnopone, semi-synthetic and synthetic morphine-like agents indications and contraindications.
8. The concept of neuroleptanalgesia.
9. Pharmacology of agonist-antagonist opiate receptors.
10. Functional antagonists of narcotic analgesics: principle of action, application.
11. Acute poisoning with opioid analgesics, the principles of pharmacotherapy.
12. Principles of drug and substance abuse therapy.
13. Classification of non-opioid analgesics by mechanism of action.

Topic 15. Colloquium «Drugs acting on the central nervous system».

Questions

1. Possible complications of each stage of anesthesia, their prevention and treatment.
2. Mechanisms of action of drugs for anesthesia. The concept of the breadth of narcotic action.
3. Classification of drugs for anesthesia, depending on the ways of introducing them into the body.
4. Inhalation anesthesia, its advantages and disadvantages. Factors contributing to the absorption and elimination of inhalants for anesthesia. Comparative characteristics of drugs for inhalation anesthesia (activity, rate of development of anesthesia, analgesic and muscle-relaxing properties, aftereffect, effect on the cardiovascular system, inflammability).
5. Advantages and disadvantages of non-inhalation anesthesia. Features of the action of drugs for non-inhalation anesthesia, their comparative assessment (the rate of development of anesthesia, analgesic and muscle-relaxing properties, duration of action, aftereffect).
6. The concept of combined, basic, mixed and potentiated anesthesia.
7. Ethyl alcohol, its local and resorptive action. The use of ethyl alcohol in medical practice. Acute alcohol poisoning. Treatment of this condition. Principles of pharmacotherapy of chronic alcoholism. The mechanism of action of teturam.
8. Classification of hypnotics depending on their chemical structure and duration of action, drugs.
9. Influence of Hypnoticson the structure of sleep. Mechanisms of hypnotic action.
10. Requirements for sleeping pills. Principles of their clinical application. Problems arising from the use of hypnotics.
11. Acute and chronic poisoning with sleeping pills, the principles of their pharmacotherapy. Antagonists of Hypnoticsbenzodiazepine series (flumazenil).
12. Classification, drugs, pharmacodynamics, indications and contraindications, principles of application, side effects of antiepileptic drugs.
13. Drugs used for the relief of convulsive syndrome.
14. Basic principles of pharmacotherapy of Parkinson's disease and Parkinson's syndrome. Classification of antiparkinsonian drugs according to their mechanism of action.
15. Comparative evaluation of the effectiveness of antiparkinsonian drugs of different groups.
16. The main side effects of antiparkinsonian drugs.
17. Classification of painkillers (narcotic and non-narcotic analgesics).

18. Narcotic analgesics: classification, features of analgesic action, indications and contraindications to the appointment.
19. Functional antagonists of narcotic analgesics: principle of action, application.
20. The effect of morphine on the body.
21. Comparative characteristics of morphine with omnopona, promedola, fentanyl.
22. Acute and chronic opioid analgesic poisoning, principles of its pharmacotherapy.
23. Pharmacodynamics, indications for use, contraindications, and side effects of analgesics with a mixed mechanism of action (opioid and neopytnym).
24. Sedatives: drugs, their mechanisms of action, indications for use. Chronic bromide poisoning, relief measures.
25. Classification, pharmacodynamics of different groups, indications, contraindications, side effects of tranquilizers (anxiolytics), the possibility of drug dependence.
26. Classification of neuroleptics. The concept of" typical "and" atypical " antipsychotic drugs. Comparative characteristics of pharmacodynamics of different groups of neuroleptics.
27. Indications for the use of neuroleptics. Prevention and treatment of side effects arising from the use of neuroleptics. The concept of neuroleptic syndrome.
28. Drugs for the treatment of mania, the main side effects of lithium salts.
29. Classification of antidepressants. Pharmacodynamics, indications for use and side effects of antidepressants of each group.
30. Pharmacology of psychomotor stimulants: classification, drugs, basic principles of the mechanism of action, pharmacological effects, indications for use and their side effects.
31. Features of pharmacodynamics of psychometabolic stimulants, indications for use.
32. General ionizing agents: drugs, pharmacodynamics and indications for use.
33. Classification, drugs, mechanisms of stimulating action on the Central nervous system, the effect on breathing and blood circulation, indications for use and side effects of analeptics.

Section 4. Means influencing functions of Executive bodies.

Topic 16. Means affecting the cerebral circulation. Antimigraine means.

Questions

1. Classification of drugs that increase cerebral blood flow.
2. Principles of action of drugs that increase cerebral blood flow, antiplatelet agents, neuroprotectors.

3. Principles of migraine pharmacotherapy.
4. Means used for relief and prevention of migraine attacks.

Topic 17. Cardiotonic agents. Antiarrythmic drugs.

Questions

1. The concept of heart failure: types, mechanism of development.
2. Classification, General and comparative characteristics of cardiotonic and pacemakers.
3. Mechanisms of action of cardiotonic agents of non-glycosidic structure, peculiarities of their application in the clinic.
4. Plants containing cardiac glycosides. Individual glycosides isolated from plants.
5. Features of the chemical structure of cardiac glycosides, the role of their constituent parts, classification by pharmacokinetic features.
6. The mechanism of cardiotonic action of cardiac glycosides: effect on the strength and rhythm of heartbeats, conductivity, automatism, metabolism in the myocardium. Extracardial effects of cardiac glycosides.
7. Indications and contraindications to the use of cardiotonic and pacemakers. The essence of their therapeutic action in heart failure.
8. Comparative characteristics of different drugs (activity, absorption from the gastrointestinal tract, the rate of development and duration of action, cumulation).
9. The choice of drugs depending on the type and manifestation of heart failure.
10. Factors, clinical manifestation of glycoside intoxication, its prevention and treatment.
11. Classification of antiarrhythmic agents.
12. Classification, influence on automatism, conductivity, effective refractory period of membrane stabilizing agents. Indications for their use, side effects.
13. Comparative characteristics of different subgroups of sodium channel blockers (IA, IB and IC).
14. Features of antiarrhythmic action of β - blockers, indications for their use, side effects.
15. Antiarrhythmic effect of calcium channel blockers, indications for their use, side effects.
16. Antiarrhythmic activity of agents that increase the duration of the action potential (potassium channel blockers). Side effects, indications for use of this group of drugs.
17. Antiarrhythmic effect of potassium preparations.
18. Antiarrhythmic activity of cardiac glycosides, indications for their use.

19. Drugs used in blockades of the cardiac conduction system (β- adrenomimetics, M-cholinergic blockers).

Topic 18. Antianginal drugs.Antiatherosclerotic means.

Questions

1. Basic principles of elimination of oxygen deficiency in angina.
2. Classification of antianginal agents. Preparations.
3. Pharmacodynamics, indications for use and side effects of nitroglycerin. Features of action and use of drugs nitroglycerin prolonged action (sustak, nitrong, trinitrolong).
4. Pharmacodynamics, indications for the use of long-acting organic nitrates.
5. Antianginal properties of calcium ion antagonists, β - blockers and bradycardic agents. The principle of action of cardioprotective agents (preduktal).
6. Basic principles of drug therapy of myocardial infarction.
7. The use of painkillers, antiarrhythmic agents, drugs normalizing hemodynamics (anticoagulants, antiplatelets, fibrinolytics).
8. Classification, mechanism of action of different groups of anti-atherosclerotic agents. Preparations. Features of use in different types of hyperlipidemia. Side effect.

Credit. Exhibited subject to the timely delivery of the colloquiums.

6th semester

Topic 19. Hypotensive and hypertensive drugs.

Questions

1. Mechanisms of neuroendocrine regulation of vascular tone and blood pressure level.
2. Classification of antihypertensive agents.
3. Mechanism, indications, side effects, distinctive features of individual groups of antihypertensive drugs.
4. The role of sedatives, hypnotics, nootropics and tranquilizers in the treatment of hypertension.
5. Hypotensive effect and use of diuretics.
6. Combined use of antihypertensive agents with different localization and mechanism of action.
7. Prevention and elimination of side effects of antihypertensive drugs.
8. Classification of drugs used in acute hypotension.

9. Localization and mechanism of action of adrenomimetics, angiotensinamide and dopamine. Application and side effects.

Topic 20. Drugs affecting the function of the respiratory organs.

Questions

1. Classification of respiratory stimulants in the direction of action, drugs.
2. Mechanisms of stimulating effect of substances on respiration.
3. Comparative characteristics of respiratory stimulants from the groups of analeptics and N - cholinomimetics.
4. Indications for use of respiratory stimulants.
5. Antitussives: classification.
6. Comparative characteristics of antitussive agents of Central and peripheral action, narcotic and non-narcotic type of action.
7. Localization and mechanisms of expectorant action of various drugs.
8. Comparative characteristics of expectorants reflex and direct action.
9. Pharmacology of mucolytic agents.
10. Indications for use of expectorants.
11. Classification of media used in bronchial asthma.
12. Comparison of the mechanisms of action of bronchodilators from the groups of adrenomimetics, M-cholinergic blockers and myotropic antispasmodics.
13. Preparations β2-adrenomimetikov and derivatives of methylxanthine prolonged action.
14. Indications for use of bronchodilators, ways of their introduction, side effect.
15. The use of anti-allergic and anti-inflammatory drugs in bronchial asthma (cromoline-sodium, ketotifen, glucocorticoids, agents that reduce the formation or action of leukotrienes).
16. Principles of action of drugs used to treat pulmonary edema. The choice of drugs depending on the pathogenetic mechanisms of its development.
17. Defoaming effect of ethyl alcohol.
18. Medicinal surfactants: principle of action and application.

Topic 21. Diuretics, drugs affecting myometrium.

Questions

1. The process of urination in the kidneys (filtration, reabsorption and secretion), its neurohumoral regulation.
2. Classification of diuretics according to the chemical structure and localization of action.
3. The mechanism of diuretic action, comparative characteristics, indications for use of different groups of diuretics: loop, osmotic, thiazide, carbanhydrase inhibitors.
4. Comparative evaluation of diuretics that have a depressing effect on the epithelium of the renal tubules (efficiency, rate of development and duration of the effect, the effect on the ion balance).
5. Herbal medicines with a diuretic effect.
6. Side effects of diuretics, their prevention.
7. The mechanism of action protivopodagricakih drugs used in chronic gout. Pharmacological and side effects, indications and contraindications to their use.
8. Means used in acute attacks of gout.
9. Classification of agents affecting the myometrium.
10. Drugs used to stimulate the labor. The influence of oxytocin and prostaglandins on the myometrium. Features of their application.
11. Pharmacodynamics of drugs that reduce the contractile activity of the uterus.
12. Pharmacological properties of ergot alkaloids. The mechanism of their hemostatic action in uterine bleeding.

Topic 22. Drugs affecting the function of the digestive organs.

Questions

1. Means, affecting appetite. Classification, pharmacodynamics, side effects, indications and contraindications for the use of appetite stimulants and anorexigens.
2. Classification of drugs used in violation of the function of the glands of the stomach. The use of drugs, stimulating the secretion of gastric glands, their use for diagnostic purposes. Means of replacement therapy in case of insufficiency of the gastric glands.
3. Classification, principles of action of substances that lower the secretory function of the gastric glands.
4. Comparative characteristics of anti-acid drugs. Indications for their use, side effects.
5. The principles of operation of gastroprotection. Their use in gastric ulcer.
6. Antibacterial therapy of gastric ulcer.

7. Pharmacology of choleretics. Classification, features of application
8. The principle of cholelitolitic drugs. Indications for use. Conditions necessary for the success of gene therapy.
9. The principle of operation, indications for use of hepatoprotectors.
10. Pharmacology of drugs used in violations of the excretory function of the pancreas.
11. The mechanism of action of emetics. Their application.
12. Principles of action of antiemetics. Indications for use of certain drugs. Means to prevent vomiting in chemotherapy tumors (ondansetron).
13. Classification, mechanism of action, pharmacological effects, indications, side effects and contraindications of drugs affecting the motility of the gastrointestinal tract: depressing and enhancing it. Purgatives.
14. Comparative evaluation of mechanisms and localization of action of substances that inhibit the motility of the gastrointestinal tract. Their use, side effects. Sorbent preparations.
15. Differences in the mechanism and localization of action of substances that enhance the motility of the gastrointestinal tract (cholinomimetics, anticholinesterase agents, prokinetics). Their application.

Topic 23. Colloquium «Drugs regulating functions of organs».

Questions

1. Pharmacology of drugs acting on the respiratory system.
2. Classification of respiratory stimulants in the direction of action, drugs.
3. Comparative characteristics of respiratory stimulants from the groups of analeptics and N-cholinomimetics. Indications for use of stimulants.
4. Antitussives: classification, drugs. Comparative characteristics of antitussive agents of Central and peripheral action.
5. Localization and mechanisms of action of expectorant. Comparative characteristics of different drugs. Indications for use.
6. Comparison of the mechanisms of action of bronchodilators from the groups of adrenomimetics, M-cholinergic blockers and myotropic antispasmodics.
7. The use of anti-allergic and anti-inflammatory drugs in bronchial asthma.

8. Principles of action of drugs used to treat pulmonary edema. The choice of drugs depending on the pathogenetic mechanisms of its development.
9. Defoaming effect of ethyl alcohol.
10. Medicinal surfactants: principle of action and application.
11. Mechanisms of action of cardiotonic agents of non-glycosidic structure, peculiarities of their application in the clinic.
12. Features of the chemical structure of cardiac glycosides, the role of their constituent parts, classification by pharmacokinetic features.
13. The mechanism of cardiotonic action of cardiac glycosides: effect on the strength and rhythm of heartbeats, conductivity, automatism, metabolism in the myocardium. Extracardial effects of cardiac glycosides.
14. Indications and contraindications to the use of cardiotonic and pacemakers. Comparative characteristics of different drugs.
15. Factors contributing to glycoside intoxication. Clinical manifestation of glycoside intoxication, its prevention and treatment.
16. Classification of antiarrhythmic agents. Classification, influence on automatism, conductivity, effective refractory period of membrane stabilizing agents. Indications for their use, side effects.
17. Comparative characteristics of different subgroups of sodium channel blockers (IA, IB and IC).
18. Features of antiarrhythmic action of β - blockers, indications for their use, side effects.
19. Antiarrhythmic effect of calcium channel blockers, indications for their use, side effects.
20. Antiarrhythmic activity of agents that increase the duration of the action potential (potassium channel blockers). Side effects, indications for use of this group of drugs.
21. Classification of antianginal agents. Preparations.
22. Pharmacodynamics, indications for use and side effects of nitroglycerin.
23. Antianginal properties of calcium ion antagonists, β- blockers. The principle of action of cardioprotective agents (preduktal).
24. Means used in myocardial infarction.
25. Classification, mechanism of action of different groups of anti-atherosclerotic agents. Preparations. Features of use in different types of hyperlipidemia. Side effect.
26. Principles of action of the means increasing cerebral blood flow. Indications for their use.
27. Principles of migraine pharmacotherapy. Means used for relief and prevention of migraine attacks.

28. Classification of antihypertensive agents.
29. Mechanism, indications, side effects, distinctive features of individual groups of antihypertensive drugs. Prevention and elimination of side effects of antihypertensive drugs.
30. Classification of drugs used in acute hypotension. Localization and mechanism of action of adrenomimetics, angiotensinamide and dopamine. Application and side effects.
31. Classification of diuretics according to the chemical structure and localization of action.
32. The mechanism of diuretic action, indications for use of different groups of diuretics. Comparative evaluation of diuretics. Side effects of diuretics, their prevention.
33. The mechanism of action protivopodagricakih drugs used in chronic gout. Pharmacological and side effects, indications and contraindications to their use.
34. Means used in acute attacks of gout.
35. Classification of agents affecting the myometrium.
36. Drugs used to stimulate the labor. The influence of oxytocin and prostaglandins on the myometrium. Features of their application.
37. Pharmacodynamics of drugs that reduce the contractile activity of the uterus.
38. Pharmacological properties of ergot alkaloids. The mechanism of their hemostatic action in uterine bleeding.
39. Means, affecting appetite. Classification, pharmacodynamics, side effects, indications and contraindications for the use of appetite stimulants and anorexigens.
40. Drugs that reduce the secretion of digestive. Antacids. Antiemetic drugs. Indications for use.
41. Choleretic and cholekinetic.
42. Hepatoprotectors.
43. Cholelitolitic drugs and means of changing the motility of the gastrointestinal tract.
44. Antispasmodics, laxatives.
45. Means used in pancreatitis.
46. Enzyme and anti-enzyme preparations, sorbents.

Section 5. « Agents with a predominant effect on tissue metabolism and immune processes. Agents affecting the blood system».

Topic 24. Agents affecting the blood system.

Questions

1. Classification of drugs that affect hematopoiesis.
2. Drugs used for the treatment of hypochromic anemia. Comparative characteristics of iron preparations, their side effects and pharmacokinetics.
3. The effect of cobalt drugs on the process of hematopoiesis.
4. The use of recombinant human erythropoietins in anemia.
5. The mechanism of action and features of the use of vitamins B12 (cyanocobalamin) and BC (folic acid) in hyperchromic anemia.
6. The principle of operation and indications for use of stimulants leukopoiesis. Preparations.
7. Classification of drugs, inhibiting platelet aggregation, the mechanism of action. Preparations.
8. Features of antiplatelet action of ticlopidine, dipyridamole and anthuran. Application.
9. Hemostatic means of local and resorptive action. Preparations. Side effects, indications and contraindications to their use.
10. Classification of anticoagulants. The mechanism of action of direct-acting anticoagulants, indications for their use. Features of low molecular weight heparins.
11. Features of pharmacodynamics of anticoagulants of indirect action, indications for use. Preparations.
12. Symptoms of overdose of anticoagulants direct and indirect action. Measures to help it. Antagonists of anticoagulants of direct and indirect action (Protamine sulfate, vitamin K). Application of sodium citrate.
13. Classification and preparations of agents affecting fibrinolysis. The mechanism of their action, side effects, indications and contraindications.

Topic 25. Vitamins and enzymes.

Questions

1. Sources of vitamins, biological role in the body.
2. Classification of vitamin preparations.
3. Biological role, the main pharmacological properties of vitamin B1 (thiamine). Relevance of its application in medical practice. Manifestation of hypervitaminosis.
4. Pharmacodynamics and pharmacological properties of vitamin B2 (Riboflavin), B6 (pyridoxine), PP (nicotinic acid), indications and contraindications for their use. Manifestation of hypervitaminosis.

5. Pharmacology of cyanocobalamin and folic acid. Their effect on metabolism, hematopoiesis, nervous system. Side effects and indications for their use.

6. Manifestation of hypervitaminosis.

7. Biological role and pharmacological properties of ascorbic acid and routine. Their influence on the permeability of the vascular wall and tissue membranes. Indications for their use. Manifestation of hypervitaminosis.

8. Biological role (influence on epithelial covers, participation in the synthesis of visual purple) of vitamin A (retinol). Indications for use, side effects. Manifestation of hypervitaminosis.

9. Mechanism of formation of ergocalciferol and cholecalciferol. Their influence on calcium and phosphorus metabolism. Application, side effects. Manifestation of hypervitaminosis.

10. Pharmacology, side effects and indications for vitamin K (phylloquinone). Its role in the clotting process. A synthetic substitute for phylloquinone is vicasol. Application. The biological role of vitamin E(tocopherol), its antioxidant properties. Application.

11. Classification of enzyme preparations. Principles of action, indications for use.

12. Classification antifermental drugs. Application, side effects.

Topic 26. . Hormones (hypothalamic and pituitary hormonal drugs, epiphysis, thyroid, parathyroid, pancreatic hormones).

Questions

1. Principles of regulation of functions of endocrine glands. General mechanisms of action of hormones of different chemical structures.

2. Classification of hormonal agents. Sources of their production. The concept of biological standardization.

3. The biological role of hormones of the hypothalamus and pituitary gland. Classification. Preparations. Mechanism of action, pharmacological and side effects, indications for use of this group of drugs.

4. The effect of bromocriptine and danazol in the production of hormones by the pituitary gland. Their application.

5. Physiological role and use of pineal gland hormone (melatonin).

6. Classification and biological role of hormones of the thyroid gland. Pharmacodynamics of thyroid hormones, indications for their use.

7. Pharmacology of antithyroid drugs used to treat thyroid hyperfunction. Application and side

effects.

8. Preparations of the parathyroid gland. Features of their pharmacodynamics and indications for use, side effects. To compare the effects of supplements and calcitonin on the metabolism of phosphorus and calcium.

9. The value of the works of L. V. Soboleva. Obtaining insulin (F. Banning and K. best). Human insulin preparations.

10. The effect of insulin on metabolism.

11. Classification of insulin preparations. Their mechanism of action, pharmacological and side effects, indications for use. The principle of dosing insulin in the treatment of diabetes.

12. Pharmacology of synthetic hypoglycemic agents for oral administration (sulfonylurea derivatives, biguanides). Indications for use, side effects.

13. Pharmacology of drugs that violate the absorption of carbohydrates from the intestine.

Topic 27. Hormonal drugs (sex gormones, adrenocorticotropic hormones).

Questions

1. Features of application of hormonal preparations for the purpose of replacement therapy, with the stimulating purpose, for the purpose of oppression of function of endocrine glands and as pharmacological nonspecific means.

2. Preparations of female sex hormones, classification. Their biological role in the body, pharmacodynamics and indications for use. Antagonists of this group of drugs.

3. Contraceptive. Classification and preparations. Features of pharmacodynamics, pharmacokinetics and indications for the use of different groups of contraceptives.

4. Preparations of male sex hormones, pharmacodynamics and indications for use. Antiandrogenic drugs (androgen receptor blockers, 5□-reductase inhibitors), their use.

5. Anabolic steroids, effect on protein metabolism, indications for use and their side effects.

6. Pharmacological effects of drugs hormones of the adrenal glands.

7. Indications for the use of glucocorticoids. Side effects arising from the use of this group of drugs, their prevention and correction.

8. Mineralocorticoids: pharmacological and side effects, indications for their use.

Topic 28. Drugs affecting the immune system. Antiallergic drugs. Anti-inflamatory drugs.

Questions

1. Classification of agents that affect the immune system. Preparations.
2. Immunostimulatory drugs, pharmacodynamics and indications for use. Features of the use of drugs interferon and interferonogenov to stimulate immune processes.
3. Immunosuppressive properties of cytostatic agents.
4. Classification of antiallergic agents. Preparations.
5. The mechanism of antiallergic action of glucocorticoids. Application.
6. The principle of operation and application of cromolyn sodium and ketotifen.
7. Classification and topography of histamine receptors.
8. Classification of H1-histamine receptor blockers, their comparative evaluation. Application, side effects.
9. The use of adrenomimetics and broncholytics of myotropic action in anaphylactic reactions.
10. Pharmacodynamics, indications for use, contraindications, side effects non-opioid analgesics primarily Central actions (derived paraaminophenol). Acute paracetamol poisoning, relief measures.
11. The mechanism of analgesic, anti-inflammatory and antipyretic action of non-narcotic analgesics.
12. Classification of non-narcotic analgesics. Comparative characteristics of non-narcotic analgesics. Indications and contraindications to the use of non-narcotic analgesics.
13. Complications in the treatment of non-narcotic analgesics and the mechanism of their occurrence.

Topic 29. Colloquium «Drugs that control metabolic processes. Drugs affecting hemopoiesis».

Questions

1. Classification of drugs that affect hematopoiesis.
2. Drugs used for the treatment of hypochromic anemia.
3. The principle of operation and indications for use of stimulants leukopoiesis. Preparations.
4. Classification of drugs, inhibiting platelet aggregation, the mechanism of action. Preparations. Application.
5. Hemostatic means of local and resorptive action. Preparations. Side effects, indications and contraindications to their use.

6. Classification of anticoagulants. The mechanism of action of direct-acting anticoagulants, indications for their use.

7. Features of pharmacodynamics of anticoagulants of indirect action, indications for use. Preparations.

8. Symptoms of overdose of anticoagulants direct and indirect action. Measures to help it. Application of sodium citrate.

9. Classification and preparations of agents affecting fibrinolysis. The mechanism of their action, side effects, indications and contraindications.

10. Biological role, the main pharmacological properties of vitamin B1 (thiamine). Relevance of its application in medical practice. Manifestation of hypervitaminosis.

11. Pharmacodynamics and pharmacological properties of vitamin B2 (Riboflavin), B6 (pyridoxine), PP (nicotinic acid), indications and contraindications for their use. Manifestation of hypervitaminosis.

12. Pharmacology of cyanocobalamin and folic acid. Their effect on metabolism, hematopoiesis, nervous system. Side effects and indications for their use.

13. Manifestation of hypervitaminosis.

14. Biological role and pharmacological properties of ascorbic acid and routine. Their influence on the permeability of the vascular wall and tissue membranes. Indications for their use. Manifestation of hypervitaminosis.

15. Biological role (influence on epithelial covers, participation in the synthesis of visual purple) of vitamin A (retinol). Indications for use, side effects. Manifestation of hypervitaminosis.

16. Mechanism of formation of ergocalciferol and cholecalciferol. Their influence on calcium and phosphorus metabolism. Application, side effects. Manifestation of hypervitaminosis.

17. Pharmacology, side effects and indications for vitamin K (phylloquinone). Its role in the clotting process. A synthetic substitute for phylloquinone is vicasol. Application. The biological role of vitamin E(tocopherol), its antioxidant properties. Application.

18. Classification, mechanism of action, the main pharmacological and adverse effects, indications for the use of the main representatives of enzyme preparations.

19. Principles of regulation of functions of endocrine glands.

20. Classification of hormonal preparations of the hypothalamus and pituitary gland. Mechanism of action, pharmacological and side effects, indications for their use.

21. Pharmacology of preparations of thyroid and parathyroid glands, antithyroid drugs. Features of their pharmacodynamics and indications for use, side effects.
22. Classification of insulin preparations and oral antidiabetic agents. Their mechanism of action, pharmacological and side effects, indications for use.
23. Mechanism of action, pharmacological effects, side effects indications for the use of glucocorticoids and mineralcorticoids.
24. Sex hormone preparations. Pharmacodynamics and indications for the use of sex hormones. Antagonists of these drugs.
25. Pharmacology of anabolic steroids and contraceptives. Classification, indications for use and their side effects.
26. Classification, drugs, pharmacodynamics and indications for the use of drugs that affect the immune processes.
27. The mechanism of analgesic, anti-inflammatory and antipyretic action of non-narcotic analgesics.
28. Classification of non-narcotic analgesics. Comparative characteristics of non-narcotic analgesics. Indications and contraindications to the use of non-narcotic analgesics.
29. Complications in the treatment of non-narcotic analgesics and the mechanism of their occurrence.

Section 6. Antimicrobial drugs. Chemotherapy of neoplastic diseases.

Topic 30. Antiseptics and disinfectants. Sulfonamides. Synthetic antibacterial agents.

Questions

1. Classification of antiseptic and disinfectants. Preparations.
2. Pharmacological characteristics of antiseptics, groups of Halogens, oxidants, acids, alkalis and salts of heavy metals. Symptoms and help with poisoning by heavy metal salts, arsenic, acids and alkalis.
3. Antimicrobial action and indications for the use of antiseptics, phenol, dyes, alcohols, aldehydes and detergents.
4. Spectrum, mechanism of antimicrobial action of sulfonamides.
5. Classification of sulfonamide preparations. Characteristics of pharmacodynamics and pharmacokinetics of drugs of each group.

6. Indications and contraindications for the use of sulfonamides. Side effects, their prevention and treatment.

7. Spectrum, mechanism and type of antimicrobial action, indications for use and side effects of nitrofuran derivatives.

8. Antimicrobial action, indications for the use of antimicrobial preparations of quinolone derivatives (naphthyridine, quinoxaline, derivatives of 8-oxyquinoline, 4-oxyquinoline and fluoroquinolones).

Topic 31. Antibiotics.

Questions

1. Types of antimicrobial action.
2. Classification of antibacterial agents.
3. Principles of rational antibiotic therapy.
4. Classification of antibiotics.
5. Spectrum, mechanism, type of antimicrobial action, pharmacokinetics, indications and side effects of biosynthetic and semisynthetic penicillins.
6. Features of pharmacology of combined preparations of semisynthetic penicillins with inhibitors of β - lactamases (clavulanic acid, etc.).
7. General characteristics of cephalosporins. Differences between generations on the spectrum of action and pharmacokinetics.
8. Pharmacology of antibiotics-macrolides and azalides. Indications for use, their side effects.
9. Spectrum, mechanism, type of antimicrobial action, indications for use and side effects of tetracycline and levomycetin antibiotics.
10. Pharmacology of antibiotics-aminoglycosides and polymyxins. Side effects, indications for use.
11. Spectrum, mechanism, type of antimicrobial action, pharmacokinetics, indications and side effects of carbapenems, glycopeptide antibiotics (vancomycin) and lincosamides (clindamycin).
12. Antibiotics of different chemical structure. Features of action and application.
13. Problems arising from the use of chemotherapeutic agents. Ways to overcome them.

Topic 32. Antituberculosis, antiprotozoal, antifungal, antiviral, antihelminthic drugs.

Questions

1. Classification of anti-TB drugs. General characteristics of drugs.
2. Features of the use of anti-TB drugs (duration of treatment, principles of combination therapy).
3. Pharmacology of anti-TB antibiotics.
4. Pharmacodynamics and side effects of anti-syphilitic drugs. Back-up anti-respiratory antibiotics.
5. Classification, drugs, mechanism, spectrum and type of action of antifungal agents. Indications for their use.
6. Pharmacology of antiviral drugs. Classification, drugs, mechanism of action and indications for use.
7. Pharmacology of anthelmintic agents. Classification and mechanism of their action. Basic principles of clinical application.
8. Characteristics of chemotherapeutic agents used for the treatment of amoebic dysentery, giardiasis, toxoplasmosis, leishmaniasis and trichomonadosis.
9. Classification of antimalarials. Preparations. Indications for their use, side effects.
10. Mechanism of action and side effects of drugs used in balantidiasis.
11. Pharmacology of drugs used in trypanosomiasis.
12. Classification of anticancer agents. Requirements for antitumor agents.
13. Pharmacodynamics and indications for use of folic acid antimetabolites, purine and pyrimidine bases.
14. Pharmacodynamics, classification and indications for use of derivatives of dichloroethylamine, ethylenimine, esters of disulfonic acids, radioactive isotopes and platinum preparations. Indications for their use.
15. Antitumor alkaloids and antibiotics. The mechanism of their action. Indications for use.
16. Hormone therapy of malignant neoplasms. Indications for use of antiestrogenic drugs, antiandrogenic drugs and inhibitors of adrenal hormone biosynthesis.
17. Complications arising from chemotherapy of malignant neoplasms, their prevention and treatment.

Topic 33. Colloquium «Antimicrobial drugs. Chemotherapy of neoplastic diseases».

Questions

1. The history of the discovery of antibiotics. Works of A. Fleming and Z. V. Ermoleva Classification of antibacterial agents.
2. Types of antimicrobial action. Problems arising from the use of chemotherapeutic agents. Ways to overcome them. Principles of rational antibiotic therapy. The concept of basic and reserve antibiotics.
3. Spectrum, mechanism, type of antimicrobial action, pharmacokinetics, indications and side effects of biosynthetic and semisynthetic penicillins.
4. Features of pharmacology of combined preparations of semisynthetic penicillins with inhibitors of β- lactamases (clavulanic acid, etc.).
5. General characteristics of cephalosporins. Differences between generations on the spectrum of action and pharmacokinetics.
6. Pharmacology of antibiotics-macrolides and azalides. Indications for use, their side effects.
7. Spectrum, mechanism, type of antimicrobial action, indications for use and side effects of tetracycline and levomycetin antibiotics.
8. Pharmacology of antibiotics-aminoglycosides and polymyxins. Side effects, indications for use.
9. Spectrum, mechanism, type of antimicrobial action, pharmacokinetics, indications and side effects of carbapenems, glycopeptide antibiotics (vancomycin) and lincosamides (clindamycin).
10. Classification of antiseptic and disinfectants. Characteristics of drugs in groups.
11. Spectrum, mechanism of antimicrobial action of sulfonamides.
12. Classification of sulfonamide preparations. Characteristics of pharmacodynamics and pharmacokinetics of drugs of each group.
13. Indications and contraindications for the use of sulfonamides. Side effects, their prevention and treatment.
14. Spectrum, mechanism and type of antimicrobial action, indications for use and side effects of nitrofuran derivatives.
15. Antimicrobial action, indications for the use of antimicrobial preparations of quinolone derivatives (naphthyridine, quinoxaline, derivatives of 8-oxyquinoline, 4-oxyquinoline and fluoroquinolones).

16. Classification of anti-TB drugs. Features of the use of anti-TB drugs (duration of treatment, principles of combination therapy).
17. Pharmacology of anti-TB antibiotics.
18. Pharmacodynamics and side effects of anti-syphilitic drugs. Characteristics of drugs.
19. Classification, mechanism, spectrum of action of antifungal agents. Characteristics of drugs.
20. Pharmacology of antiviral drugs. Classification and mechanism of action. Characteristics of drugs.
21. Pharmacology of anthelmintic agents. Classification and mechanism of action. Basic principles of clinical application.
22. Characteristics of chemotherapeutic agents used for the treatment of amoebic dysentery, giardiasis, toxoplasmosis, leishmaniasis and trichomonadosis.
23. Classification of antimalarials. Characteristics of drugs.
24. Mechanism of action and side effects of drugs used in balantidiasis.
25. Pharmacology of drugs used in trypanosomiasis.
26. Classification of anticancer agents. Requirements for antitumor agents.
27. Pharmacodynamics and indications for use of folic acid antimetabolites, purine and pyrimidine bases.
28. Pharmacodynamics, classification and indications for use of derivatives of dichloroethylamine, ethylenimine, esters of disulfonic acids, radioactive isotopes and platinum preparations.
29. Antitumor alkaloids and antibiotics. The mechanism of their action. Indications for use.
30. Hormone therapy of malignant neoplasms. Indications for use of antiestrogenic drugs, antiandrogenic drugs and inhibitors of adrenal hormone biosynthesis.
31. Complications arising from chemotherapy of malignant neoplasms, their prevention and treatment.

Section 7. Basic principles of treatment of acute poisoning by pharmacological substances.

Topic 34. Basic principles of treatment of acute poisoning by pharmacological substances Preparations regulating acid-alkaline metabolism. Salts of alkaline and alkaline earth metals.

Questions

1. Measures to prevent the absorption of toxic substances into the blood at different routes of entry into the body.
2. Methods of removing toxic substances from the gastrointestinal tract and adsorbed in tissues.
3. Elimination of the action of the absorbed toxic substance (antidotes).
4. Symptomatic therapy of acute poisoning.
5. Action aid at acute poisoning with M-cholinomimetics and anticholinesterase drugs.
6. Measures in acute poisoning M-anticholinergics.
7. Measures to help antidepoliarizutmi overdose of muscle relaxants.
8. Measures aid under acute poisoning of our substances, depressing Central nervous system (sleeping pills, means for narcosis, morphine, ethyl alcohol).
9. Measures in case of intoxication cardiac glycosides.
10. Measures to help with insulin overdose.
11. Measures to help with an overdose of anticoagulants.
12. Measures to help with poisoning by acids, alkalis and salts of heavy metals.
13. Prevention of acute poisoning.
14. Drugs that regulate acid-base metabolism.
15. Pharmacology of sodium, potassium, calcium and magnesium.

*** Part of the topics of practical training requires laboratory work.**

7. LABORATORY WORK

Section 2.Means affecting the peripheral nervous system.

Topic 6. Drugs affecting the afferent innervation.

Experience 1. The solubility of anesthetics

The purpose of the experiment: to study the solubility of novocaine and anesthesin in water and oil.

The course of the experiment. In tubes pour on 2ml of water, then in one add 0,05 g of novocaine, in another-0,05 g of anesthesin. Repeat the experiment with oil. Observe the solubility of drugs. Justify the results of the experiment. To draw a conclusion about what type of anesthesia can be used novocaine and anesthesin. The results of observations to write in a notebook.

Experience 2. **Irritating effect of mustard on the skin.**

The purpose of the experiment: to determine the optimal temperature for the manifestation of the mustard effect.

The course of the experiment. The new shot is immersed in warm water, the second – in the cold, and the third in boiling water. After that, they are applied to the symmetrical areas of the flexor surface of both forearms, strengthening the bandage. After 10 minutes, mustard plasters are removed, subjective sensations are noted and the intensity of hyperemia on both forearms is compared. Justify the results of the experiment. To draw conclusions about what happens to mustard oil under the influence of heated to different temperatures, as well as chilled water. The results of observations to write in a notebook.

Experience 3. The effect of enveloping agents on the reaction of sensitive nerve endings.

The purpose of the experiment: to study the possibility of protecting starch mucus sensitive nerve endings from the irritating action of sulfuric acid.

The course of the experiment: the frog decapitate, hang for the lower jaw and three times to determine the time of the reflex when each foot is immersed in a Cup containing 0.25% sulfuric acid solution. Then wash the feet by immersion in a Cup of water. Immerse the foot in a Cup with starch mucus and then immerse the same foot in a 0.25% solution of sulfuric acid. Again to determine the time of occurrence of reflex. Justify the results of the experiment. To draw conclusions about the possibility of protecting starch mucus sensitive nerve endings from the irritating action of sulfuric acid. The results of observations to write in a notebook.

Topic 7. Cholinomimetic agents. Anticholinesterase agents. Holinoblokirutuyu drugs.

Experience. The effect of cholinergic drugs on the size of the pupil.

The purpose of the experiment: to study the effect of cholinergic drugs on the pupil.

The course of the experiment. Examine the eyes of a cat, the reaction of pupils to light. In one eye drip 1-2 drops of 1% solution of atropine, in the second drip 1-2 drops of 1% solution of pilocarpine.

Note the reaction of pupils to light, the beginning of the effect and the onset of maximum effect.

Justify the results of the experiment. To draw conclusions about how the reaction of the pupil to light changes under the influence of pilocarpine and atropine sulfate. The results of observations to write in a notebook.

Section 3. Drugs acting on central nervous system.

The topic 10. Means to narcosis. Ethyl alcohol.

Experience 1. Effect of ethyl alcohol on protein.

*The purpose of the experiment: t*o determine the effect of different concentrations of ethyl alcohol on protein.

The course of the experiment: a mixture of egg protein and water is placed in three test tubes. Carefully add (layering) a few drops of 40%, 70%, 95% ethyl alcohol.

Justify the results of the experiment. To draw conclusions about the effect of alcohol of different concentrations on protein. The results of observations to write in a notebook.

Experience 2. Comparison of various means for anesthesia: ether and chloroform.

The purpose of the experiment: to assess the strength of the narcotic effect of ether and chloroform.

The course of the experiment: in two flasks (800 ml), place one mouse. On the fleece of one flask, apply 0.3 ml of chloroform, on the fleece of the other-0.6 ml of ether. Pay attention to the rate of onset of lateral position of mice. Check for reflexes. Compare the awakening time of mice, pay attention to the differences in the concentrations of ether and chloroform.

The obtained data is recorded in a table.

TO DRAW A CONCLUSION ABOUT THE USE OF THESE SUBSTANCES IN CLINICAL PRACTICE.

	Ether	Chloroform
Dose		
Route of administration		
The beginning of the experience		
The time of occurrence of lateral position		
The rate of onset of anesthesia		
Wake up time		
Duration of anesthesia		

Experience 3. The effect of ethyl alcohol on the frog.

The purpose of the experiment: to show that ethyl alcohol can cause anesthesia.

The experiment: a frog placed under the funnel. Pay attention to the speed of reflexes. Moistened with ethyl alcohol cotton wool put under the funnel. Observe the phases of alcohol action on the body.

To draw a conclusion about the effect of alcohol on the Central nervous system. The results of observations to write in a notebook.

Topic 11. Hypnotics. Antiepileptic means. Antiparkinsonic drugs.

Experience 1. Anticonvulsant activity of hypnotics.

The purpose of the experiment: to investigate the anticonvulsant activity of hypnotics.

The course of the experiment: Mice (or rats) are injected subcutaneously 0.6% solution of sodium thiopental at the rate of 6 mg per 100 g of body weight. After 20 min the same and the other two mice (or rats) administered intraperitoneally a dose of camphor that causes seizures (0.6 ml 10% oil solution of camphor in 100 g of animal weight). Observe the condition of animals. In the event of seizures, one of the mice is administered intraperitoneal sodium thiopental at a dose of 6 mg per 100 g of body weight.

Justify the results of the experiment. To draw conclusions about the possibility of preventive, therapeutic use of hypnotics in convulsive States. The results of observations to write in a notebook.

Experience 2. The effect of neuroleptics on the depressing effect of hypnotics.

The purpose of the experiment: to determine the effect of aminazine on the depressing effect of hypnotics.

The course of the experiment: to introduce two mice 0.2 ml of isotonic sodium chloride solution and 0.5 ml of 0.5% aminazine solution. After 3 minutes, both mice enter intraperitoneal 0.2 ml of 0.1% barbamil solution. Observe changes in behavior and time of onset of the hypnotic effect in mice. Justify the results of the experiment. To draw conclusions about how aminazine affects the action of hypnotics. The results of observations to write in a notebook.

Section 5. Agents with a predominant effect on tissue metabolism and immune processes. Agents affecting the blood system.

The topic 24. Means affecting the blood system.

Experience 1. The effect of heparin fenilina and sodium citrate on the coagulation of blood.

The purpose of the experiment: to show that only direct anticoagulants prevent the process of blood clotting.

The course of the experiment: on each of the 4 glasses, apply 5 drops of one of the solutions: heparin, phenylin, sodium citrate, sodium chloride, then add 2 drops of fresh rat blood taken from the frenulum. Thoroughly mix the blood with the solution. After 10 minutes note the condition of the blood.

Justify the results of the experiment. To draw conclusions about the effect of heparin, phenylin and sodium citrate on blood clotting. The results of observations to write in a notebook.

Topic 26. Hormones (hypothalamic and pituitary hormonal drugs, epiphysis, thyroid, parathyroid, pancreatic hormones).

Experience 1. Insulin hypoglycemia in mice.

The purpose of the experiment: to observe insulin hypoglycemia in mice and relief of this condition with glucose.

The course of the experiment: the experiment was carried out on 3 hungry mice. Two mice enter

intraperitoneal 0.5 ml (20 UNITS) of insulin (the third-control). Observe for 20 minutes One of the mice that received the insulin to enter intraperitoneally 1 ml of a 20% glucose solution. Justify the results of the experiment.

Draw conclusions. The results of observations to write in a notebook.

Section 6. Antimicrobial drugs. Chemotherapy of neoplastic diseases.

The topic 31. Antibiotics.

Experience 1. Effect of phenol on animals.

The purpose of the experiment: to Prove the presence of gramicidin hemolytic properties.

The course of the experiment: in 2 centrifuge tubes pour 3 ml of citrate blood and add to the first – 0.2 ml of 2% alcohol solution of gramicidin C, in the second-the same amount of ethanol. The contents of the tubes should be thoroughly mixed, after 10-15 minutes, centrifuged for 10 -15 minutes. Pay attention to the color and lack of a layer of red blood cells ("lacquer" blood) in the tube, where gramicidin C was added.

Analyze the results. To emphasize the inadmissibility of parenteral use of gramicidin. Draw conclusions. The results of observations to write in a notebook.

8. TOPICS OF ESSAYS

Essays are written on the main topics of practical classes:

1. Introduction to pharmacology. General pharmacology. The total recipe.
2. Solid dosage forms.
3. Liquid dosage forms.
4. Mild dosage forms.
5. General questions of pharmacokinetics.
6. General questions of pharmacodynamics.
7. Cholinomimetic agents. Anticholinesterase agents. Holinoblokirutuyu drugs.
8. Adrenomimetic agents. Adrenoceptor blocking means.
9. Means to narcosis. Ethyl Alcohol.

10. Sleeping pills.
11. Antiepileptic and antiparkinsonian media.
12. Sedatives, tranquilizers, antipsychotics.
13. Remedies for the treatment of mania.
14. Antidepressants.
15. Analeptic.
16. Psychostimulants.
17. General ionizing agents.
18. Narcotic analgesic.
19. Agents affecting the respiratory system.
20. Cardiotonic and antianginal agents.
21. Antiarrhythmic drugs.
22. Means, affecting cerebral blood circulation.
23. Protivomigrenoznae drugs.
24. Antihypertensive drugs.
25. Hypertensive drugs.
26. Diuretics, protivopodagricakih drugs.
27. Agents affecting the myometrium.
28. Drugs that affect the function of the digestive system.
29. Agents that affect the blood system.
30. Drugs that regulate acid-base metabolism.
31. Vitamin and enzyme preparations.
32. Salts of alkaline and alkaline earth metals.
33. Pharmacology of hormonal agents.
34. Agents that affect immune processes.

35. Antiseptic and disinfectants.
36. Sulfanilamide preparations.
37. Synthetic antimicrobial agents.
38. Antibiotics.
39. Antitumor agents.
40. Principles of treatment of acute drug poisoning.

The performance criteria:

Abstract-prepared by students of choice. Can be prepared by a group of students, each of whom develops one section. The abstract should reveal the essence of the issues, be as informative as possible and contain conclusions.

Evaluation criterion:

Form of control	Evaluation evaluation	Criteria
Preparation and protection of the abstract	Great	The abstract is executed accurately and handed over in due time, is written independently not less than on 10 pages of the typewritten text, with use not less than 5 literary sources. Schemes, tables and figures corresponding to the theme of the abstract are given. When defending the abstract, the text does not read, but tells. Confidently and accurately answers all questions.
	Well	The abstract is executed accurately and handed over in due time, is written independently not less than on 10 pages of the typewritten text, with use not less than 5 literary sources. Schemes, tables and figures corresponding to the theme of the abstract are given. When defending the abstract, the text does not read, but tells. When answering questions, he makes unprincipled mistakes.
	Satisfactorily	The abstract is executed accurately and handed over in due time, is written independently not less than on 10 pages of the typewritten text, with use not less than 5 literary sources. When defending the abstract, the text reads. Hesitantly answers questions, makes fundamental mistakes.

	Unsatisfactorily	The abstract is executed sloppily and not handed over in due time, is written independently less than on 10 pages of the typewritten text, with use less than 5 literary sources. When defending the abstract, the text reads. When answering questions, he makes blunders, does not Orient himself in the material.
	Unsatisfactorily	The presentation is not delivered on time, the volume is less than 20 slides. Less than 5 literature sources were used. Slides are not meaningful. In the defense, the author makes gross errors in answering questions. Not oriented in their own material.

9. Questions to credit

№ tasks	Formulation of the questions
Section «General pharmacology »	1. State Pharmacopoeia: content, meaning. 2. The sources of medicinal substances. 3. Rules for storage, registration, use of pharmaceuticals in medical institutions 4. Recipe: structure, forms of prescription forms. 5. The request (invoice) for prescription pharmaceuticals. 6. Rules of designation of medicines in the prescription. 7. Pharmacokinetics: processes, their characteristics 8. Biotransformation of pharmaceuticals. 9. Half-life, bioavailability. 10. Enteral route of administration of LP. 11. Paranteral route of administration of LP. 12. Types of action of drugs on the body. 13. Doses. Types of doses. Therapeutic latitude, therapeutic index. 14. Addictive. Drug dependence. 15. Idiosyncrasy. Tachyphylaxis. 16. Effect of drugs on the fetus. 17. Tests of new drugs. 18. Cumulation: types, tactics of the doctor.

	19. Rules for prescribing powders. 20. The rules for prescribing pills and capsules are medical. 21. Rules for prescribing pills. 22. Rules for prescribing solutions, ways to indicate the concentration of drugs in the prescription. 23. Writing in the recipes of oil and alcohol solutions. 24. Infusions and decoctions. Preparation. The writing in the recipe. 25. Tinctures and extracts. Receiving. The writing in the recipe. 26. The concept of novogalenovyh drugs. Ophthalmic dosage forms: types, prescribed in the recipe. 27. Ointments, pastes: Composition. Rules of writing out the recipe. 28. Liniments: composition, writing in the recipe. 29. Suppositories: the types, composition and rules of writing out the recipe. 30. Dosage forms for injection. Rules of writing out the recipe. 31. Lists of drugs.
Section **«Drugs, which influence on afferent innervations»**	1. Astringents: classification. Mechanism of action .indications for use. 2. Enveloping agents. Name drugs, indications for use. The writing in the recipe mucus. 3. Adsorbing agents. Indications for use. 4. Classification of local anesthetics. The prolongation of the action. 5. Novocaine. Concentration for different types of anesthesia. Application in therapy. 6. Comparative characteristics of local (duration of action, toxicity, types of anesthesia). 7. Classification of cholinomimetic agents. 8. Classification cholinoblockers agents. 9. General characteristics of M-cholinomimetics. The difference between pilocarpine and aceclidine toxicity and application. 10. General characteristics of N-cholinomimetics. 11. Drugs that facilitate withdrawal from smoking. The mechanism of their action.

	12. The mechanism of action anticholinesterase agents. Indications for use. Side effect. 13. Symptoms and help with cholinomimetic poisoning (FOS). 14. Pharmacological effects, application on the basis of these effects of cholinergic and adrenergic agents. 15. Classification cholinoblocker agents. 16. M- cholinoblockers: classification, pharmacological effects, indications for use. 17. Ganglioblockers: mechanism of action, classification by duration of action, pharmacological effects, features of application, indications for use. 18. Muscle relaxants: classification by mechanism of action. Indications for use. Help with overdose of different muscle relaxants. 19. Classification of adrenomimetic agents. 20. General characteristics of α-adrenomimetics. 21. General characteristics of β-adrenomimetics. 22. General characteristics of α and β –adrenomimetics. 23. Sympathomimetics: mechanism of action, pharmacological effects, indications for probably side effects. 24. Symptoms and help with atropine poisoning. 25. Atropine sulfate; mechanism of action, pharmacological effects, indications for use, side effects. The comparison gastrozepin and ipratropium bromide. 26. α-blockers: pharmacological effects, indications for use of prazosin, doxazine, phentolamine .Side effect. 27. Anaprilin: pharmacological effects, indications for use, side effects. 28. Cardioselective B-blockers. Unlike non-selective. 29. α and β - blockers: pharmacological effects, indications for use. 30. Sympatholytics: pharmacological effects, indications for use
Section **«Drugs acting on the central**	1. Classification of drugs for anesthesia. Pharmacology of halothane. 2. Classification of drugs for non-inhalation anesthesia by duration of action. Pharmacology of propofol. 3. Combined use of drugs for anesthesia with drugs of other

nervous system»	pharmacological groups. 4. Ethyl alcohol: acute and chronic poisoning, symptoms, help. Mechanism of action of teturam. 5. Classification of hypnotics. Principles of treatment of sleep disorders. 6. Poisoning with hypnotics: symptoms, help. 7. Classification of analgesics. 8. Comparative characteristics of morphine, omnopon, fentanyl, and morphine. 9. The effect of morphine on the Central nervous system and the body as a whole. 10. Symptoms and help with acute opiate drug poisoning (morphine). 11. Principles of application of antiepileptic agents. 12. Classification of antiepileptic drugs (by forms of epilepsy). 13. Classification of antiparkinsonian drugs.
Section «Psychotropic drugs»	1. Classification of antipsychotic drugs. Indications for use. Side effect. 2. Pharmacology of chlorpromazine. 3. Antidepressants: classification, indications, side effects, correction and prevention. 4. Sedatives: drugs, mechanism of action, indications for use. 5. Classification of psychostimulants. 6.Comparative characteristics of psychomotor and psychometabolic psychostimulants. 7. Caffeine: caffeine preparations, pressure on blood vessels, heart function, blood pressure. 8. Nootropic agents: effects, indications for use. 9. General ionizing agents: drugs, effects, indications for use. 10. Anxiolytics (tranquilizers): classification by duration of action. The concept of "day" and "night" tranquilizers; ataralgesia. 11 Analeptics: classification, pharmacological effects, indications for use. 12. Etimizol: pharmacological characteristics.

LIST OF QUESTIONS FOR THE EXAM:

1. The subject and objectives of pharmacology, its place among other medical disciplines. The main stages of development of pharmacology. Principles of research of new medicines.
2. Comparative characteristics of the routes of administration of drugs. Distribution of drugs in the body. Biological barrier. Deposit.
3. Chemical transformations of drugs in the body, their significance. Ways of excretion of drugs from the body. The concept of half-life, clearance, elimination. Pharmacological significance of lipophilicity and hydrophilicity of drugs.
4. The concept of pharmacodynamics. Types of action of drugs. The concept of specific receptors, agonists and antagonists. Dependence of pharmacological effect on physico-chemical properties of drugs. Types of doses. Dependence of pharmacological effect on dose and concentration. Breadth of therapeutic action.
5. Pharmacokinetics: main stages, characteristics of stages.
6. Repeated use of drugs. Dependence of pharmacological effect on sex, age, pathological state of the organism. The role of genetic factors. Chronopharmacology.
7. Types and results of drug interactions. The mechanisms of pharmacodynamic interactions of drugs. The main types of drug therapy. The concept of antidotes.
8. The concept of the main, side and toxic effects of drugs. Toxic effect of drugs: types and manifestations. The concept of idiosyncrasy.
9. The concept of biological standardization.
10. The concept of afferent innervation. Classification of agents that irritate sensitive nerve endings, at the point of application (localization of action).
11. Local anesthetic drugs. General characteristic.
12. The principle of action and classification of substances that protect sensitive nerve endings: astringents, enveloping and adsorbing agents. Indications for the use of drugs in medical practice.
13. Classification, mechanism of action and indications for use of laxatives.
14. Classification, mechanism of action and indications for use of choleretic agents and bitterness.
15. Selective M - and N-cholinomimetics: drugs, pharmacodynamics, indications, side effects and contraindications to their use. Toxic effects of nicotine. The use of N-cholinomimetic agents to facilitate withdrawal from smoking.
16. Pharmacodynamics and pharmacokinetics of anticholinesterase agents and cholinesterase reactivators.

17. Poisoning by M-cholinomimetics and organophosphorus compounds.

18. M-cholinoblockers: classification, drugs, pharmacodynamics, indications and contraindications. Acute poisoning by this group of drugs, measures of assistance.

19. Classification, mechanism of action, pharmacological effects of ganglioblockers. Indications for use ganglioblockers. Side effects.

20. Muscle relaxants: classification, pharmacodynamics and indications for use. Side effects.

21. The concept of adrenergic synapse, mediator, features of biosynthesis and inactivation of the mediator. Topographic location of adrenergic synapses. Types and subtypes of adrenergic receptors. Classification of agents acting on adrenergic synapses.

22. Pharmacology □,□- adrenomimetics: mechanism of action, pharmacological effects, side effects, indications and contraindications. Pharmacodynamics, indications, contraindications for use and side effects of indirect adrenomimetics.

23. Classification, drugs, mechanism of action, side effects, indications and contraindications to the use of □ - adrenomimetics.

24. Classification, drugs, mechanism of action, side effects, indications and contraindications to the use of □1-and □2-adrenomimetics.

25. Classification, drugs, mechanism of action, side effects, indications and contraindications to the use of □ - adrenoblockers.

26. Classification, drugs, mechanism of action, side effects, indications and contraindications to the use of □ - adrenoblockers.

27. Pharmacological effects of □,□-adrenoblockers, indications for use. Drugs, mechanism of action, side effects, indications and contraindications to the use of sympatholytics.

28. Inhalation anesthesia, its advantages and disadvantages. Factors contributing to the absorption and elimination of inhalation drugs for anesthesia. Comparative characteristics of means for inhalation anesthesia.

29. Advantages and disadvantages of non-inhalation anesthesia. Features of the action of drugs for non-inhalation anesthesia, their comparative assessment.

30. Ethyl alcohol. The use of ethyl alcohol in medical practice. Registration of the prescription, rules of storage and accounting of use of alcohol in medical institution.

31. Classification of hypnotics. Mechanism of action. Problems arising from the use of hypnotics. Acute and chronic poisoning with sleeping pills, the principles of their pharmacotherapy. Antagonists of benzodiazepine hypnotics.

32. Classification, drugs, mechanism of action, indications and contraindications, side effects of antiepileptic drugs. Comparative evaluation of the effectiveness of individual drugs in various forms of epilepsy. A medicine used for the relief of status epilepticus.

33. Classification of antiparkinsonian agents by the mechanism of their action. Pharmacokinetics, mechanisms of action, indications and contraindications to the use of antiparkinsonian agents. The main side effects of antiparkinsonian drugs. The use of DOPA-decarboxylase inhibitors, peripheral dopamine receptor blockers, COMT," atypical " neuroleptics to reduce the side effects of levodopa.

34. Pharmacokinetics, pharmacodynamics of different groups, indications for use, side effects, contraindications of tranquilizers (anxiolytics).

35. Classification of neuroleptics. The concept of "typical" and "atypical" antipsychotic drugs. Comparative characteristics of pharmacodynamics of different groups of neuroleptics. Indications for use of neuroleptics. Prevention and treatment of side effects arising from the use of neuroleptics.

36. Classification of antidepressants. Mechanism of action, indications for use and side effects of antidepressants of each group.

37. Pharmacology of psychostimulants: classification, drugs, main mechanisms of action, pharmacological effects, indications for use and side effects. Comparative characteristics of psychomotor and psychometabolic stimulants.

38. Classification, drugs, mechanisms of stimulating action on the Central nervous system, the effect on breathing and blood circulation, indications for use and side effects of analeptics.

39. Narcotic analgesics: classification. Effect of morphine on the body, comparative characteristics of synthetic substitutes for morphine.

40. Functional antagonists of narcotic analgesics: principle of action, application. Acute poisoning with opioid analgesics, principles of its pharmacotherapy. Pharmacodynamics, indications, contraindications and side effects of analgesics with a mixed mechanism of action. Mechanisms of analgesic component of the action of drugs from different pharmacological groups and their application.

41. Nonsteroidal anti-inflammatory drugs: mechanism of action, classification by chemical structure, features of pharmacological effects of each group.

42. Expectorants and antitussives. Classification. Mechanism of action. Indications for use.

43. Preparations of 2-adrenomimetics and methylxanthine derivatives of prolonged action. Indications for use of bronchodilators, ways of their introduction, side effect. The use of bronchial asthma antiallergic and anti-inflammatory drugs.

44. Principles of action of drugs used to treat pulmonary edema. The choice of drugs depending on the pathogenetic mechanisms of its development. Defoaming effect of ethyl alcohol. Surfactant preparations: mechanism of action, indications for use,

45. Classification, General and comparative characteristics of cardiotonic drugs. Mechanism of action of cardiotonic means of non-glycosidic structure, features of their application in the clinic.

46. Features of the chemical structure of cardiac glycosides, the role of their components, classification by pharmacokinetic features. Mechanism of cardiotonic action of cardiac glycosides. Influence on the strength and rhythm of the heart, conductivity, automatism, metabolism in the myocardium. Extracardial effects of cardiac glycosides. Clinical manifestation of glycoside intoxication, its prevention and treatment.

47. Classification of antiarrhythmic agents. Indications for their use, side effects. Comparative characteristics of different subgroups of sodium channel blockers. Features of antiarrhythmic action of □- adrenoblockers, indications for their use, side effects.

48. Classification of antianginal agents. Preparations. Pharmacodynamics, indications for use and side effects of nitroglycerin. Features of the action and use of drugs nitroglycerin prolonged action.

49. Antianginal properties of calcium ion antagonists, beta-blockers and bradycardic agents. The principle of action of cardioprotective agents (Preductal).

50. Classification, mechanism of action of different groups of anti-atherosclerotic agents. Preparations. Features of application in different types of hyperlipidemia. Side effect.

51. Principles of action of drugs that increase cerebral blood flow, antiplatelet agents, neuroprotectors. Indications for their use.

52. Principles of pharmacotherapy of migraine. Means used for relief and prevention of migraine attacks.

53. Classification of antihypertensive agents.

54. Mechanism, indications, side effects, distinctive features of individual groups of antihypertensive drugs. Combined use of antihypertensive agents with different localization and mechanism of action.

55. Classification of drugs used in acute hypotension. Localization and mechanism of action. Application and side effects.

56. Classification of diuretics according to the chemical structure and localization of action. The mechanism of diuretic action, indications for use of various groups of diuretics.

57. Comparative evaluation of diuretics that have a depressing effect on the epithelium of the renal

tubules (efficiency, speed of development and duration of the effect, the effect on the ion balance). Herbal medicines with diuretic effect.

58. The mechanism of action of anti-gout agents used in chronic gout. Pharmacological and side effects, indications and contraindications to their use. Means used in acute attacks of gout.

59. Classification of agents affecting the myometrium. Drugs used to stimulate the labor. The influence of oxytocin and prostaglandins on the myometrium. Features of their application.

60. Pharmacodynamics of drugs that reduce the contractile activity of the uterus. Pharmacological properties of ergot alkaloids. The mechanism of their hemostatic action in uterine bleeding.

61. Means, affecting appetite. Pharmacodynamics, side effects, indications and contraindications for the use of appetite stimulants and anorexigenic substances.

62. Principles of action of substances that reduce the secretory function of the stomach glands.

63. Comparative characteristics of anti-acid drugs. Indications for their use, side effects.

64. The principles of operation of gastroprotection and antacids. Their use in gastric ulcer.

65. Principles of action of antiemetics. Indications for use of individual drugs. Means for the prevention of vomiting in chemotherapy of tumors. Emetics. Indications for use.

66. Classification, mechanism of action, pharmacological effects, indications for use, side effects and contraindications to the appointment of drugs affecting the motility of the gastrointestinal tract: depressing and enhancing it.

67. Classification of drugs used in violation of the function of the stomach glands. The use of drugs, stimulating the secretion of gastric glands. Means of replacement therapy in case of insufficiency of the gastric glands.

68. Cholelitolitic drugs. Conditions necessary for the success of psychotherapy.

69. Hepatoprotectors. General characteristic. Differences in the mechanism of action of drugs.

70. Classification of drugs affecting hematopoiesis. Mechanism of action and features of the use of vitamins B12 (cyanocobalamin) and BC (folic acid) in hyperchromic anemia.

71. Means used for the treatment of hypochromic anemia. Comparative characteristics of iron preparations, their side effects and pharmacokinetics. The effect of cobalt drugs on the process of hematopoiesis. The use of recombinant human erythropoietins in anemia.

72. The principle of action and indications for use of leukopoiesis stimulants. Preparations.

73. Classification of drugs that inhibit platelet aggregation, the mechanism of action. Preparations. Application.

74. Hemostatic means of local and resorptive action. Preparations. Side effects, indications and

contraindications to their use.

75. Classification of anticoagulants. Mechanism of action of direct-acting anticoagulants, indications for their use. Features of low molecular weight heparins.

76. Features of pharmacodynamics of anticoagulants of indirect action, indications for use. Preparations. Symptoms of overdose of anticoagulants direct and indirect action. Measures to help it.

77. Pharmacodynamics and pharmacological properties of vitamins B1 (thiamine), B2 (Riboflavin), B6 (pyridoxine), PP (nicotinic acid), indications and contraindications for their use. Manifestation of hypervitaminosis.

78. Biological role and pharmacological properties of ascorbic acid and rutin. Their influence on the permeability of the vascular wall and tissue membranes. Indications for their use. Manifestation of hypervitaminosis.

79. Biological role of vitamins a (retinol), K (phylloquinone), E (tocopherol). Indications, side effects. Manifestation of hypervitaminosis.

80. Mechanism of formation of ergocalciferol and cholecalciferol. Their effect on the exchange of calcium and phosphorus. Application, side effects. Manifestation of hypervitaminosis.

81. Classification of enzyme preparations by clinical application. Features of application of separate preparations.

82. Drugs that regulate acid-base metabolism.

83. Classification of hormonal agents. Sources of their receipt. Features of application of hormonal preparations for the purpose of replacement therapy, with the stimulating purpose, for the purpose of oppression of function of endocrine glands and as pharmacological nonspecific means.

84. The biological role of hormones of the hypothalamus and pituitary gland. Classification. Preparations. Mechanism of action, pharmacological and side effects, indications for use of this group of drugs.

85. Classification and biological role of hormones of the thyroid gland. Pharmacodynamics of thyroid hormones, indications for their use.

86. Pharmacodynamics and pharmacokinetics of antithyroid drugs used to treat thyroid hyperfunction. Application and side effects.

87. Classification of insulin preparations. Their mechanism of action, pharmacological and side effects, indications for use.

88. Pharmacology of synthetic hypoglycemic agents for oral administration. Indications, side

effects.

89. Preparations of female sex hormones, classification. Their biological role in the body, pharmacodynamics and indications for use. Antagonists of this group of drugs.

90. Contraceptive. Classification and preparations. Features of pharmacodynamics, pharmacokinetics and indications for use of different groups of contraceptives.

91. Preparations of male sex hormones, pharmacodynamics and indications for use. Antiandrogenic drugs (androgen receptor blockers, 5α-reductase inhibitors), their use. Anabolic steroids, effect on protein metabolism, indications for use, side effects.

92. Hormonal preparations of adrenal cortex hormones: glucocorticoids: drugs, indications for use, side effects, tactics of the doctor to prevent them. Mineralocorticoids: pharmacodynamics and pharmacokinetics, indications for use

93. Classification of antiallergic agents. Preparations. Comparative evaluation. Application, side effects.

94. Immunostimulatory drugs, classification, pharmacodynamics and indications for use. Features of application of preparations of interferon and interferonogene to stimulate immune processes.

95. Classification of antiseptic and disinfectants. Preparations. Pharmacological characteristics of antiseptics groups of Halogens, oxidants, acids, alkalis and salts of heavy metals. Symptoms and help with poisoning by heavy metal salts, acids and alkalis.

96. Antimicrobial action and indications for the use of antiseptics, phenol, dyes, alcohols, aldehydes and detergents.

97. Spectrum, mechanism of antimicrobial action of sulfonamides. Classification of sulfonamides. Characteristics of pharmacodynamics and pharmacokinetics of drugs of each group. Indications and contraindications for the use of sulfonamides. Side effects, their prevention and treatment.

98. Spectrum, mechanism and type of antimicrobial action, indications for use and side effects of nitrofuran derivatives.

99. Antimicrobial action, indications for the use of antimicrobial preparations of quinolone derivatives (naphthyridine, quinoxaline, derivatives of 8-oxyquinoline, 4-oxyquinoline and fluoroquinolones).

100. Classification of antibacterial agents. Types of antimicrobial action. Problems arising from the use of chemotherapeutic agents. Ways to overcome them.

101. Principles of rational antibiotic therapy. The concept of basic and reserve antibiotics. Classification of antibiotics.

102. Spectrum, mechanism, type of antimicrobial action, pharmacokinetics, indications for use and side effects of biosynthetic and semisynthetic penicillins. Features of pharmacodynamics and pharmacokinetics of combined preparations of semisynthetic penicillins with inhibitors of β - lactamase (clavulanic acid, etc.).

103. Pharmacology of antibiotics-macrolides and cephalosporins. Indications, side effects. Differences between generations on the spectrum of action and application.

104. Spectrum, mechanism, type of antimicrobial action, pharmacokinetics, indications and side effects of tetracyclines, levomycetin and carbapenems.

105. Classification of anti-TB drugs. General characteristics of drugs. Features of the use of anti-TB drugs.

106. Pharmacodynamics and side effects of anti-syphilitic drugs.

107. Classification, drugs, mechanism, spectrum and type of action of antifungal agents. Indications for use.

108. Pharmacodynamics and pharmacokinetics of antiviral agents. Classification, drugs, mechanism of action and indications for use.

109. Pharmacodynamics and pharmacokinetics of anthelmintic agents. Classification and mechanism of their action. Basic principles of clinical application.

110. Classification of antimalarial agents. Preparations. Indications for use, side effects.

111. Characteristics of chemotherapeutic agents used for the treatment of amoebic dysentery, giardiasis, toxoplasmosis, leishmaniasis and trichomonadosis.

112. Classification of antitumor agents. Requirements for antitumor agents. Pharmacodynamics and indications for use. Complications arising from chemotherapy of malignant neoplasms, their prevention and treatment.

113. Hormone therapy of malignant neoplasms. Indications for use of antiestrogenic drugs, antiandrogenic drugs and inhibitors of adrenal hormone biosynthesis.

114. Principles of therapy of acute drug poisoning.

10. INDEPENDENT WORK

Form of education- full-time education

№	Title of sections and topics	Type of independent work	Volume in hours	Form of control
1.	**Section 1.** Introduction to pharmacology. General pharmacology. General recipe.	Prescription tasks for pharmacotherapy, used in the practice of a doctor with the skills of prescribing drugs in various drug forms .	**16**	Readiness and content check
2.	**Section 2**. Drugs acting on the autonomic nervous system.	Preparation of abstracts.Prescription tasks for pharmacotherapy in the practice of a doctor.	**14**	Readiness and content check
3.	**Section 3**. Drugs acting on central nervous system.	The decision of situational tasks. Prescribing. Perform tasks for the calculation of doses.	**14**	Readiness and content check
4.	**Section 4.** Means influencing functions of Executive bodies.	Preparation of abstracts.Prescription tasks for pharmacotherapy, close to the practice of the doctor. Preparation of situational tasks.	**16**	Readiness and content check
5.	**Section 5.** Agents with a predominant effect on tissue metabolism and immune processes. Agents affecting the blood system.	Work with prescription reference books. Preparation of abstracts. Prescribing.	**9**	Readiness and content check
6.	**Section 6.** Antimicrobial drugs. Chemotherapy of neoplastic diseases.	Preparation of abstracts.Prescription tasks for pharmacotherapy, close to the practice of the doctor. Preparation of situational tasks.	**6**	Readiness and content check
7.	**Section 7.** Basic principles of treatment of acute poisoning by pharmacological substances.	Work with prescription reference books. The decision of situational tasks.	**1**	Readiness and content check

The organization and implementation of independent work of students can be found in the training manual "Guidelines on pharmacology for independent work of students", the authors: Mazurova O.V., Sapozhnikov A.N.

LIST OF CHANGES of

Educational plan of discipline «Pharmacology»

Speciality 31.05.01. «General medicine»

№	Content of the change or a link to the attached text of the	Full name of the head of the Department developing the discipline	Signature	Date
1	Introduction of changes to item C) Professional databases, information and reference systems item 11 "Educational, methodological and information support of the discipline" with the design of Appendix 1	Markevich M.P.		27.05.2022
2	Introduction of changes to item A) Recommended Literature item 11 "Educational, methodological and information support of the discipline" with the design of Appendix 2	Markevich M.P.		27.05.2022

	tissue metabolism and immune processes. Agents affecting the blood system.	Prescribing.		
6.	**Section 6.** Antimicrobial drugs. Chemotherapy of neoplastic diseases.	Preparation of abstracts.Prescription tasks for pharmacotherapy, close to the practice of the doctor. Preparation of situational tasks.	**6**	Readiness and content check
7.	**Section 7.** Basic principles of treatment of acute poisoning by pharmacological substances.	Work with prescription reference books. The decision of situational tasks.	**1**	Readiness and content check

The organization and implementation of independent work of students can be found in the training manual "Guidelines on pharmacology for independent work of students", the author: Mazurova O.V., Sapozhnikov A.N.

11. EDUCATIONAL-METHODICAL AND INFORMATION SUPPORT OF DISCIPLINE

List of recommended literature:

a)Core reading:

1. Kharkevitch, D. A. Pharmacology : 12th edition, revised and improved. - M. : ГЭОТАР-Медиа, 2019. - 2nd edition. - 680 с. - ISBN 978-5-9704-4985-1. - // URL: http://www.studmedlib.ru/book/ISBN9785970449851.html

2. Alyautdin, R. N. Pharmacology. Illustrated textbook / ed. R. N. Alyautdin. - Moscow : GEOTAR-Media, 2020. - 312 p.- ISBN 978-5-9704-5665-1. - Text : electronic // EBS "Student Consultant" : [website].– URL:

https://www.studentlibrary.ru/ru/book/ISBN9785970456651.html

b) Supplementary reading:

1. Mazurova, O. V. Pharmacology: guidelines for practical classes for foreign students. Part 1 / O. V. Mazurova, A. N. Sapoznikov, M. P. Markevich ; Ulyanovsk State University, Insitute of Medicine, Ecology and Physical culture. - 2nd edition. - Электрон. текстовые дан. (1 файл : 1,07 Мб). - Ulyanovsk : UlSU, 2020. - 76 p. - На англ. яз. - URL: https://portal.ulsu.ru/course/view.php?id=87537. - Режим доступа: Портал ЭИОС УлГУ. -Загл. с экрана. - Текст : электронный.

2. Enikeeva, D. A. Pharmacology. Part 1. Workbook / Enikeeva D. A. , Bondarchuk N. G. , Alyautdin R. N. , Fisenko V. P. - Moscow : GEOTAR-Media, 2021. - 264 p. - ISBN 978-5-9704-6202-7. - Text: electronic // EBS "Student Consultant" : [website]. - URL : https://www.studentlibrary.ru/book/ISBN9785970462027.html

3 General formulation on pharmacology = General formulation on pharmacology : an educational and methodological guide for English-speaking FIS students / K. A. Tatzhikova, N. V. Timofeeva, D. A. Gorshkov, etc. - Astrakhan : Astrakhan State Medical University, 2019. - 41 p. - ISBN 9785442404890. - Text : electronic // EBS "Bukap" : [website]. - URL : https://www.books-up.ru/ru/book/obcshaya-receptura-po-farmakologii-11237607

c) Educational and methodical literature:

1. Mazurova O. V.Guidelines for organizing practical classes and independent work of students of the discipline «Pharmacology» direction/specialisation 31.05.01 General medicine / O. V. Mazurova, A. N. Sapozhnikov. - Ulyanovsk : UlSU, 2020. - 27 p. - Неопубликованный ресурс; На англ. яз. - URL: http://lib.ulsu.ru/MegaPro/Download/MObject/11304 . - Режим доступа: ЭБС

УлГУ. - Текст : электронный.

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Main Librarian Стадольникова / Стад / 12.05.2022

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d) Software:

- Windows operating system;
- Package of office programs Microsoft Office.

e) Professed data base, directory and search systems:

1. eLIBRARY.RU: scientific electronic library : website / Scientific Electronic Library LLC. – Moscow, [2022]. – URL: http://elibrary.ru. – access mode : for authorization. users'. – Text : electronic.
2. «Student Consultant» : electronic library system : website / LLC Politehresurs. – Moscow, [2022]. – URL: http://www.studentlibrary.ru/catalogue/switch_kit/x2019-128.html. – Access mode: for registered users. users'. – Text : electronic.
3. YURAYT : electronic library system : website / LLC electronic publishing house YURAYT. – Moscow, [2022]. - URL: https://www.urait.ru - access mode: for registered users. users'. - Text : electronic.
4. World Health Organization official website. http://www.who.org
5. The European Association for Clinical Pharmacology and Therapeutics. http://www.eacpt.org
6. The American Society for Clinical Pharmacology and Therapeutics. http://www.ascpt.org/
7. An official website of the United States government. http://www.fda.gov
8. IPRbooks : electronic library system : website / group of companies AI PI Ar Media. - Saratov, [2022]. – URL: http://www.iprbookshop.ru - access mode: for registered users. users'. - Text : electronic.
9. LAN : electronic library system : website / LLC EBS LAN. – Saint Petersburg, [2022]. – URL: https://e.lanbook.com - access mode: for registered users. users'. – Text : electronic.

10. Znanium.com : e-library system : website / OOO Synium. - Moscow, [2022]. - URL: http://znanium.com - access mode : for registered users. users'. - Text : electronic.
11. Clinical Collection : collection for medical universities, clinics, medical libraries // EBSCOhost : [portal]. – URL: http://web.a.ebscohost.com/ehost/search/advanced?vid=1&sid=9f57a3e1-1191-414b-8763-e97828f9f7e1%40sessionmgr102. – access mode : for authorization. users'. – Text : electronic.
12. ConsultantPlus [Electronic resource]: reference legal system. /Consultant Plus LLC - Electron. Dan. - Moscow : ConsultantPlus, [2022].

f) Databases of periodicals:

1. Database of periodicals: electronic journals / LLC IVIS. - Moscow, [2022]. – URL: https://dlib.eastview.com/browse/udb/12. – access mode : for authorization. users'. – Text: electronic.
2. "Grebennikon": electronic library / ID Grebennikov. – Moscow, [2022]. – URL: https://id2.action-media.ru/Personal/Products. – access mode : for authorization. users'. – Text : electronic.
3. National electronic library: electronic library : Federal state information system : website / Ministry of culture of the Russian Federation ; RSL. – Moscow, [2022]. – URL: https://нэб.рф - access mode : for users of the scientific library. – Text : electronic.
4. SMART Imagebase // EBSCOhost: [portal]. – URL: https://ebsco.smartimagebase.com/?TOKEN=EBSCO1a2ff8c55aa76d8229047223a7d6dc9c&custid=s6895741. – access mode : for authorization. users'. – Image : electronic.

g) Federal information and educational portals:

1. A single window of access to educational resources : Federal portal / founder of the Federal STATE educational institution DPO CRGOP and it. – URL: http://window.edu.ru/. – Text : electronic.
2. Russian education : Federal portal / founder of the Federal STATE educational institution DPO CRGOP and it. – URL: http://www.edu.ru. – Text : electronic.

h) Educational resources USU:

1. Ulsu Electronic library : ABIS Mega-PRO module / date Express LLC. – URL: http://lib.ulsu.ru/MegaPro/Web - access mode : for users of the scientific library. – Text :

electronic.

2. Educational portal of USU. – URL: http://edu.ulsu.ru. – access mode : for registered users. – Text : electronic.

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12. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE:

Classrooms for lecture, seminars, for the current control and interim certification, group and individual consultations:

1. Classroom №320 (Ulyanovsk region, Ulyanovsk, Ulyanovsk State University, building №3, 3rd floor) for seminars, group and individual consultations, ongoing monitoring and interim certification (with a set of demonstration equipment to ensure the provision of illustrative material in accordance with the work program of the discipline, access to EBS). The room is equipped with a set of student furniture for 25 seats.
2. The lecture theatre (Ulyanovsk State University, building №4, Great Hall, 4th floor)
3. List of equipment used in the educational process:

Workshop equipment:

1. Wardrobes
2. Blackboard
3. Teacher's tables and chairs
4. Students ' tables and chairs
5. Models of drugs of industrial release
6. State Pharmacopoeia
7. Reference literature: LRS, Vidal reference, Mashkovsky reference
8. Reference table

Technical means of training:

1. Computers, printers
2. Multimedia installation

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8. Reference table

Technical means of training:

1. Computers, printers
2. Multimedia installation
3. Interactive whiteboard
4. Calculator

Laboratory utensils and instruments

1. Hood
2. Electrocardiograph
3. Forceps
4. Tripods
5. Flasks
6. Glass caps
7. Glass beaker

8. Syringes
9. Pipettes
10. Tubes
11. Containers for liquid
12. Electric kettle
13. Rectal thermometer
14. Laboratory glasses
15. Scales

13. SPECIAL CONDITIONS FOR STUDENTS WITH DISABILITIES

Training students with disabilities is carried out taking into account the peculiarities of psychophysical development, individual capabilities and health of such students. Education of students with disabilities can be organized in conjunction with other students, and separately. If necessary, students from among persons with disabilities (at the request of the student) may be offered one of the following options for the perception of information, taking into account their individual psychophysical characteristics:

- for persons with visual impairment: in printed form in large print; in the form of an electronic document; in the form of an audio file (translation of educational materials into audio format); in printed form in Braille; individual consultations with the involvement of a tiflosurdoperevodchika; individual tasks and consultations.
- for persons with hearing impairment: in printed form; in the form of an electronic document; video materials with subtitles; individual consultations with the assistance of a sign language interpreter; individual tasks and consultations.
- for persons with musculoskeletal disorders: in printed form; in the form of an electronic document; in the form of an audio file; individual tasks and consultations."
- If it is necessary to use partially or exclusively remote educational technologies in the educational process, the organization of work of teaching staff with students with disabilities and disabilities is provided in an electronic information environment, taking into account their individual psychophysical characteristics.

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Senior lecturer Mazurova O.V.

Associate professor Sapozhnikov A.N.