Приложение 4

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION

Federal State Autonomous Educational Institution of Higher Education
«National Research Lobachevsky State University of Nizhny Novgorod»

Институт клинической медицины

УТВЕРЖДЕНО
решением Ученого совета ННГУ

протокол № 10 от 02.12.2024 г.

Working programme of the discipline

Pharmacology

Higher education level

Specialist degree

Area of study / speciality

31.05.01 - General Medicine

Focus /specialization of the study programme

General Medicine

Mode of study

full-time

Nizhny Novgorod

Year of commencement of studies 2025

1. Место дисциплины в структуре ОПОП

Дисциплина Б1.О.30 Фармакология относится к обязательной части образовательной программы.

2. Планируемые результаты обучения по дисциплине, соотнесенные с планируемыми результатами освоения образовательной программы (компетенциями и индикаторами достижения компетенций)

Формируемые компетенции (код, содержание компетенции)	**Планируемые результаты обучения по дисциплине (модулю), в соответствии с индикатором достижения компетенции**		**Наименование оценочного средства**	
	Индикатор достижения компетенции (код, содержание индикатора)	**Результаты обучения по дисциплине**	**Для текущего контроля успеваемости**	**Для промежуточной аттестации**
ОПК-7: Способен назначать лечение и осуществлять контроль его эффективности и безопасности	*ОПК-7.1: разрабатывает общий план лечения пациента с учетом этиологии, патогенеза и особенностей течения болезни* *ОПК-7.2: назначает медикаментозное и немедикаментозное лечение заболеваний и состояний* *ОПК-7.3: Оценивает эффективность и безопасность медикаментозной и немедикаментозной терапии у взрослых*	*ОПК-7.1: Разрабатывать общий план лечения пациента с учетом этиологии, патогенеза и особенностей течения болезни* *ОПК-7.2: Назначать медикаментозное и немедикаментозное лечение заболеваний и состояний* *ОПК-7.3: Оценивать эффективность и безопасность медикаментозной и немедикаментозной терапии у взрослых*	*Доклад-презентация* *Задачи*	*Зачёт:* *Контрольные вопросы* *Экзамен:* *Тест* *Контрольные вопросы* *Задачи*

3. Структура и содержание дисциплины

3.1 Трудоемкость дисциплины

	очная
Общая трудоемкость, з.е.	**7**
Часов по учебному плану	**252**
в том числе	
аудиторные занятия (контактная работа):	
- занятия лекционного типа	**30**
- занятия семинарского типа (практические занятия / лабораторные работы)	**60**
- КСР	**3**
самостоятельная работа	**123**
Промежуточная аттестация	**36**

	Экзамен, Зачёт

3.2. Содержание дисциплины

(структурированное по темам (разделам) с указанием отведенного на них количества академических часов и виды учебных занятий)

Наименование разделов и тем дисциплины	Всего (часы)	в том числе			
		Контактная работа (работа во взаимодействии с преподавателем), часы из них			Самостоятельная работа обучающегося, часы
		Занятия лекционного типа	Занятия семинарского типа (практические занятия/лабораторные работы), часы	Всего	
	очно	очно	очно	очно	очно
Section 1. General pharmacology	36	4	5	9	27
Section 2. Special pharmacology	177	26	55	81	96
Аттестация	36				
КСР	3			3	
Итого	252	30	60	93	123

Contents of sections and topics of the discipline

.Section 1. General pharmacology

1.1. General pharmacology. Definition of medicinal substance, dosage form, medicinal product, preparation. Medicinal raw materials, their types by origin. State Pharmacopoeia. Prescription and its structure. Form of prescription forms. Rules for writing prescriptions.

1.2. Rules for writing dosage forms

1.2.1. Solid dosage forms

Tablets, dragees, powders. Rules for writing prescriptions. Solid dosage forms most frequently used in practice.

1.2.2. Liquid dosage forms

Solutions for external and internal use, dosage forms for injections.

Rules for writing prescriptions for liquid dosage forms.

Dosage forms from herbal raw materials: infusions, decoctions. Rules for writing prescriptions. Dosage forms from herbal raw materials: tinctures, extracts. Rules for writing prescriptions.

1.2.3. Semi-solid (soft) dosage forms

Ointments, pastes, suppositories. Rules for writing prescriptions for individual soft dosage forms.

1.3. The content of pharmacology and its objectives.

Position among other medical disciplines. The main stages of pharmacology development.

Pharmacodynamics of drugs: The main biological substrates with which drugs interact. The concept of specific receptors, agonists and antagonists. Types and nature of action of drugs.

1.4. Pharmacokinetics of drugs.

Routes of administration of drugs. Absorption of drugs with different routes of administration.

The main mechanisms of absorption. Distribution, deposition and transformation of drugs in the body. Routes of

elimination of drugs from the body.
Factors influencing the pharmacokinetics and pharmacodynamics of drugs.
1.5. Dependence of the effect on the dose (concentration) of the drug. Types of doses. Width of therapeutic action. Changes in the effect of drugs with repeated administration.
Drug dependence (psychological, physical). Medical and social aspects of combating drug addiction.
Combined use of drugs
1.6. Side effects of drugs.
Causes, manifestations, methods of prevention and treatment.
Classification of poisoning with drugs by the cause of their occurrence and clinical course. The concept of detoxification of the body. Principles of detoxification and basic methods of detoxification of the body. Methods of enhancing natural detoxification. Indications. Contraindications.
Side effects. Methods of artificial detoxification. Indications. Contraindications. Side effects.
Methods of antidote detoxification. The concept of antidotes. Classification of antidotes by mechanism of action. Main directions of antidote therapy for acute poisoning. Symptomatic treatment to maintain the basic vital functions of the body.

Section 2. Special Pharmacology
Pharmacology of Neurotropic Agents
2.1. Drugs Affecting Afferent Innervation
Local Anesthetics: Classification. Mechanism of Action. Comparative Characteristics of Drugs and Their Use for Different Types of Anesthesia. Indications and Contraindications. Toxic effects of Local Anesthetics and Measures to Prevent It.
Astringents: Organic and Inorganic Astringents. Principle of Action. Indications for Use.
Enveloping and Adsorbent Agents: Principle of Action. Application. Adsorbent Agents. Principle of Action. Application.
Irritants: Effect on Skin and Mucous Membranes. Significance of
Resulting Reflexes. Distracting Effect. Application of Irritants.
2.2. Agents Affecting Efferent Innervation.
2.2.1. Drugs acting on cholinergic synapses
The concept of M- and N-cholinergic receptors. Subtypes of M- and N-cholinergic receptors. Classification of drugs affecting the transmission of excitation in cholinergic synapses. Creation of drugs with a preferential effect on certain subtypes of cholinergic receptors.
M- and N-cholinergic agents. Mediator, its derivatives, anticholinesterase drugs, prokinetics.
M-cholinergic agents. Effects arising from excitation of various subtypes of M-cholinergic receptors. Comparative characteristics of M-cholinergic blocking agents. First aid measures in case of poisoning with M-cholinomimetics and M-cholinergic blockers.
N-cholinergic agents. Classification. Effects associated with excitation of N-cholinergic receptors. Toxic effect of nicotine. Ganglionic blocking agents. Main effects, mechanism of their occurrence. Indications for use. Side effects. Agents that block neuromuscular transmission. Mechanism of action of depolarizing and antidepolarizing agents. Application. Side effects.
2.2.2. Agents acting on adrenergic synapses
Definition. Pathways of possible pharmacological action on adrenergic synapse functions. Classification of adrenoreceptors. Effects of excitation of alpha1-, alpha2-, beta1-, beta2-, beta2-adrenoreceptors.
Classification of adrenergic substances. Characteristics of the main groups: alpha, beta-adrenergic substances, alpha-adrenergic substances, beta-adrenergic substances, mixed-action sympathomimetics; alpha, beta-adrenergic blocking agents, alpha-adrenergic blocking substances, beta-adrenergic blocking substances, sympatholytics. In each group: severity of action on various types of adrenoreceptors, pharmacological effects, indications for use and contraindications. Side effects.

2.3. Anesthetics

Definition of the concept of anesthesia. History of the discovery and use of anesthesia. Classification of anesthetics. Theories about the mechanism of action of anesthetics. The concept of the breadth of narcotic action.
Comparative characteristics of inhalation anesthetics. Complications during and after anesthesia. Assistance measures. Features of the action of non-inhalation anesthetics. Indications and contraindications for use. Side effects. Assistance measures.
2.4. Ethyl alcohol
Resorptive action of ethyl alcohol. Local action on the skin and mucous membranes. Use in medical practice. Toxicological characteristics. Effect on the cardiovascular system, gastrointestinal tract, liver, endocrine system. Acute poisoning and its treatment.
Chronic alcoholism, its social aspects. Principles of pharmacotherapy of chronic alcoholism.
2.5. Hypnotics
Hypnotics. Classification. Mechanisms of action. Benzodiazepine receptor agonists, central histamine H1 receptor blockers. Use of melatonin preparations for sleep disorders. Barbituric acid derivatives, their use. Side effects of hypnotics. Development of drug dependence. Acute poisoning, measures of assistance.
Benzodiazepine hypnotic antagonists (flumazenil).
2.6. Painkillers (analgesics)
Classification of analgesics. Narcotic analgesics. Classification. Effects caused by the influence on the central nervous system. Features of the analgesic effect.
Possible mechanisms of analgesia. Concept of opiate receptors and their endogenous ligands.
Effect on the activity of internal organs. Comparative characteristics of drugs. Indications and contraindications for use. Side effects. Acute poisoning and measures of assistance.
Addiction, drug dependence.
Antagonists of narcotic analgesics. Principles of action. Application.
Non-opioid analgesics of predominantly central action. COX-3 inhibitors. Sodium channel blockers (carbamazepine), monoamine reuptake inhibitors (amitriptyline), centrally acting alfa2-adrenergic agonists (clonidine), NMDA receptor antagonists (ketamine), GABA-B mimetics. Differences from opioid analgesics. Mechanism of analgesic action, application.
2.7. Antiepileptic drugs
Mechanisms of action of antiepileptic drugs. Comparative characteristics of drugs used in different forms of epilepsy. Drugs for the relief of epileptic status. Side effects of antiepileptic drugs.
2.8. Antiparkinsonian drugs
Mechanisms of action of antiparkinsonian drugs that stimulate dopaminergic processes. MAO-B inhibitors; substances that inhibit COMT. Comparative characteristics of individual drugs. Main side effects. The use of DOPA decarboxylase inhibitors, peripheral dopamine receptor blockers, "atypical" antipsychotics to reduce the side effects of levodopa.
2.9. Psychotropic drugs:
2.9.1. Antipsychotic drugs
History of the discovery of psychotropic drugs.
Antipsychotic drugs. Classification (by chemical structure and side effects).
Comparative characteristics of the main groups of drugs. Indications and contraindications for use. Side effects and their pharmacological correction.
2.9.2. Anxiolytics (tranquilizers)
Classification. Mechanism of action. Pharmacological effects. Comparative characteristics of the main groups of drugs. Indications and contraindications for use. Side effects. Possibility of drug dependence.
2.9.3. Sedatives
Classification. Mechanism of action. Comparative characteristics of bromides and sedatives of plant origin.
2.9.4. Psychostimulants
Classification. Effect on the central nervous system and cardiovascular system.
Characteristics of the psychostimulant effect. Indications and contraindications for use Side effects. Possibility

of drug dependence.
2.9.5. Nootropics
Classification. Effect on metabolic processes in the central nervous system. Indications for use.;
2.9.6. Analeptics
Indications for use. Classification. Mechanisms of stimulating action on the central nervous system. Effect on blood circulation and respiration. Indications and contraindications for use.;
2.9.7. Antidepressants
Classification. Effect on adrenergic, serotonergic and dopaminergic processes in the central nervous system. Comparative assessment of drugs by antidepressant, psychostimulant and sedative effects. Indications and contraindications for use. Side effects.

Pharmacology of drugs regulating the functions of peripheral organs and systems
2.10. Drugs affecting respiratory functions
Classification of drugs affecting respiratory organs.
Respiratory stimulants. Classification. Mechanism of stimulating effect of substances on respiration. Indications and contraindications for use.
Anticough drugs. Classification. Mechanism of action. Indications and contraindications for use. Side effects.
Expectorants. Classification. Mechanism of action. Indications and contraindications for use. Side effects.
Drugs used for bronchospasms. Physiological mechanisms of regulation of bronchial patency. Paths of pharmacological action on bronchial tone. Classification of bronchodilators. Mechanisms of action of various groups of bronchodilators. Indications, contraindications for use. Side effects.
Drugs used for pulmonary edema, respiratory distress syndrome. Principles of action of drugs used to treat pulmonary edema. Selection of drugs depending on the pathogenesis of pulmonary edema.
2.11. Drugs affecting the cardiovascular system
2.11.1. Cardiotonic drugs
Cardiac glycosides. Definition. Plants containing cardiac glycosides. Individual glycosides isolated from plants. Pharmacodynamics of cardiac glycosides. Cardiac and non-cardiac effects of cardiac glycosides. Comparative characteristics of various drugs (activity, absorption from the gastrointestinal tract, rate of development and duration of action, cumulation). Intoxication with cardiac glycosides, clinical picture, treatment and prevention.
Cardiotonic drugs of non-glycoside structure. Mechanism of cardiotonic action, application.
2.11.2. Medicines used for cardiac arrhythmia (antiarrhythmic agents)
Classification. Agents used for tachyarrhythmias. Basic properties of sodium channel blockers (effect on automatism, conduction, effective refractory period). Peculiarities of the antiarrhythmic action of beta-blockers, potassium and calcium channel blockers.
Indications for use. Side effects.
Agents used for bradyarrhythmias. Peculiarities of the antiarrhythmic action of M-anticholinergics, beta-adrenergic agonists.
2.11.3. Drugs used for coronary circulatory failure
Basic principles of eliminating oxygen deficiency in ischemic heart disease. Classification of agents used for coronary (ischemic) heart disease.
Organic nitrates. Mechanism of action, pharmacological effects. Indications for use, contraindications, side effects. Comparative characteristics of nitroglycerin, isosorbide dinitrate and isosorbide-5-mononitrate.
Antianginal properties of beta-blockers, calcium channel blockers, bradycardic drugs. The principle of action of cardioprotective drugs.
Medicines used in myocardial infarction.
2.11.4. Antihypertensive drugs (antihypertensive drugs)
Classification. Localization and mechanisms of action of neurotropic drugs. Application. Side effects.
Drugs affecting the renin-angiotensin system. Classification. Mechanism of action of ACE inhibitors. Indications for use. Side effects. Angiotensin receptor blockers. Application.
Myotropic drugs (calcium channel blockers, potassium channel activators, nitric oxide donors and drugs with

different mechanisms of action). Mechanisms of action. Pharmacological effects. Application.
Hypotensive effect of diuretics. Comparative data on the effectiveness of different drugs, rate of effect development, its duration.
Combined use of antihypertensive drugs with different localization and mechanism of action.
2.11.5. Hypertensive drugs (drugs used in the treatment of arterial hypotension)
Drugs that increase cardiac output and tone of peripheral vessels. Pharmacology adrenergic agonists. Drugs that increase tone mainly tone of peripheral vessels.
Characteristics of drugs, indications, contraindications, side effects.
2.12. Medicines affecting the functions of the digestive organs
Medicines affecting appetite. Appetite-enhancing drugs. Mechanism of the stimulating effect of bitters on appetite and gastric secretion. Indications for use.
Appetite-reducing agents. Mechanisms of action. Use in the treatment of obesity.
Side effects. Contraindications for use.
Medicines used for dysfunction of the gastric glands. Agents stimulating the secretion of the gastric glands. Use for diagnosing disorders of the secretory activity of the stomach.
Medicines for substitution therapy. The effect of hydrochloric acid and pepsin on digestion in the stomach. Indications for use.
Medicines that reduce the secretion of the gastric glands. Classification.
Principles of action of H+, K+-ATPase blockers, histamine H2-receptor blockers and M-anticholinergics. Application. Side effects.
Antacid agents. Comparative characteristics of drugs. Indications for use. Side effects.
Gastroprotectors. Principles of action. Use in peptic ulcer.
Emetics and antiemetics. Classification. Mechanism of action of emetics. Their use. Principles of action of antiemetics. Indications for use of individual drugs.
Drugs affecting liver function. Choleretic agents. Classification. Principle of action of drugs that enhance bile formation. Drugs that promote bile formation. Indications for use. Drugs that promote dissolution of gallstones. Principle of action of cholelitholytic drugs. Indications for use.
Hepatoprotectors. Principle of action, indications for use.
Drugs used in case of pancreatic excretory dysfunction.
Drugs of replacement therapy in case of pancreatic insufficiency.
Drugs affecting gastrointestinal motility. Drugs that inhibit gastrointestinal motility. Differences in the mechanism and localization of action of agents that inhibit gastrointestinal motility. Application. Side effects.
Agents that enhance gastrointestinal motility. Differences in the mechanism and localization of action of substances that enhance gastrointestinal motility (cholinomimetic agents).
Laxatives. Classification by mechanism and predominant localization of action. Comparative characteristics of laxatives that cause chemical irritation of intestinal mucosa receptors; change in chyme volume and mechanical irritation of intestinal mucosa receptors; promoting softening of feces, facilitating their movement through the intestine (mechanism and rate of action, indications and contraindications for use, side effects).
2.13. Diuretics
Classification. Mechanisms of action of diuretics that inhibit the function of the epithelium of the renal tubules. Their comparative assessment (efficiency, rate of development and duration of effect,
influence on ionic balance). Indications for use. Side effects. Potassium- and magnesium-sparing diuretics. Mechanism of action. Application.
Aldosterone antagonists, influence on ionic balance. Indications for use. The principle of action of osmotic diuretics. Application.
Principles of drug combination. Side effects.
2.14. Medicines Affecting the Tone and Contractile Activity of the Myometrium
Classification. Medicines Used to Enhance Labor. Effect
of Oxytocin on the Myometrium. Pharmacological Properties of Prostaglandin Preparations. Application.
Tocolytics. Mechanism of Action. Application. Uterine Hemostatic

Agents. Pharmacological Properties of Ergot Alkaloids and Preparations. Indications for Use.
Side Effects. Poisoning, First Aid. Synthetic Agents. Features of Use.
2.15. Medicines Affecting Hematopoiesis Antianemic Drugs.
Agents Affecting Erythropoiesis. Agents Used to Treat Hypochromic Anemia. Absorption, Distribution, and Excretion of Iron Preparations. Effect on Hematopoiesis. Comparative Characteristics of Iron Preparations. Side Effects. Effect of Cobalt Preparations on Hematopoiesis.
Use of recombinant human erythropoietin preparations in anemias. Mechanism of pharmacotherapeutic effect of cyanocobalamin, folic acid in hyperchromic anemias.
Agents affecting leukopoiesis. Mechanism of action. Indications for use.
2.16. Medicines affecting platelet aggregation, blood clotting and fibrinolysis
Agents inhibiting platelet aggregation. Effect of preparations on the biosynthesis of thromboxane and prostacyclin. Use of substances inhibiting platelet aggregation.
Agents affecting blood clotting. Substances promoting blood clotting. Direct and indirect coagulants.
Mechanism of action and use of direct coagulants. Mechanism of action of vitamin K preparations. Use.
Substances preventing blood clotting (anticoagulants). Mechanisms of action of heparin and indirect anticoagulants. Features of low-molecular heparins. Application.
Side effects. Antagonists of direct and indirect anticoagulants.
Agents affecting fibrinolysis. Fibrinolytic agents. Mechanism of fibrinolytic activity. Indications for use.
Antifibrinolytic agents. Mechanism of action and pharmacological effects of contrical. Indications for use.

Pharmacology of drugs regulating metabolic processes
2.17. Hormonal drugs
2.17.1. Hormonal drugs of polypeptide structure, amino acid derivatives
Hypothalamic hormone drugs. Somatostatin and its synthetic analogues. Application.
Bromocriptine, effect on prolactin and somatotropin production, application. Gonadorelin, danazol. Application.
Preparations of anterior pituitary hormones. Pharmacological effects. Indications for use.
Preparations of posterior pituitary hormones. Mechanism of action and pharmacological effects of oxytocin. Indications for use. Side effects. Antidiuretic properties of vasopressin, effect on vascular tone. Application.
Preparations of thyroid hormones. Effect on metabolism. Application. Physiological role and use of calcitonin.
Antithyroid drugs. Classification.
Pharmacodynamics of mercazolil. Mechanism of antithyroid action of iodine preparations. Application.
Side effects.
Preparation of parathyroid gland hormone. Effect of parathyroidin on phosphorus and calcium metabolism. Application.
Insulin preparations and synthetic hypoglycemic agents. Classification of insulin preparations. Mechanism of action, effect on metabolism. Principles of insulin dosing in the treatment of diabetes mellitus.
Prolonged-release insulin preparations. Recombinant human insulin preparations.
Synthetic hypoglycemic agents. Classification. Mechanism of action. Comparative assessment of insulin preparations and synthetic hypoglycemic agents. Indications for use. Side effects.
2.17.2. Hormonal preparations of steroid structure
Glucocorticoid preparations. Classification. Mechanism of action. Pharmacological effects. Indications for use. Side effects.
Synthetic glucocorticoids for topical use.
Mineralocorticoid preparations. Main effect. Indications for use.
Male sex hormone preparations. Androgen preparations for enteral and parenteral use. Long-acting preparations. Pharmacological effects. Indications for use. Side effects.
Antiandrogen preparations (androgen receptor blockers, 5a-reductase inhibitors). Application.
Anabolic steroids. Effect on protein metabolism. Indications and contraindications for use. Side effects.
Ovarian hormone preparations (estrogen and gestagen preparations). Physiological significance of estrogens and gestagens. Classification of preparations. Mechanism of action. Pharmacological effects. Indications and

contraindications for use. Side effects.
Antiestrogenic and antigestagen preparations. Application.
Contraceptives.
2.18. Vitamin preparations
2.18.1. Water-soluble vitamin preparations. Exogenous and endogenous causes of hypo- and avitaminosis. Main symptoms of hypo- and avitaminosis. Vitamins as drugs. The role of B vitamins in metabolism. Effect on carbohydrate, fat and protein metabolism.
Participation in oxidation-reduction processes. Effect on the nervous and cardiovascular systems, gastrointestinal tract, hematopoiesis, regeneration processes. Indications for the use of individual preparations. Side effects.
Participation of ascorbic acid in oxidation-reduction processes. Therapeutic use.
2.18.2. Fat-soluble vitamin preparations
Features of pharmacodynamics and pharmacokinetics of vitamin preparations. Antioxidant properties of fat-soluble vitamins.
Indications and features of their use. Side effects of vitamins as drugs.
2.19. Drugs used in hyperlipoproteinemia (antiatherosclerotic agents) Classification. Mechanisms of influence on lipid metabolism. Cholesterol synthesis inhibitors.
Bile acid sequestrants. Fibric acid derivatives. Nicotinic acid and its derivatives. Use of anti-atherosclerotic agents in different types of hyperlipoproteinemia. Side effects.

Pharmacology of drugs that suppress inflammation and affect immune processes
2.20. Anti-inflammatory drugs
2.20.1. Steroid anti-inflammatory drugs
Mechanisms of anti-inflammatory action. Characteristics of individual drugs. Indications for use. Side effects.
2.20.2. Non-steroidal anti-inflammatory drugs
Classification of non-steroidal anti-inflammatory drugs. Effect on various COX isoforms. Mechanism of anti-inflammatory, antipyretic and analgesic action. Comparative characteristics of drugs. Indications, contraindications for use. Side effects.
2.21. Antiallergic agents
The concept of immediate and delayed hypersensitivity reactions.
Glucocorticoids. The mechanism of their antiallergic action. The principle of action and use of cromolyn sodium and ketotifen. Antihistamines - H1-receptor blockers. Their comparative assessment. Application. Side effects.
Immunosuppressant properties of cytostatic agents.
The use of antiallergic agents in delayed and immediate allergic reactions.
Immunostimulants. Application. Side effects.
The use of interferon and interferonogen preparations to stimulate immune processes.

Pharmacology of antimicrobial, antiviral, antifungal and antiparasitic agents
2.22. Antiseptics and disinfectants
The concept of antisepsis and disinfection. Conditions determining antimicrobial activity. The main mechanisms of action of antiseptics. Classification.
Halogen-containing compounds. Features of the action and use of chlorine and iodine compounds.
Oxidizers. Mechanism of action. Application.
Acids and alkalis. Mechanism of action. Indications and contraindications for use. Side effects.
Metal compounds. Antimicrobial properties. Conditions determining antimicrobial activity. Local action (astringent, irritating and cauterizing effects). Features of the use of individual drugs. Characteristics of the resorptive action. Poisoning with heavy metal salts. Treatment.
Aliphatic antiseptics (alcohols, aldehydes). Antimicrobial properties, mechanism of action. Application.
Aromatic antiseptics (pure phenol, birch tar, ichthyol). Features of action and application.

Dyes. Features of action and application.
Detergents. The concept of anionic and cationic detergents. Antimicrobial properties. Application.
Nitrofuran derivatives. Spectrum of antimicrobial action. Application.
2.23. Antibiotics
Biological significance of antibiosis. Classification of antibiotics. Mechanisms of action of antibiotics.
Principles of rational antimicrobial therapy. Side effects of antibiotic therapy, their prevention and treatment.
Penicillins. Classification. Mechanism of action. Spectrum of action. Comparative characteristics of semi-synthetic penicillins. Combined (inhibitor-protected) penicillins. Indications and contraindications for the use of antibiotics of the penicillin group.
Cephalosporins. Classification. Mechanism of action. Comparative characteristics of cephalosporins of I-V generations. Indications and contraindications for use.
Carbapenems. Mechanism of action. Spectrum of action. Indications for use.
Macrolides. Classification. Mechanism of action. Spectrum of action. Comparative characteristics of 14-, 15-, 16-membered macrolides. Indications and contraindications for use.
Lincosamides. Mechanism of action. Spectrum of action. Indications and contraindications for use.
Tetracyclines and glycylcyclines. Mechanism of action. Spectrum of action. Indications and contraindications for use.
Chloramphenicol (levomycetin). Mechanism of action. Spectrum of action. Indications and contraindications for use.
Aminoglycosides. Classification. Mechanism of action. Spectrum of action. Comparative characteristics of aminoglycosides of I-IV generations.
Oxazolidinones (linezolid). Mechanism of action. Spectrum of action. Indications for use.
Polymyxins. Mechanism of action. Spectrum of action. Comparative characteristics of drugs. Indications and contraindications for use.
Antibiotics of different chemical structures. Features of the action and use of fusidic acid and fusafungine.
2.24. Anti-tuberculosis drugs
The relevance of the problem in the 21st century. Principles of tuberculosis treatment in modern conditions.
Classification of anti-tuberculosis drugs. Mechanism of action. Comparative characteristics of anti-tuberculosis drugs. Indications, contraindications for use. Side effects.
2.25. Anti-syphilitic drugs
Antispirochetal properties of benzylpenicillin drugs. Mechanism of action of bismuth drugs, their use in the treatment of syphilis. Side effects.
Reserve antispirochetal antibiotics.
2.26. Sulfanilamide drugs and other synthetic agents
Sulfanilamide drugs. Classification by chemical structure, spectrum and duration of action. Features of the chemical structure, the relationship of the chemical structure and action in a series of sulfanilamide drugs.
Mechanism of action. Principles of sulfanilamide therapy. Indications for the use of sulfanilamide drugs. Side effects.
Synthetic antimicrobial agents. Classification Characteristics of the main groups (8-oxyquinolines, quinolones and fluoroquinolones, nitroimidazoles, nitrofurans, quinoxalines). Mechanism of action. Spectrum of action. Indications and contraindications for use. Side effects.
2.27. Antiviral agents
Antiviral agents. Classification by effect on the stage of virus reproduction.
Anti-influenza drugs. Mechanism of action. Side effects. Antiherpetic drugs. Mechanism of action. Indications for use. Side effects. The drug of choice in the treatment of HIV infection. Mechanism of action. Side effects.
2.28. Antifungal agents
Classification. Drugs for the treatment of systemic mycoses. Mechanisms of action. Indications and contraindications for use. Side effects. Drugs for the treatment of dermatomycosis. Mechanism of action. Spectrum of action. Pharmacological effects. Indications and contraindications for use. Side effects.
2.29. Antiprotozoal agents

Antimalarial drugs. Drugs for the treatment of trichomoniasis, leishmaniasis, amebiasis. Pharmacodynamics and pharmacokinetics of drugs. Dosage features. Release form. Routes of administration. Indications and contraindications for use. Side effects.
2.30. Anthelmintics
Drugs used in the treatment of intestinal and extraintestinal helminthiases.
Pharmacodynamics and pharmacokinetics of drugs. Dosage features. Release form. Routes of administration. Indications and contraindications for use. Side effects
Pharmacology of drugs used in malignant neoplasms
2.31. Antineoplastic (antiblastoma) agents
Alkylating agents and similar drugs. Antimetabolites.
Antibiotics.
Herbal remedies.
Hormonal drugs and hormone antagonists.
Enzymes. Cytokines.
Monoclonal antibodies.
Protein kinase inhibitors.
Pharmacodynamics and pharmacokinetics of drugs. Dosage features. Release form. Routes of administration. Indications and contraindications for use. Side effects.

4. Учебно-методическое обеспечение самостоятельной работы обучающихся

Самостоятельная работа обучающихся включает в себя подготовку к контрольным вопросам и заданиям для текущего контроля и промежуточной аттестации по итогам освоения дисциплины приведенным в п. 5.

Для обеспечения самостоятельной работы обучающихся используются:
Электронные курсы, созданные в системе электронного обучения ННГУ:

Pharmacology, https://e-learning.unn.ru/course/view.php?id=10994.

Иные учебно-методические материалы:
Харкевич, Д. А. Фармакология : учебник / Д. А. Харкевич. - 13-е изд. , перераб. - Москва : ГЭОТАР-Медиа, 2022. - 752 с. : ил. - 752 с. - ISBN 978-5-9704-6820-3. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970468203.html

5. Assessment tools for ongoing monitoring of learning progress and interim certification in the discipline (module)

5.1 Model assignments required for assessment of learning outcomes during the ongoing monitoring of learning progress with the criteria for their assessment:

5.1.1 Model assignments (assessment tool - Report-presentation) to assess the development of the competency ОПК-7:

Approximate plan of a report/presentation/ (select appropriate points for preparation): 1. Definition. 2. Classification. 3. Pharmacokinetic features. 4. Pharmacodynamic features: mechanisms of action, pharmacological effects, undesirable side effects. 5. Indications for use. 6. Contraindications for use. 7. Dosage features. 8. Significance/relevance of use for treatment in practice.

1. Definition of pharmacology, its position among other medical and biological sciences, importance for treatment of patients.

2. Parts/sections of pharmacology, their essence and significance for the treatment of patients.

3. Enteral routes of administration and excretion of medicinal substances from the body (therapeutic and toxic significance).

4. Parenteral routes of administration and excretion of medicinal substances from the body (therapeutic and toxic significance).

Assessment criteria (assessment tool — Report-presentation)

Grade	Assessment criteria
outstanding	The concept of the report was flawlessly developed. The report contains complete information on the topic presented, based on mandatory literary sources and modern publications; the performance is accompanied by high-quality demonstration material (slide presentation, handouts); the student is fluent in the content, presents the material clearly and competently; responds freely and correctly to questions and comments from the audience; fits exactly within the regulations (7 - 10 minutes); all design requirements have been met.
excellent	The report contains complete information on the topic presented, based on mandatory literary sources and modern publications; the speech is accompanied by high-quality demonstration material (report/presentation); the student is fluent in the content, presents the material clearly and competently; answers questions and comments from the audience freely and correctly; fits exactly within the regulations (4 - 7 minutes); all requirements for the report/presentation have been met
very good	The topic presented is covered, but the report contains minor inaccuracies on the topic presented; the performance is accompanied by demonstration material (presentation); the speaker presents the material clearly and competently; answers questions and comments from the audience in a reasoned manner, but the speaker made minor errors in presenting the material and answering questions; design requirements are 80% fulfilled
good	The presented topic is covered, but the report contains incomplete information on the presented topic; the performance is accompanied by demonstration material (presentation); the speaker presents the material clearly and competently; answers questions and comments from the audience in a reasoned manner, but the speaker made minor errors in presenting the material and answering questions; design requirements are 80% fulfilled
satisfactory	The speaker demonstrates superficial knowledge on the chosen topic and has difficulty using the scientific-conceptual apparatus and terminology of the course; accompanying demonstration material is incomplete and illogical; registration requirements are fulfilled by less than 80%
unsatisfactory	The report has significant gaps on the topics presented and is based on unreliable information; the speakers made fundamental errors when presenting the material; work does not meet

Grade	Assessment criteria
	requirements
poor	Lack of knowledge on the topic presented; work not presented.

5.1.2 Model assignments (assessment tool - Tasks) to assess the development of the competency ОПК-7:

Task 1*

In the situations below, choose the type of drug therapy (pharmacotherapy) from the following: 1. Pathogenetic. 2. Preventive (etiotropic). 3. Symptomatic.

A. A 5-year-old child diagnosed with type 1 diabetes mellitus (insulin-dependent) is prescribed an insulin drug, which, by activating enzymes, helps the entry of glucose into cells from the blood and normalizes glucose levels.

B. To prevent influenza in the winter-spring period, the doctor advised the child to receive a flu vaccine, which promotes the production of specific antibodies and, thereby, neutralizing viruses, prevents the development of the disease.

C. The patient took a paracetamol tablet to relieve a symptom - headache.

Answer. 1. A. 1. B. 2. C. 3.

Task 2**

At the consultation, an experienced doctor suggested that in order to obtain a faster effect, inject an aqueous solution of the desired medicine into a vein instead of taking a tablet with the same substance orally.

A. Will you support his decision? Why?

Answer. A. The proposal is reasonable. When taking the tablet orally, the effect of the drug will not be rapid, so the medicine must first enter the stomach and then the small intestine. At this time, the tablet must dissolve, after which the medicine must be absorbed into the portal vein system, enter the liver, pass through it (with possible primary metabolism), and only after this the medicine enters the systemic circulation. With intravenous administration, the effect will be much faster, since the medicine immediately enters the systemic circulation (there is no passage through the stomach, absorption, etc.).

Task 3**

At a consultation, a novice doctor suggested injecting an oil solution of the desired medicine into a vein to obtain a faster effect.

A. Will you support his decision? Why?

Answer. A. The proposal cannot be supported. An oil solution injected into a vein will lead to pulmonary embolism, which is potentially fatal.

Task 4***

A 48-year-old patient came to you, a practicing physician, with complaints of severe headache, dizziness, nausea, and weakness; Blood pressure 200/120 mm Hg, heart rate 90 beats per minute. The deterioration of the condition began last evening. When collecting anamnesis, he said that due to essential hypertension of the 2nd degree, he constantly took the antihypertensive drug M every morning for a year. During this period of time, he felt well: blood pressure did not exceed 130/85 mm Hg, heart rate – 60-66 beats per minute, headaches do not bother him. Therefore, he began to believe that he was completely cured and since yesterday morning he stopped taking the drug on his own and until yesterday evening he felt well.

A. Explain what happened to the patient and why.

B. What is the name of the condition observed in the patient?

C. Give recommendations to this patient on how to prevent this condition.

Answer. A. Pharmacokinetically, after a missed dose, the drug concentration decreased and went out of the therapeutic range into the concentration zone of zero effect. Such drug concentrations are insufficient to provide the necessary hypotensive effect, due to which the full clinical picture of the disease resumed (with the phenomena of a hypertensive crisis, which poses a threat to the health and life of the patient).

B. Withdrawal syndrome (symptoms of hypertensive crisis).

C. The disease is chronic (incurable) and requires constant treatment (“chronic treatment must be treated chronically”). Indeed, before the unauthorized

Assessment criteria (assessment tool — Tasks)

Grade	Assessment criteria
outstanding	The solution is given in a volume exceeding the volume of the program for mastering the discipline, in compliance with the necessary sequence of actions; the answer contains all entries, tables, drawings, drawings, graphs, and calculations correctly and accurately; error analysis was performed correctly.
excellent	The solution is given in full in compliance with the necessary sequence of actions. The answer contains all entries, tables, figures, drawings, graphs, and calculations correctly and accurately. Error analysis performed correctly.
very good	The solution is given in full, following the required sequence of actions. There are 1-2 errors in the answer
good	The solution is given in full, following the required sequence of actions. There are 2-3 errors in the answer

Grade	Assessment criteria
satisfactory	The solution is not given in full, but the volume of the completed part is such that it allows us to obtain the correct results and conclusions. Errors were made during the work.
unsatisfactory	The solution is not given in full or the volume of work performed does not allow us to draw correct conclusions
poor	No solution provided. Inability to assess the completeness of knowledge due to the student's refusal to answer.

5.2. Description of scales for assessing learning outcomes in the discipline during interim certification

Шкала оценивания сформированности компетенций

Уровень сформированности компетенций (индикатора достижения компетенций)	**плохо**	**неудовлетворительно**	**удовлетворительно**	**хорошо**	**очень хорошо**	**отлично**	**превосходно**
	не зачтено		**зачтено**				
Знания	Отсутствие знаний теоретического материала. Невозможность оценить полноту знаний вследствие отказа обучающегося от ответа	Уровень знаний ниже минимальных требований. Имели место грубые ошибки	Минимально допустимый уровень знаний. Допущено много негрубых ошибок	Уровень знаний в объеме, соответствующем программе подготовки. Допущено несколько негрубых ошибок	Уровень знаний в объеме, соответствующем программе подготовки. Допущено несколько несущественных ошибок	Уровень знаний в объеме, соответствующем программе подготовки. Ошибок нет.	Уровень знаний в объеме, превышающем программу подготовки.
Умения	Отсутствие минимальных умений. Невозможность оценить наличие умений вследствие отказа обучающегося от ответа	При решении стандартных задач не продемонстрированы основные умения. Имели место грубые ошибки	Продемонстрированы основные умения. Решены типовые задачи с негрубыми ошибками. Выполнены все задания, но не в полном объеме	Продемонстрированы все основные умения. Решены все основные задачи с негрубыми ошибками. Выполнены все задания в полном объеме, но некоторые с недочетами	Продемонстрированы все основные умения. Решены все основные задачи. Выполнены все задания в полном объеме, но некоторые с недочетами.	Продемонстрированы все основные умения. Решены все основные задачи с отдельными несущественными недочетами, выполнены все задания в полном объеме	Продемонстрированы все основные умения. Решены все основные задачи. Выполнены все задания, в полном объеме без недочетов
Навыки	Отсутствие базовых	При решении стандартных	Имеется минимальн	Продемонстрированы	Продемонстрированы	Продемонстрированы	Продемонстрирован

	навыков. Невозможность оценить наличие навыков вследствие отказа обучающегося от ответа	задач не продемонстрированы базовые навыки. Имели место грубые ошибки	ый набор навыков для решения стандартных задач с некоторыми недочетами	базовые навыки при решении стандартных задач с некоторыми недочетами	базовые навыки при решении стандартных задач без ошибок и недочетов	навыки при решении нестандартных задач без ошибок и недочетов	творческий подход к решению нестандартных задач

Scale of assessment for interim certification

Grade		Assessment criteria
pass	**outstanding**	All the competencies (parts of competencies) to be developed within the discipline have been developed at a level no lower than "outstanding", the knowledge and skills for the relevant competencies have been demonstrated at a level higher than the one set out in the programme.
	excellent	All the competencies (parts of competencies) to be developed within the discipline have been developed at a level no lower than "excellent",
	very good	All the competencies (parts of competencies) to be developed within the discipline have been developed at a level no lower than "very good",
	good	All the competencies (parts of competencies) to be developed within the discipline have been developed at a level no lower than "good",
	satisfactory	All the competencies (parts of competencies) to be developed within the discipline have been developed at a level no lower than "satisfactory", with at least one competency developed at the "satisfactory" level.
fail	**unsatisfactory**	At least one competency has been developed at the "unsatisfactory" level.
	poor	At least one competency has been developed at the "poor" level.

5.3 Model control assignments or other materials required to assess learning outcomes during the interim certification with the criteria for their assessment:

5.3.1 Model assignments (assessment tool - Control questions) to assess the development of the competency ОПК-7

1. Pharmacology of M-cholinomimetic drugs.

2. Pharmacology of anticholinesterase drugs.

3. Pharmacology of M-cholinoblockers.

4. Pharmacology of H-cholinoblockers (ganglion blockers).

Assessment criteria (assessment tool — Control questions)

Grade	Assessment criteria
pass	The level of knowledge corresponds to the training program. Several minor errors were made.
fail	The level of knowledge is below the minimum requirements. There were major errors.

5.3.2 Model assignments (assessment tool - Control questions) to assess the development of the competency ОПК-7

1. Definition of pharmacology, its position among other medical and biological sciences.
2. Routes of administration and excretion of drugs from the body (therapeutic and toxic value).
3. Pharmacology of beta-adrenergic blocking agents.
4. Pharmacology of non-steroidal anti-inflammatory drugs.
5. Pharmacology of hypolipidemic agents.

Assessment criteria (assessment tool — Control questions)

Grade	Assessment criteria
outstanding	The level of knowledge exceeds the volume of the training program, without errors.
excellent	The level of knowledge corresponds to the volume of the training program, without errors.
very good	The level of knowledge corresponds to the volume of the training program. One or two minor errors were made.
good	The level of knowledge corresponds to the volume of the training program. Several minor errors were made
satisfactory	The minimum acceptable level of knowledge. Many minor errors were made.
unsatisfactory	The level of knowledge is below the minimum requirements. There were major errors.
poor	Knowledge is missed.

5.3.3 Model assignments (assessment tool - Test) to assess the development of the competency ОПК-7

Tests

*1. Pharmacology is:

A .the science that studies the interaction of drugs with any organism; the laws and patterns (regularities) of such interaction as the basis for the use of pharmacotherapy in treatment.

B. studies the interaction of drugs with any organism.

C. the principles of using pharmacotherapy for treatment.

D. a scientific and practical branch engaged in the search, production, research, storage, manufacture and delivery of drugs.

***2. What branches of medicine (as a science) is pharmacology related to?

A. pharmacy

B. clinical pharmacology.

C. pharmacotherapy.

D .All of the above.

*3. Pharmacokinetics is (definition):

A .the effect of the body on the drug.

B. the effect of the drug on the body.

C. the study of the transport of drugs to the target organ.

D. the study of the mechanisms of action of drugs.

*4. Pharmacodynamics is (definition):

A .the effect of a drug on the body.

B. the effect of the body on the drug.

C. the study of drug transport to the target organ.

D. the study of the mechanisms of action of drugs.

*5. Medicinal substances are chemical substances used for:

A. drug production.

B. biological and genetic technologies.

C. the growth of microorganisms.

D .prevention, diagnosis, treatment of diseases, pregnancy prevention, obtained from blood, blood plasma, as well as organs, tissues of the human or animal body, plants, microorganisms, minerals by synthesis methods or using biological and genetic technologies.

***6. How many corrections can a doctor make in a prescription?**

A. 1.

B. 2.

C. 3.

D. 4.

E .none.

*****7. The rules for issuing prescriptions in the Russian Federation include the following requirements:**

A. the prescription is completed with the signature and seal of the doctor, which confirms his responsibility for this medical document.

B. only one drug containing a poisonous or narcotic substance can be prescribed on one prescription form

C. no more than two drugs can be prescribed on one prescription form for drugs that do not contain a poisonous or narcotic substance.

D .all points A-C are correct.

***8. Solid dosage forms include:**

A .tablets, capsules, granules, powders, dry powders for inhalers and chewable tablets, etc.

B. tablets, capsules, granules, powders and powders dissolved in a solvent.

C. solid pharmacological substances intended for the preparation of tablets and capsules.

D. solid pharmacological substances intended for use in solutions.

***9. Advantages of solid dosage forms:**

A. More stable than other dosage forms.

B. Portable. Easy to handle.

C. Allow for precise dosing of medicinal substances.

D. Provides sequential absorption of medicinal substances.

E .All points A-D are correct.

*****10. Disadvantages of solid dosage forms:**

A. Often require expensive machines for production.

B. Difficult for children and patients to swallow during sleep.

C. Cannot be prescribed to people who cannot swallow tablets or have lost this ability, or who are unconscious.

D. Can cause mechanical or chemical irritation of the mucous membrane of the digestive tract when taken orally.

solubility during long-term storage.

E. Chemical changes in components, colour or solubility are possible during long-term storage.

F .All points A-E are correct.

*****11. Disadvantages of soft dosage forms:**

A. Reduced dosing accuracy.

B. May cause staining and contamination of skin and clothing.

C. Bulky to handle.

D. Less physicochemically stable than solid dosage forms.

E. May cause irritation or allergies in some patients.

F.All points A-E are correct.

***12. Gaseous dosage forms are used to obtain**

A. local effect only

B. systemic effect only

C .local or systemic effect

D. placebo effect

	Answers to tests	
1. A	2. D	3. A
4. A	5. D	6. E
7. D	8.A	9. E
10. F	11. F	12. C

Assessment criteria (assessment tool — Test)

Grade	Assessment criteria
outstanding	100% correct answers
excellent	90 – 99 % correct answers
very good	80 – 90 % correct answers
good	70-80 % correct answers
satisfactory	50 – 70 % correct answers
unsatisfactory	20 – 50 % correct answers
poor	0 – 20 % correct answers

5.3.4 Model assignments (assessment tool - Tasks) to assess the development of the competency ОПК-7

Task 1*

In the situations below, choose the type of drug therapy (pharmacotherapy) from the following: 1. Pathogenetic. 2. Preventive (etiotropic). 3. Symptomatic.

A. A 5-year-old child diagnosed with type 1 diabetes mellitus (insulin-dependent) is prescribed an insulin drug, which, by activating enzymes, helps the entry of glucose into cells from the blood and normalizes glucose levels.

B. To prevent influenza in the winter-spring period, the doctor advised the child to receive a flu vaccine, which promotes the production of specific antibodies and, thereby, neutralizing viruses, prevents the development of the disease.

C. The patient took a paracetamol tablet to relieve a symptom - headache.

Answer. A. 1. B. 2. C. 3.

Task 2**

At the consultation, an experienced doctor suggested that in order to obtain a faster effect, inject an aqueous solution of the desired medicine into a vein instead of taking a tablet with the same substance orally.

A. Will you support his decision? Why?

B. List possible routes of administration for aqueous solutions.

Answer.

A. The proposal is reasonable. When taking the tablet orally, the effect of the drug will not be rapid, so the medicine must first enter the stomach and then the small intestine. At this time, the tablet must dissolve, after which the medicine must be absorbed into the portal vein system, enter the liver, pass through it (with possible primary metabolism), and only after this the medicine enters the systemic circulation. With intravenous administration, the effect will be much faster, since the medicine immediately enters the systemic circulation (there is no passage through the stomach, absorption, etc.).

B. Injections of aqueous solutions are possible intravenously, intraarterially, intracardiacly (used for resuscitation, currently not recommended), subcutaneously and intradermally.

Task 3**

At a consultation, a novice doctor suggested injecting an oil solution of the desired medicine into a vein to obtain a faster effect.

A. Will you support his decision? Why?

B. Indicate a possible route of administration for oil solutions.

Answer.

A. The proposal cannot be supported.

An oil solution injected into a vein will lead to pulmonary embolism, which is potentially fatal.

B. An oil solution of the drug is administered subcutaneously or intramuscularly. Preheat the ampoule to 37-38 degrees. After inserting the needle, you need to pull the plunger towards you to make sure that no blood enters

the syringe. If there is no blood flow, this means that the needle is not in an artery or vein and, therefore, there is no danger of drug embolism (oil embolism). After this, slowly introduce the solution.

Task 4***

A 44-year-old patient, starting treatment for essential hypertension (BP 180/110 mm Hg), was prescribed the drug "Gypotensin", which lowers blood pressure. The dose of the drug is 8 mg, the number of tablets per dose per day is two tablets (morning and evening). At the next follow-up examination after 2 weeks, the patient noted a significant improvement in his condition ('he feel healthy"), but during the examination, the blood pressure values were 160-165 / 95-90 mm Hg. The doctor explained to the patient the difference between "health status" and "health feeling", indicating that the doctor and the patient should base treatment mainly on the "health status" (in this case, elevated blood pressure). Therefore, he decided to increase the dose of the drug (1 tablet 3 times a day), with a new follow-up examination in 10 days.

A. Help the doctor write a prescription for a new course of treatment.

B. Explain the doctor's plan of action for adjusting the treatment from the position of the concept of an individual therapeutic range and the key law of clinical pharmacology and pharmacotherapy.

Answer.

A.

Rp.: Gypotensini 0,008

D.t.d.N 30 in tab.

S. Orally 1 tablet 3 times a day (8^{00}, 13^{00}, 19^{00}).

B. The desired effect of lowering blood pressure and improving the patient's well-being was achieved, but the optimal blood pressure level was not achieved (< 140/85 mm Hg). This result confirms the correctness of the drug choice: it got to the "right place (= target organ/tissue)" and acts in the right direction! But an insufficient effect indicates underdosage, since it did not create the "right" concentration in the target organ (i.e., corresponding approximately to the middle of the individual therapeutic range), and this does not lead to normalization of blood pressure. Thus, clinical data and these considerations require an increase in the drug dose for treatment.

Assessment criteria (assessment tool — Tasks)

Grade	Assessment criteria
outstanding	The solution is given in a volume exceeding the volume of the program for mastering the discipline, in compliance with the necessary sequence of actions; the answer contains all entries, tables, drawings, drawings, graphs, and calculations correctly and accurately; error analysis was performed correctly.
excellent	The solution is given in full in compliance with the necessary sequence of actions. The answer

Grade	Assessment criteria
	contains all entries, tables, figures, drawings, graphs, and calculations correctly and accurately. Error analysis performed correctly.
very good	The solution is given in full, following the required sequence of actions. There are 1-2 errors in the answer
good	The solution is given in full, following the required sequence of actions. There are 2-3 errors in the answer
satisfactory	The solution is not given in full, but the volume of the completed part is such that it allows us to obtain the correct results and conclusions. Errors were made during the work.
unsatisfactory	The solution is not given in full or the volume of work performed does not allow us to draw correct conclusions
poor	The solution is not given in full or the volume of work performed does not allow us to draw correct conclusions

6. Учебно-методическое и информационное обеспечение дисциплины (модуля)

Основная литература:

1. Харкевич Д.А. Фармакология : учебник / Харкевич Д.А. - Москва : ГЭОТАР-Медиа, 2022. - 752 с. - ISBN ISBN 978-5-9704-6820-3., https://e-lib.unn.ru/MegaPro/UserEntry?Action=FindDocs&ids=808685&idb=0.

Дополнительная литература:

1. Аляутдин. Фармакология : учебник / Аляутдин. - Москва : ГЭОТАР-Медиа, 2023. - 1152 с. - ISBN 978-5-9704-7958-2., https://e-lib.unn.ru/MegaPro/UserEntry?Action=FindDocs&ids=878518&idb=0.
2. Kharkevitch D.A. Pharmacology : учебник / Kharkevitch D.A. - Москва : ГЭОТАР-Медиа, 2023. - 680 с. - ISBN 978-5-9704-7088-6., https://e-lib.unn.ru/MegaPro/UserEntry?Action=FindDocs&ids=839061&idb=0.

Программное обеспечение и Интернет-ресурсы (в соответствии с содержанием дисциплины):

ЭБС «Юрайт». Режим доступа: http://biblio-online.ru.
ЭБС «Консультант студента». Режим доступа: http://www.studentlibrary.ru.
ЭБС «Лань». Режим доступа: http://e.lanbook.com/.
ЭБС «Znanium.com». Режим доступа: www.znanium.com.

7. Материально-техническое обеспечение дисциплины (модуля)

Учебные аудитории для проведения учебных занятий, предусмотренных образовательной

программой, оснащены мультимедийным оборудованием (проектор, экран), техническими средствами обучения, компьютерами.

Помещения для самостоятельной работы обучающихся оснащены компьютерной техникой с возможностью подключения к сети "Интернет" и обеспечены доступом в электронную информационно-образовательную среду.

Программа составлена в соответствии с требованиями ФГОС ВО по направлению подготовки/специальности 31.05.01 - General Medicine.

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Конышкина Татьяна Михайловна, кандидат медицинских наук, доцент.
Заведующий кафедрой: Шарабрин Евгений Георгиевич, доктор медицинских наук.

Программа одобрена на заседании методической комиссии от 28 ноября 2024, протокол № №9.