



MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION  
Federal state autonomous educational institution  
of higher education  
«Far Eastern Federal University»  
(FEFU)

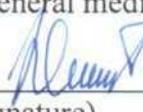
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**SCHOOL OF BIOMEDICINE**

«AGREED»

Head of education program  
«General medicine»

  
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(signature) Khotimchenko Yu.S.  
(Full name)  
«09» of July 2019

«APPROVED»

Director of the Department of Clinical  
Medicine

  
  
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(signature) Geltser B.I.  
(Full name)  
«09» of July 2019

**WORKING PROGRAM OF ACADEMIC DISCIPLINE (WPAD)**

«Pharmacology»

Educational program

Specialty 31.05.01 «General medicine»

**Form of study: full time**

year 3,4 semester 5,6,7  
lectures 54 hours  
practical classes 126 hours  
laboratory works not provided  
total amount of in-classroom work 180 hours  
independent self-work 108 hours  
including exam preparation 27 hours  
control works ()  
credit 5,6 semester  
exam 4 year, 7 semester

The working program is drawn up in accordance with the requirements of the Federal state educational standard of higher education (level of training), approved by the order of the Ministry of education and science of the Russian Federation from 09.02.2016 № 95.

The working program of the discipline was discussed at the meeting of the Department of fundamental and clinical medicine. Protocol No. 8, 09 of July 2019

Author: d.m.sc., professor Khotimchenko M.Y.

## RESUME

The working program "Pharmacology" is intended for the 3rd year students enrolled in the educational program 05.31.01 "General Medicine", included in the basic part of the curriculum, and implemented within the 3rd year, in 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> semesters.

The total volume of the discipline studied is 288 hours (8 credits) with lectures (54 hours), practical classes (108 hours) and independent self-work (108 hours including 27 hours for exam preparation). The course of pharmacology ends with an exam at the end of the 7<sup>th</sup> semester.

In developing the working program of the discipline is made in accordance with the Federal State Educational Standard of Higher Education in the specialty 31.05.01 "General Medicine" (level of specialty) and the curriculum for preparation of students.

The course program is based on the basic knowledge gained by students.:

ability to abstract thinking, analysis, synthesis (GCC-1);

readiness to use basic physicochemical, mathematical and other natural science concepts, and methods in solving professional problems (GPC-7);

The discipline "Pharmacology" is closely related to the other disciplines. During the study it relies on the biological sciences and provides for preliminary mastery of such disciplines as: anatomy, histology, cytology, biology, physiology, inorganic, physical and organic chemistry, biochemistry, microbiology, etc.

**Purpose of the program** - mastering by the students of the basic conceptions of general pharmacology and pharmacology of individual systems of the body, the mechanisms of action of drugs, knowledge of molecular targets for drugs, the development of integrated thinking in future specialists, allowing them to predict positive and negative aspects of the drug effects as well as their combinations, formation of skills to apply acquired knowledge in professional activities.

**Objectives:**

- master basic information on general pharmacology, the mechanisms of the drug effects in biological targets, pharmacokinetics, pharmacodynamics and the use of major groups of drugs;

- to teach students the basic principles of the written prescription designs and their rules, the ability to write prescriptions for medicines in various dosage forms and combinations;

- be able to analyze the effect of drugs at the level of the whole organism, organ, cell, subcellular structures and molecules;

- know the principles of action of the main pharmacotherapeutic groups of medicinal substances, issues of the molecular mechanism of their action and safety profile;

- determine the indications and contraindications for prescribing drugs for major diseases;

- take into account the influence of various factors (gender, weight, age, history, comorbidity, the use of other drugs, etc.) on the results of drug therapy;

- have an knowledge of drug toxicology and the principles of first aid in case of acute drug poisoning;

- to predict and timely prevent development of adverse drug reactions, concerning the aspects of the molecular action of drugs.

To successfully study the discipline "Pharmacology" the following preliminary competences should be previously formed among students:

GPC-8 - willingness to work in a team, tolerantly perceive social, ethnic, confessional and cultural differences;

GPC-9 - readiness to solve standard tasks of professional activity using information, bibliographic resources, biomedical terminology, information and communication technologies and taking into account the basic requirements of information security;

PC-14 - willingness to determine the need for the use of natural therapeutic factors, drug, non-drug therapy and other methods in patients in need of medical rehabilitation and sanatorium-resort treatment.

As a result of this discipline studying is formation of the following competencies in students:

Code and formulation of competence	Stages of competence formation	
GPC-8 - readiness for the medical use of drugs and other substances and their combinations in solving professional problems;	<b>To know</b>	Typical pathological processes in the human body and the mechanisms of their development
	<b>Be able to</b>	Explain changes in the patient's body based on knowledge of typical pathological processes.
	<b>To master</b>	Skills of interpretation of disorders in the patient's body to explain the correction of existing violations
GPC-9 - ability to assess morphological and functional, physiological states and pathological processes in the human body to solve professional problems	<b>To know</b>	<ul style="list-style-type: none"> <li>- basic concepts of pharmacokinetics and pharmacodynamics;</li> <li>- mechanisms responsible for development of drug resistance;</li> <li>- the basic principles of an individualized approach to the pharmacological treatment of diseases;</li> </ul>
	<b>Be able to</b>	<ul style="list-style-type: none"> <li>- explain the mechanisms of the main pathological processes;</li> <li>- explain the mechanisms of action studied during the course of drugs.</li> </ul>
	<b>To master</b>	<ul style="list-style-type: none"> <li>- the skill of choosing a drug on the basis of its pharmacological properties, mechanisms, and localization of the action and the possibility of replacing it with another drug in the absence;</li> <li>- skills to predict the possible interaction of drugs with the combined use of various drugs;</li> <li>- skills of work with reference and scientific</li> </ul>

		<p>literature, electronic databases, internet resources for solving professional problems;</p> <p>- the basics of measures to provide first aid before emergency and life-threatening conditions, acute poisoning with drugs.</p>
<p>PC-14 - willingness to determine the need for the use of natural therapeutic factors, drug, non-drug therapy and other methods in patients in need of medical rehabilitation and sanatorium-resort treatment.</p>	<b>To know</b>	<p>- current problems and trends in the development of pharmacology;</p> <p>- theoretical and methodological foundations of pharmacology;</p> <p>- rules for prescribing drugs in various dosage forms</p>
	<b>Be able to</b>	<p>- explain the mechanisms of the main pathological process occurrence;</p>
	<b>To master</b>	<p>- the methodology of processing pharmacological, diagnostic information using modern computer technologies.</p>

## I. STRUCTURE AND CONTENT OF THEORETICAL PART OF THE COURSE (54 HOURS)

### Section I. General pharmacology (12 hours.)

#### Theme 1. Theme title: Introduction to Pharmacology (2 hours)

Brief summary of the theme: Introduction to pharmacology. Goal and tasks. Pharmacology as an independent science. Relationship of pharmacology with other medical disciplines. Federal Law No. 61-FZ dated April 12, 2010, on the Circulation of Medicinal Products. Scientific approaches to the of new drug creation. The terms "biologically active substance", "pharmaceutical substance", "drug", "dosage form". Principles of evidence-based medicine.

#### Theme 2. Theme title: Pharmacokinetics (2 hours)

Brief summary of the theme: Dosing of medicinal substances. Administration routes of drugs into the body. Basic pharmacokinetic patterns.

#### Theme 3. Theme title: Concept of receptors, types of receptors (2 hours)

Brief summary of the theme: Aspects of general, molecular and biochemical pharmacology. Targets for pharmaceuticals. The concept of receptors, types of receptors. Classification of receptors and their localization in the cell. Receptor connections with membrane structures.

#### Theme 4. Theme title: Pharmacodynamics (2 hours)

Brief summary of the theme: Pharmacodynamics, definition. Types of drug action. The concept of agonists and antagonists.

**Topic 5. Theme title:** Repeated and combined drug administration of drugs (2 hours)

Brief summary of the theme: Reactions of the body induced by repeated administration, and combined use of drugs. The interaction of drugs due to their combined use. Side effects of drugs.

**Theme 6. Theme title:** Repeated and combined drug administration (2 hours.)

Brief summary of the theme: The influence of internal and external factors on the pharmacokinetics and pharmacodynamics of pharmaceuticals.

**Section II. Drugs affecting efferent innervation (10 hrs.)**

**Theme 1. Theme title: Pharmacology of cholinergic synapses. Cholinomimetic drugs (2 hours)**

Brief summary of the theme: Drugs affecting the peripheral nervous system. Pharmacology of cholinergic synapses. Synthesis and inactivation of acetylcholine. Cholinomimetic drugs. Anticholinesterase drugs. Cholinesterase reactivators.

**Theme 2. Theme title: Acetyl choline blocking drugs (2 hours).**

Brief summary of the theme: The structure of the nervous system. The influence of the parasympathetic and sympathetic nervous system on some organs and systems. The structure of the nerve cell. The concept of synapse. The structure of the synapse. Transmission of nerve impulses in synapses.

Acetyl choline blocking agents Types of cholinergic receptors. M- and n-Acetyl choline blockers, ganglioblockers, muscle relaxants of peripheral action. Classification of anticholinergic agents. The main effects of M- and n-acetyl choline blockers.

**Theme 3. Theme title: Pharmacology of adrenergic synapses. Adrenomimetic agents (2 hours)**

Brief summary of the theme: The main mediators. Concepts blockers, mimetics. Drugs affecting adrenoceptors. Synthesis and inactivation of norepinephrine. Types of adrenoceptors. Adrenomimetics, classification of adrenomimetics.

**Theme 4. Theme title: Adrenomimetic agents (2 hours)**

Brief summary of the theme: Classification of adrenoceptors. Classification adrenoceptor blocking agents. Physiological and clinical effects of blockade of  $\alpha$ - and  $\beta$ -adrenergic receptors. The main drugs, their characteristics and side effects.

**Theme 5. Theme title: Pharmacological regulation of body functions in the field of histaminergic, dopaminergic and serotonergic structures (2 hours)**

Brief summary of the theme: Dopamine functions. Dopamine receptor agents: dopaminomimetics and dopamine receptor blockers. Serotonin functions. Serotonergic and antiserotonin means. Histamine and histamine function. Agonists and antagonists of histamine receptors. Antihistamines: 1,2 and 3 generations. Mast cell membrane stabilizers.

### **Section III. Drugs affecting the central nervous system (14 hours)**

#### **Theme 1. Theme title: Drugs for local anesthesia (2 hours)**

Brief summary of the theme: Classification of local anesthetics, mechanism of action Types of anesthesia. Pharmacological characteristics of basic drugs.

#### **Theme 2. Theme title: Funds for general anesthesia. Ethyl alcohol (2 hours)**

Brief summary of the theme: History of the discovery and use of anesthetic agents. Classification of drugs for anesthesia. Mechanism of action. Characteristic stages of inhalation anesthesia. Pharmacological characteristics of the main drugs of anesthesia. Ethyl alcohol, local and systemic action, poisoning.

#### **Theme 3. Theme title: Hypnotic, antiepileptic, anti-parkinsonic drugs (2 hours)**

Brief summary of the theme: Epilepsy, definition, form. Antiepileptic drugs: definition, main effects. Requirements for antiepileptic drugs. The main drugs used to treat epilepsy, the mechanism of action. Side effects that are characteristic of the common drugs. Disease and Parkinson's syndrome. Anti-parkinsonian drugs, classification. Basic drugs, combined drugs. Classification of hypnotic drugs by chemical structure, duration, generations. Features of the action of hypnotic drugs 1 and 2 generation and modern drugs.

#### **Theme 4. Theme title: Neuroleptics, tranquilizers, sedatives (2 hours)**

Brief summary of the theme: Classification of neuroleptics. Pharmacological characteristics of phenothiazine derivatives. Features of the action of individual drugs. Indications for use. Side effects and complications. Urgency care. Classification of anxiolytics. Pharmacological characteristics of benzodiazepine derivatives. Non-benzodiazepine anxiolytics. Mechanism of action. Features of the action of drugs. Side effects. Sedatives classification. Indications for use.

#### **Theme 5. Theme title: Central nervous system stimulants: psychostimulants, antidepressants, nootropics, analeptics (2 hours)**

Brief summary of the theme: General classification of agents that excite the central nervous system. Classification, mechanism of action, pharmacological characteristics of psychostimulants. Classification, mechanism of action and pharmacological characteristics of antidepressants. Possible complications and measures of their prevention. Analeptics, classification of analeptic agents. The mechanism of action of analeptics. Overdose and relief measures for it. Nootropics, classification, mechanism of action, basic drugs.

#### **Theme 6. Theme title: Pharmacology of pain. Narcotic analgesics. Opioid receptor agonists (2 hours)**

Brief summary of the theme: Pain conception. Classification of remedies for pain relief. Analgesics, classification. The mechanism of action of narcotic analgesics. Effects of narcotic analgesics. Indications for administration. Side effects, addiction development. Acute poisoning with morphine. First aid in poisoning with narcotic analgesics.

#### **Theme 7. Theme title: Non-narcotic analgesics. Nonsteroidal anti-inflammatory drugs (2 hours)**

Brief summary of the theme: Drugs of various pharmacological groups with an analgesic mechanism of action. Nonsteroidal anti-inflammatory drugs (NSAIDs). Effects of prostaglandins. The mechanism of action of NSAIDs. Classification. Effects of NSAIDs, the mechanism of their development. Side effects of NSAIDs.

#### **Section IV. Drugs affecting the cardiovascular system and blood formation (10 hrs.)**

**Theme 1. Theme title:** Cardiotonic and antiarrhythmic drugs. Cardiac glycosides. (2 hours)

Brief summary of the theme: Antiarrhythmic drugs. Cardiotonic agents. Conductive system of the heart. The concept of arthmia, tachyarrhythmias, bradyarrhythmias. Sodium channel blockers.  $\beta$ -blockers. Potassium channel blockers. Calcium channel blockers. The structure of cardiac glycosides: glyconic and aglyconic parts, functions associated with them. The mechanism of action of cardiac glycosides. The main effects of SG. Digitalization methods.

**Theme 2. Theme title:** Blood pressure regulators. Antihypotensive and antihypertensive drugs (2 hours)

Brief summary of the theme: Antihypertensive drugs, classification. Mechanisms of action of different groups of antihypertensive drugs. Principles of selection and combination of antihypertensive drugs. Side effects of antihypertensive drugs and their correction. The mechanism features the action and application of antihypertensive drugs.

**Theme 3. Theme title:** Drugs regulating the function of the kidneys. Drugs removing uric acid and uric stones. Urolitics. (2 hours)

Brief summary of the theme: Kidneys, structure. Classification of diuretics, the mechanism of action and features of the application. The principle of the combined administration of diuretics. Side effects. Gout, agents used to treat gout. Fixed assets: classification, mechanism of action.

**Theme 4. Them title:** Pharmacology of atherosclerosis. Hypolipiemic agents. Antianginal and anti-ischemic agents (2 hours)

Brief summary of the theme: Antianginal drugs, classification, mechanism of action. Principles of choice and combination of drugs, depending on the form of coronary heart disease. Side effects. Hypolipidemic agents, classification, mechanism of action, side effects.

**Theme 5. Theme title:** Drugs regulating blood formation and blood clotting. (2 hours)

Brief summary of the theme: Drugs regulating blood coagulation and fibrinolysis. Coagulation factors. Antiplatelet agents. Anticoagulants. Hemostatics. Thrombolytic agents. Fibrinolysis inhibitors. Vitamin Q preparations. Plasma replacement and detoxification agents.

#### **Section V. Hormonal and antihormonal drugs. Drugs affecting the respiratory system. Antiallergic and immunotropic drugs (8 hours)**

**Theme 1. Theme title:** Hormonal drugs: principles of action and application. (2 hours)

Brief summary of the theme: Principles of the use of hormonal drugs. Preparations of the hormones of hypothalamus, pituitary, thyroid, parathyroid and pancreas. Antithyroid drugs.

**Theme 2. Theme title:** Hormonal drugs 2. Drugs regulating activity of the uterus. Current problems of contraception. (2 hours)

Brief summary of the theme: Preparations of adrenal gland hormones, gonads, anabolic steroids. Antihormonal drugs. Current problems of contraception.

**Theme 3. Theme title:** Current problems of immunopharmacology. Immunotropic drugs. Biostimulants. (2 hours)

Brief summary of the theme: The functions of the immune system. Components of immunity. Classification of pharmaceuticals for the correction of immunity. Drugs regulating blood formation. Iron medicines for enteral and parenteral administration.

**Theme 4. Theme title:** Drugs affecting the respiratory system. Mucolytics. Expectorant drugs. (2 hours)

Brief summary of the theme: Chronic obstructive pulmonary disease (COPD) and bronchial asthma (BA) as the leading causes of morbidity and mortality. Classification of bronchodilator drugs. Anticholinergic (anticholinergic) drugs. Methylxanthines.  $\beta_2$  agonists. Respiratory stimulants (respiratory analeptics), classification. Fixed assets, mechanisms of action, indications for use.

## **Section VI. Drugs affecting the gastrointestinal tract (4 hours)**

**Theme 1. Theme title:** Drugs for the treatment of gastric ulcers. Emetic and antiemetic. Anorexic. Laxatives. Antidiarrheal drugs (2 hours)

Brief summary of the theme: Peptic ulcer, etiology. Quadrotherapy in the treatment of peptic ulcer. Emetic and antiemetic drugs, classification, mechanism of action. Pharmacological characteristics of means of increasing and depressing the appetite. Classification of laxatives. Antidiarrheal drugs.

**Theme 2. Theme title:** Hepatoprotectors, choleric drugs, hepatotropic drugs. Drugs to restore the normal intestinal microflora. Drugs of substitution therapy, enzymes and enzyme inhibitors, amino acids, protein preparations. (2 hours)

Brief summary of the theme: Liver, main functions. Choleric agents, definition, classification. The main drugs of plant and synthetic origin. Classification of hepatotropic drugs: herbal drugs, combined drugs. Drugs to restore the normal intestinal microflora. Drugs of substitution therapy, enzymes and enzyme inhibitors, amino acids, protein preparations.

## **Section VII. Antimicrobial and antiparasitic drugs (8 hours)**

**Theme 1. Theme title:** Classification of drugs for chemotherapy and chemoprophylaxis of infectious diseases. Antiseptic and disinfectants. Synthetic antibacterial agents. (2 hours)

Brief summary of the theme: History of chemotherapy. Chemotherapy, definition. Antiseptics, definition. Disinfectants, definition. The difference between antiseptics and disinfectants. Requirements for antiseptics and disinfectants. Chemical classification. Basic drugs. Applications, side effects. Poisoning, relief measures. Synthetic antibacterial agents.

**Theme 2. Theme title: Antibiotics. (2 hours)**

Brief summary of the theme: Antibiotics, definition. Ways of antibiotic synthesis. Requirements for antibiotics. Principles of antibiotic therapy. Antibiotic classification.  $\beta$ -lactam antibiotics, classification. Spectrum of beta-lactams, indications, contraindications. Macrolides, aminoglycosides. Indications, side effects. Carbapenems, monobactams, glycopeptides. Indications, side effects.

**Theme 3. Theme title:** Tuberculosis treatment. Antifungal agents, antifungal agents. Anti-spirochetes drugs. (2 hours)

Brief summary of the theme: Anti-tuberculosis drugs. Principles of treatment of tuberculosis. Classification. Tuberculosis drugs of I and II row. The combination of drugs in the treatment of tuberculosis. The formation of resistance issues. Adverse effects of drugs. Antifungal, anti-leprosy and anti-spirochetes agents.

**Title 4. Title theme:** Drugs for the treatment of protozoal infections. Drugs for the treatment of helminthiasis. Antiviral drugs. (2 hours)

Brief summary of the theme: Antiviral agents, classification, mechanism of action. Anthelmintic drugs, mechanism of action, main drugs, side effects. Means for the treatment of protozoal infections. Treatment of malaria, chemoprophylaxis of malaria. Treatment of amebiasis, giardiasis, toxoplasmosis.

**Section VIII. Medicines that increase the body's resistance. (2 hours)**

**Theme 1. Theme title:** Drugs increasing body's resistance. Adaptogens, vitamins, antioxidants, antihypoxants, actoprotectors, radioprotectors. Drugs regulating a phosphorus-calcium exchange. Remedies against osteoporosis. (2 hours)

Brief summary of the theme: The concepts of adaptation and resistance. Adaptogens. Vitamins, classification, functions. Drugs regulating a phosphorus-calcium exchange. Remedies against osteoporosis.

**Section IX. Principles of treatment of acute poisoning. Principles of rational drug combination. (4 hours)**

**Theme 1. Theme title:** Principles of treatment of acute poisoning. Undesirable effects of drugs in the body. (2 hours)

Brief summary of the theme: Poisoning, determination. Signs of acute poisoning. Treatment of acute poisoning. Antagonism of drugs in the treatment of poisoning

**Theme 2. Theme title:** Incompatibility of drugs in the body. Principles of rational drug combination. (2 hours)

Brief summary of the theme: The interaction of drugs, leading to increased effectiveness and safety of pharmacotherapy underlying the rational combination of drugs. Types of drug interactions.

### **Practical classes (108 hours)**

**Lesson 1.** General pharmacology. Research methods in pharmacology. Types of action of medicinal substances. Pharmacodynamics. Pharmacokinetics. The main stages of pharmacokinetics. The general theory of dosing of medicinal substances, the concept of dose. (4 hours)

**Lesson 2.** The influence of factors of internal and external environment on the effects of drugs. Reactions to the re-administration of drugs. The body's response to the combined use of drugs. (4 hours)

**Lesson 3.** The final credit work on the topic: "Introduction to pharmacology. Basics of medical prescription. General pharmacology. (4 hours)

**Lesson 4.** Introduction to the section: "Drugs, affecting the endings of efferent nerves". Concepts and terms. Localization of receptors in the body. Substances affecting cholinergic synapses. (4 hours)

**Lesson 5.** Medicines affecting cholinergic synapses. Cholinomimetic means. Acetylcholinesterase inhibitors. Acetylcholinesterase reactivators. (2 hours)

**Lesson 6.** Drugs affecting cholinergic synapses. M-acetyl choline blockers. Ganglioblockers. Peripheral muscle relaxants. (2 hours)

**Lesson 7.** Medicines affecting adrenergic synapses. Adrenomimetic means. (2 hours)

**Lesson 8.** Medicines affecting adrenergic synapses. Adrenergic blocking agents and sympatholytics. (2 hours)

**Lesson 9.** The final test lesson on the topic: "Pharmacology of drugs affecting the peripheral nervous system." (4 hours)

**Lesson 10.** Drugs affecting afferent innervation (local anesthetics). Drugs for anesthesia. Toxicology of ethyl alcohol. Medications for the treatment of alcoholism. (4 hours)

**Lesson 11.** Narcotic analgesics. Opioid receptor antagonists. (2 hours)

**Lesson 12.** Hypnotic, anticonvulsant and anti-parkinsonic drugs. (4 hours)

**Lesson 13.** Neuroleptics, tranquilizers and sedatives. (2 hours)

**Lesson 14.** Antidepressants, psychostimulants and nootropic drugs. Final lesson "Pharmacology of agents affecting the central nervous system" (4 hours)

**Lesson 15.** Cardiotoxic and antiarrhythmic drugs. Cardiac glycosides. (4 hours)

**Lesson 16.** Blood Pressure Regulators. Antihypotensive and antihypertensive drugs. (4 hours)

**Lesson 17.** Drugs regulating the function of the kidneys. Drugs removing uric acid and uric stones. Urolitics. (4 hours)

**Lesson 18.** Anti-atherosclerotic drugs. Drugs for the treatment coronary artery disease. (4 hours)

**Lesson 19.** Drugs regulating blood coagulation and fibrinolysis. Anticoagulants. Antiplatelet agents. Hemostatics. Thrombolytic agents. Fibrinolysis inhibitors. Final lesson on the topic: "Means affecting the cardiovascular system and blood formation." (4 hours)

**Lesson 20.** Pharmaceuticals of hormones and their synthetic substitutes. Hormonal preparations of the hormones of the hypothalamus, pituitary, thyroid, parathyroid and pancreas. Antithyroid drugs. (4 hours)

**Lesson 21.** Pharmaceuticals of hormones and their synthetic substitutes. Hormonal drugs of adrenal hormones, gonads, anabolic steroids. (2 hours)

**Lesson 22.** Medicines affecting respiratory system. Mucolytics. Expectorant drugs. (4 hours)

**Lesson 23.** Antiallergic and immunotropic drugs. Drugs regulating blood formation. Final lesson for the section: "Hormones, Drugs affecting respiratory system. Antiallergic and immunotropic drugs ". (4 hours)

**Lesson 24.** Drugs regulating digestive system. Drugs used for treatment of peptic ulcer disease. Emetic and antiemetic. Anorexic, laxative and antidiarrheal drugs. (4 hours)

**Lesson 25.** Liver function, choleric, hepatotropic drugs. Drugs to restore the normal intestinal microflora. Enzymes and enzyme inhibitors. Final lesson in the section "Drugs that affect the digestive system." (4 hours)

**Lesson 26.** Antiseptic and disinfectants, antibacterial chemotherapeutic agents. (2 hours)

**Lesson 27.** Pharmacological regulation of infectious processes. Antibiotics. (4 hours)

**Lesson 28.** Tuberculosis treatment. Antifungal agents, antifungal agents. Anti-spirochete drugs. (4 hours)

**Lesson 29.** Drugs for the treatment of protozoal infections. Drugs for the treatment of helminthiasis. Antiviral drugs. Final lesson, "The principles of chemotherapy for microbial and parasitic diseases." (4 hours)

**Lesson 30.** Drugs that increase the body's resistance. Adaptogens, vitamins, antioxidants, antihypoxants, actoprotectors, radioprotectors. Drugs regulating a phosphorus-calcium exchange. Remedies against osteoporosis. (4 hours)

**Lesson 31.** Principles of treatment of acute poisoning. Unwanted effects of drugs in the body. (2 hours)

**Lesson 32.** Incompatibility of drugs in the body. Principles of rational drug combination. (2 hours)

## **II. TRAINING AND METHODOLOGICAL SUPPORT INDEPENDENT WORK OF STUDENTS**

Educational and methodological support of independent work of students in the discipline "Faculty therapy, occupational diseases" is presented in Appendix 1 and includes:

- the schedule of performing independent work in the discipline;
- characteristics of tasks for independent self-work of students and guidelines for their implementation;
- requirements for presentation and execution of the results of independent self-work;

evaluation criteria performance of independent self-work.

### III. MONITORING THE ACHIEVEMENT OF THE COURSE OBJECTIVES

No.	Controlled modules / sections / topics of the discipline	Codes and stages of competence formation		Evaluation tools - name	
				current control	intermediate certification/ exam
1.	Introduction to pharmacology. Basics of medical prescription. General pharmacology	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 1-11
			able to	Colloquium (OA-2)	
			masters	Control work (PW-2)	
2.	Pharmacology of agents affecting the peripheral nervous system	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 12-21
			able to	Colloquium (OA-2)	Tasks 1-11
			masters	Control work (PW-2)	
3.	Pharmacology of drugs affecting the central nervous system	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 39-51
			able to	Colloquium (OA-2)	
			masters	Control work (PW-2)	
4.	Drugs affecting the cardiovascular system and blood formation	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 22-38, 60-63
			able to	Colloquium (OA-2)	Tasks 12 - 40
			masters	Control work (PW-2)	
5.	Hormone drugs, drugs that affect the respiratory system. Antiallergic and immunotropic drugs	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 52-59
			able to	Colloquium (OA-2)	
			masters	Control work (PW-2)	
6.	Drugs affecting the digestive system	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 64-75
			able to	Colloquium (OA-2)	
			masters	Control work	

				(PW-2)	
7.	Principles of chemotherapy for microbial and parasitic diseases	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	
			able to	Colloquium (OA-2)	
			masters	Control work (PW-2)	

Control and methodological materials, as well as criteria and indicators necessary for the assessment of knowledge, skills and characterizing the stages of formation of competencies in the process of development of the educational program are presented in Appendix 2.

#### **IV. A LIST OF TEXTBOOKS AND METHODOLOGICAL SUPPORT OF THE DISCIPLINE**

##### **Main literature**

*(electronic and printed publications)*

1. Anesthesia and Neurotoxicity / Springer Japan 2017  
<https://link.springer.com/book/10.1007/978-4-431-55624-4#editorsandaffiliations>
2. Side Effects of Medical Cancer Therapy / Springer International Publishing AG, part of Springer Nature 2016  
<https://link.springer.com/book/10.1007/978-3-319-70253-7#editorsandaffiliations>
3. Biological Effects of Fibrous and Particulate Substances / Springer Japan 2016 <https://link.springer.com/book/10.1007/978-4-431-55732-6#editorsandaffiliations>

##### **Additional literature**

*(printed and electronic publications)*

1. Encyclopedia of medical immunology / Springer Science+Business Media LLC 2017 <https://link.springer.com/referencework/10.1007/978-1-4614-9211-5>
2. Percutaneous Penetration Enhancers Chemical Methods in Penetration Enhancement / Springer-Verlag Berlin Heidelberg 2016 <https://link.springer.com/book/10.1007/978-3-662-47862-2#editorsandaffiliations>

**The list of resources information and telecommunications network "Internet"**

## V. LIST OF INFORMATION TECHNOLOGIES AND SOFTWARE

The location of the computer equipment on which the software is installed, the number of jobs	List of licensed software
Multimedia auditorium Vladivostok Russian island, Ayaks 10, building 25.1, RM. M723 Area of 80.3 m <sup>2</sup> (Room for independent work)	Windows Seven enterprise SP3x64 Operating System Microsoft Office Professional Plus 2010 office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.); 7Zip 9.20 - free file archiver with a high degree of data compression; ABBYY FineReader 11 - a program for optical character recognition; Adobe Acrobat XI Pro 11.0.00 - software package for creating and viewing electronic publications in PDF; WinDjView 2.0.2 - a program for recognizing and viewing files with the same format DJV and DjVu.

In order to provide special conditions for the education of persons with disabilities all buildings are equipped with ramps, elevators, lifts, specialized places equipped with toilet rooms, information and navigation support signs.

## GUIDELINES FOR DEVELOPMENT OF THE DISCIPLINE

The theoretical part of the discipline "Pharmacology" is revealed in lectures, as the lecture is the main form of training, where the teacher gives the basic

concepts of the discipline.

The sequence of presentation of the material in the lecture, aimed at the formation of student indicative basis for the subsequent assimilation of the material in the independent self-work.

Students learn to analyze and predict the development of medical science, reveal its scientific and social problems in practical classes during the discussions at the seminars, in the discussion of abstracts and in the classroom with the use of active learning methods.

Practical classes of the course are held in all sections of the curriculum. Practical work is aimed at the formation of student skills of independent research. In the course of practical training, the student performs a set of tasks that allow to consolidate the lecture material on the topic under study, to gain basic skills in the field of building diets for different groups of the population, taking into account their physiological characteristics. Active consolidation of theoretical knowledge contributes to the discussion of problematic aspects of the discipline in the form of seminars and classes with the use of active learning methods. At the same time there is a development of skills of independent research activities in the process of working with scientific literature, periodicals, the formation of the ability to defend their point of view, listen to others, answer questions, lead the discussion.

When writing essays, it is recommended to find their own literature for students. Essay reveals the content of the problem. Working on the essay helps to deepen the understanding of individual issues of the course, to form and defend their point of view, to acquire and improve the skills of independent creative work, to conduct active cognitive work.

The main types of independent self-work of students – is a work with literary sources and guidelines on the history of medicine, bioethical problems, on-line resources for a deeper acquaintance with the individual problems of development of medicine and bioethics. The results of the work are made in the form of essays or reports with subsequent discussion. Topics of essays correspond to the main sections of the course.

To conduct ongoing monitoring and interim certification, oral interviews and control essays are carried out.

## VI. MATERIAL AND TECHNICAL MAINTENANCE OF DISCIPLINE

For practical work, as well as for the organization of independent work, students have access to the following laboratory equipment and specialized rooms that meet the current sanitary and fire regulations, as well as safety requirements during training and scientific and production works:

<b>Name of the equipped rooms and rooms for independent work</b>	<b>List of main equipment</b>
The computer class of the School of biomedical AUD. M723, 15 working places	<p>Screen, electrically 236*147 cm Trim Line Screen; DLP Projector, 3000 ANSI Lm, WXGA 1280x800, 2000:1 Mitsubishi EW330U; Subsystem of specialized mounting equipment CORSA-2007 Tuarex; Subsystem of videocommunity: matrix switch DVI Pro DXP 44 DVI Extron; DVI extender over twisted pair DVI 201 Tx/Rx the Extron; Subsystem of audiocommentary and sound; speaker system for ceiling SI 3CT LP Extron digital audio processor DMP 44 LC the Extron; the extension for the controller control IPL T CR48; wireless LAN for students is provided with a system based on access points 802.11 a/b/g / n 2x2 MIMO(2SS).</p> <p>Monoblock HP Loope 400 All-in-One 19.5 in (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW, GigEth, wifi, BT, usb kbd/mse, Win7Pro (64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty</p>
Multimedia audience	<p>Monoblock Lenovo C360G-i34164G500UDK; projection Screen Projecta Elpro Electrol, 300x173 cm; Multimedia projector, Mitsubishi FD630U, 4000 ANSI Lumen 1920 x 1080; Flush interface with automatic retracting cables TLS TAM 201 Stan; Aversion CP355AF; lavalier Microphone system UHF band Sennheiser EW 122 G3 composed of a wireless microphone and receiver; Codec of videoconferencing LifeSizeExpress 220 - Codeconly - Non-AES; Network camera Multipix MP-HD718; Two LCD panel, 47", Full HD, LG M4716CCBA; Subsystem of audiocommentary and sound reinforcement; centralized uninterrupted power supply</p>
Reading rooms of the Scientific library of the University open access Fund (building A, level 10)	<p>Monoblock HP Loope 400 All-in-One 19.5 in (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW, GigEth, wifi, BT, usb kbd/mse, Win7Pro (64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty Speed Internet access 500 Mbps. Jobs for people with disabilities equipped with displays and Braille</p>

	printers.; equipped with: portable reading devices flatbed texts, scanning and reading machines videovelocity with adjustable color spectrums; increasing electronic loops and ultrasonic marker
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MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION  
Federal state autonomous educational institution  
of higher education  
**« Far Eastern Federal University »**  
(FEFU)

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**SCHOOL OF BIOMEDICINE**

**TRAINING AND METHODOLOGICAL SUPPORT OF INDEPENDENT  
WORK OF STUDENTS**

**on discipline «Pharmacology»**

**Area of study 31.05.01 General medicine**

**Form of study: full time**

**Vladivostok**

**2016**

## Schedule of the independent self-work on the discipline

No.	Date / Deadline	Type of independent work	Estimated norms of time for execution (hour)	Form of control
1.	For lesson #1	<p>Preparation of essay messages or presentations:</p> <p>"History of domestic pharmacology".</p> <p>“The main sections of pharmacology. Principles of classification of drugs.</p> <p>Conduct an analysis of the structure of the recipe.</p>	<b>2 hours</b>	Speech to the audience
2.	For lesson #2	<p>Preparation for a given topic.</p> <p>Conduct a written prescription structure analysis.</p>	<b>2 hours</b>	Oral questioning
3.	For lesson #3	<p>Preparing for the final lesson.</p> <p>Conduct a written prescription structure analysis.</p>	<b>2 hours</b>	Oral questioning
4.	For lesson #4	<p>Preparation for a given topic.</p> <p>Preparation of essay messages or presentations:</p> <p>"The modern dosage forms."</p> <p>"Principles of new drug</p>	<b>2 hours</b>	Speech to the audience

		discovery"		
5.	For lesson #5	Preparation for a given topic.  Preparation of essay messages or presentations:  "The concept of the toxic, embryotoxic action of drugs."  "Features of the drug dosing in childhood."  "Features of dosing of drugs in the elderly."	<b>2 hours</b>	Oral questioning
6.	For lesson #6	Preparation for a given topic.  Problem solving;  Performance of test tasks;  Preparation of essay messages or presentations.  "Medicinal herbs containing atropine, application in medical practice."	<b>2 hours</b>	Speech to the audience  Control of solving tasks and performing test tasks
7.	For lesson #7	Preparation for a given topic.  Preparation of essay messages or presentations.  "Medicinal herbs containing ephedrine, application in medical practice."  Completing assignments to consolidate	<b>2 hours</b>	Speech to the audience  Control of the task solving

		knowledge of pharmacotherapy using methodological and reference literature.		
8.	For lesson #8	Preparation for a given topic.  Preparation of essay messages or presentations.  "Medicinal herbs containing reserpine, application in medical practice."  Completing assignments to consolidate knowledge of pharmacotherapy using methodological and reference literature.	<b>2 hours</b>	Speech to the audience  Control of the task solving
9.	For lesson #9	Preparing for the final lesson.  Work with educational literature in the library;	<b>2 hours</b>	Control of solving tasks and performing test tasks
10.	For lesson #10	Preparation for a given topic.  Work with educational literature in the library;  Preparation of essay messages or presentations.  "Pharmacological characteristics of ethyl alcohol. Local and resorptive action. Poisoning and relief measures "	<b>2 hours</b>	Speech to the audience
11.	For lesson #11	Work with educational literature in the library;	<b>2 hours</b>	Speech to the audience

		<p>Problem solving;</p> <p>Performance of test tasks;</p>		<p>Control of the solving tasks and performing test tasks</p>
12.	For lesson #12	<p>Preparation for a given topic.</p> <p>Work with educational literature in the library;</p> <p>Preparation of essay messages or presentations.</p> <p>"The latest drugs for the treatment of Parkinson's disease and the prospects for their use"</p> <p>Preparation of essay messages or presentations.</p> <p>"History of the discovery of antipsychotic drugs"</p> <p>"The history of the discovery of antidepressants"</p> <p>"Medicinal herbs with a sedative effect"</p>	<b>2 hours</b>	<p>Speech to the audience</p>
13.	For lesson #13	<p>Preparation for a given topic.</p> <p>Work with educational literature in the library;</p> <p>Preparation of essay messages or presentations.</p> <p>"Medicinal herbs containing adaptogens"</p>	<b>2 hours</b>	<p>Speech to the audience</p>
14.	For lesson #14	<p>Preparing for the final lesson.</p>	<b>2 hours</b>	<p>Speech to the audience</p> <p>Control of the solving</p>

		<p>Problem solving;</p> <p>Performance of test tasks;</p> <p>Work with educational literature in the library;</p> <p>Preparation of essay messages or presentations.</p> <p>“Medicinal herbs with analgesics (analgesic effect).</p>		<p>tasks and performing test tasks</p>
15.	For lesson #15	<p>Preparation for a given topic.</p> <p>Preparation of essays messages or presentations.</p> <p>"Medicinal herbs containing cardiac glycosides"</p> <p>"Medicinal herbs with antiarrhythmic effect"</p> <p>Solving of case study tasks</p>	<b>2 hours</b>	<p>Speech to the audience</p> <p>Control of the problem solving</p>
16.	For lesson #16	<p>Preparation for a given topic.</p> <p>Problem solving;</p> <p>Execution of test tasks;</p>	<b>2 hours</b>	<p>Speech to the audience</p> <p>Control of the solving tasks and performing test tasks</p>
17.	For lesson #17	<p>Preparation for a given topic.</p> <p>Problem solving;</p> <p>Execution of test tasks</p>	<b>2 hours</b>	<p>Speech to the audience</p> <p>Control of the solving tasks and performing test tasks</p>
18.	For lesson #18	<p>Preparation for a given topic.</p> <p>Preparation of essay</p>	<b>2 hours</b>	<p>Speech to the audience</p> <p>Control of the solving</p>

		<p>messages or presentations.</p> <p>"Drugs with anti-sclerotic effect"</p> <p>"The use of nitrospray in an attack of angina»</p>		tasks and performing test tasks
19.	For lesson #19	<p>Preparing for the final lesson.</p> <p>Solving of case study tasks</p>	<b>2 hours</b>	Control of the solving tasks and performing test tasks
20.	For lesson #20	<p>Preparing for the final lesson.</p> <p>Solving of case study tasks</p>	<b>2 hours</b>	Monitoring the execution of tasks
21.	For lesson #21	<p>Preparation for a given topic.</p> <p>Completion of tasks with written prescription and problem solving using reference books;</p>	<b>2 hours</b>	Monitoring the execution of tasks
22.	For lesson #22	<p>Preparation for a given topic.</p> <p>Preparation of essay messages or presentations.</p> <p>"Medicinal herbs with expectorant action"</p> <p>"Features of the use of drugs to prevent attacks of bronchial asthma"</p> <p>"Drugs used to prevent attacks of bronchial asthma"</p>	<b>2 hours</b>	Speech to the audience
23.	For lesson #23	<p>Preparing for the final lesson.</p> <p>Completing assignments</p>	<b>2 hours</b>	Monitoring the execution of tasks

		<p>to consolidate knowledge of pharmacotherapy using reference and methodological literature;</p> <p>Execution of the test tasks.</p>		
24.	For lesson #24	<p>Preparation for a given topic.</p> <p>Preparation of essay messages or presentations.</p> <p>"The history of the vitamin discovery "</p> <p>"Vitamins in animal products."</p>	<b>2 hours</b>	Speech to the audience
25.	For lesson #25	<p>Preparing for the final lesson.</p> <p>Performing tasks in the written prescription using reference and methodological literature.</p> <p>Problem solving.</p>	<b>2 hours</b>	Monitoring the execution of tasks
26.	For lesson #26	<p>Preparation for a given topic.</p> <p>Preparation of essay messages or presentations.</p> <p>"Antiseptics of plant origin"</p> <p>"The history of the discovery of antiseptics"</p> <p>"Safety precautions when working with antiseptics"</p>	<b>2 hours</b>	Speech to the audience

27.	For lesson #27	<p>Preparation for a given topic.</p> <p>Preparation of essay messages or presentations.</p> <p>"The history of the discovery of antibiotics. Works of domestic and foreign scientists "</p>	<b>2 hours</b>	Speech to the audience
28.	For lesson #28	<p>Preparation for a given topic.</p> <p>Preparation of essay messages or presentations.</p> <p>"The history of the discovery of antibiotics. Works of domestic and foreign scientists.</p>	<b>2 hours</b>	Speech to the audience
29.	For lesson #29	<p>Preparation for a given topic.</p> <p>Solving of case study tasks</p>	<b>2 hours</b>	Monitoring the solution of situational tasks
30	For lesson #30	<p>Preparation for a given topic.</p> <p>Finding information about drugs in available databases given topic.</p> <p>Preparation of essay messages or presentations.</p> <p>"The history of the discovery of vitamins"</p> <p>"Vitamins in animal products."</p> <p>Preparation of abstract messages or presentations.</p>	<b>2 hours</b>	Monitoring the execution of tasks

31.	For lesson #31	Preparation for a given topic.  Preparation of essay messages or presentations on the following topics:  "The basic principles of treatment of acute poisoning with the standard (ethyl alcohol)"  "Basic principles of treatment of acute hypnotic poisoning"  "Basic principles of treatment of acute poisoning with narcotic analgesics"  "Basic principles of treatment of acute poisoning with cardiac glycosides"  "Basic principles of treatment of acute atropine poisoning"	<b>2 hours</b>	Speech to the audience
32.	For lesson # 32		<b>6 hours</b>	
	Exam preparation		<b>36 hours</b>	

### **Recommendations for independent work of students**

For successful self-preparation it is necessary to use the proposed teaching and learning tools (textbooks, teaching aids, electronic resources, as well as teacher lectures).

Various types of tasks are conducted in the classroom: independent preparation of a report or presentation or work in groups.

## **Guidelines for writing and design of an essay**

Essay is a creative activity of the student reproducing in its structure the research activities to solve theoretical and applied problems in a particular branch of scientific knowledge. That is why the course certification work is an essential component of the educational process in higher education.

The essay is a model of scientific research, independent self-work in which a student solves a problem of a theoretical or practical nature, applying the scientific principles and methods of a given branch of scientific knowledge. The result of this scientific search may have not only subjective, but also objective scientific novelty, and therefore can be presented for discussion by the scientific community in the form of a scientific report or presentation at scientific-practical conferences, as well as in a form of research article.

Essay involves the acquisition of skills for building business cooperation, based on ethical standards of scientific activity. Purposefulness, initiative, disinterested cognitive interest, responsibility for the results of their actions, conscientiousness, competence - personality traits that characterize the subject of research activities corresponding to the ideals and norms of modern science.

The essay is an independent educational and research activity of the student. The teacher assists in a consultative manner and assesses the process and the results of the activity. Teacher provides an approximate topic of the essay work, specifies the problem and topic of research with a student or intern, helps to plan and organize research activities, assigns time and a minimum number of consultations.

The teacher receives the text of the essay for verification at least ten days before the defense.

Generally there is a certain structure of the essay, the main elements of which in order of their location are the following:

1. Title page.
2. Goal.
3. Table of Contents

4. List of abbreviations, symbols and terms (if necessary).
5. Introduction.
6. Main part.
7. Conclusion.
8. Reference list.
9. Appendixes.

The title page contains educational institution, graduating department, author, teacher or supervisor, research topic, place and year of the essay.

The title of the essay should be as short as possible and fully consistent with its content.

The table of contents (content) reflects the names of the structural parts of the essay and the pages on which they are located. The table of contents should be placed at the beginning of work on one page.

The presence of a detailed introduction - a mandatory requirement for the abstract. Despite the small volume of this structural part, its preparation causes considerable difficulties. However, this is a qualitatively executed introduction that is the key to understanding the entire work, which testifies to the professionalism of the author.

Thus, the introduction is a very crucial part of the essay. The introduction should start with a justification of the relevance of the chosen topic. As applied to the essay, the concept of "relevance" has one feature. From how the author of the essay can choose a topic and how correctly he understands and evaluates this topic from the point of view of modernity and social significance, characterizes his scientific maturity and professional preparedness.

In addition, in the introduction it is necessary to isolate the methodological basis of the essay, name the authors, whose works constituted the theoretical basis of the study. A review of the literature on the topic should show the author's thorough acquaintance with special literature, his ability to systematize sources, critically examine them, highlight the essential and determine the most important in the up-to-date state of knowledge of the topic.

The introduction reflects the importance and relevance of the chosen topic, defines the object and subject, purpose and objectives, and the chronological framework of the study.

The introduction ends with a statement of the general conclusions about the scientific and practical significance of the topic, the degree of its knowledge and sources, and the hypothesis being put forward.

The main part describes the essence of the problem, reveals the topic, determines the author's position, factual material is given as an argument and for display of further provisions. The author must demonstrate the ability to consistently present the material while analyzing it simultaneously. Preference is given to the main facts, rather than small details.

The essay ends with the final part called "conclusion". Like any conclusion, this part of the essay serves as a conclusion due to the logic of the study which is a form of synthesis accumulated in the main part of scientific information. This synthesis is a consistent, coherent presentation of the results obtained and their relation to a common goal and specific tasks set and formulated in the introduction. At this place there is a so-called "output" knowledge, which is new in relation to the original knowledge. The conclusion may include suggestions of practical matter, thereby increasing the value of theoretical materials.

So, the conclusion of the essay should contain: a) presents the conclusions of the study; b) theoretical and practical significance, novelty of the essay; c) indicated the possibility of applying the results of the study.

After conclusion it is acceptable to place the reference list of the literature used throughout. This list is one of the essential parts of the essay and reflects the independent creative work of the author of the essay.

The list of sources used is placed at the end of the work. It is made either in alphabetical order (by the name of the author or the name of the book), or in the order in which the references appear in the text of the prepared work. In all cases, the full title of the work, the names of the authors or the editor of publication are indicated if the writing team involved a group of authors, data on the number of

volumes, the name of the city and publisher in which the work was published, year of publication, number of pages.

### **Methodical recommendations for the presentation preparation**

For preparation of presentation it is recommended to use: PowerPoint, MS Word, Acrobat Reader, LaTeX-bev package. The simplest program for creation of presentations is Microsoft PowerPoint. To prepare a presentation, it is necessary to process the information collected while writing the essay.

The sequence of preparation of the presentation:

1. Clearly state the purpose of the presentation.
2. Determine what the presentation format will be: live presentation (then how long it will be) or e-mail (what will be the context of the presentation).
3. Select the entire content of the presentation and build a logical chain of presentation.
4. Identify key points in the content of the text and highlight them.
5. Determine the types of visualization (pictures) to display them on slides in accordance with the logic, purpose and specificity of the material.
6. Choose the design and format the slides (the number of pictures and text, their location, color and size).
7. Check the visual perception of the presentation.

The types of visualization include illustrations, images, charts, tables. The illustration is a representation of a real-life visual. The images - as opposed to illustrations - are metaphor. Their purpose is to cause an emotion and create an attitude towards it, to influence the audience. With the help of well-designed and presented images, information can remain permanently in a person's memory. Chart is visualization of quantitative and qualitative relationships. They are used for convincing data demonstration, for spatial thinking in addition to the logical one. Table is a specific, visual and accurate data display. Its main purpose is to structure information, which sometimes facilitates the perception of data by the audience.

### *Practical hints on preparing a presentation*

- printed text + slides + handouts are prepared separately;
- slides -visual presentation of information that should contain a minimum of text and maximum of images that bring a meaning, to look visually and simply;
- textual content of the presentation - oral speech or reading, which should include arguments, facts, evidence and emotions;
- recommended number of slides 17-22;
- mandatory information for the presentation: the subject, surname and initials of the speaker; message plan; brief conclusions from all that has been said; list of sources used;
- handouts should be provided with the same depth and coverage as the live performance: people trust more what they can carry with them than disappear images, words and slides are forgotten, and handouts remain a constant tangible reminder; handouts are important to distribute at the end of the presentation; Handouts should be different from slides, should be more informative.

### **Evaluation criteria for essays.**

The stated understanding of the essay as a holistic copyright text defines the criteria for its evaluation: the novelty of the text; the validity of the source choice; the degree of disclosure of the issue essence; compliance with the requirements for registration.

**Essay novelty:** a) the relevance of the research topic; b) novelty and independence in the problem formulation, formulation of a new aspect of the well-known problem in the establishment of new connections (interdisciplinary, intra-subject, integration); c) ability to work with research and critical literature, systematize and structure research material; d) the appearance of the author's position, independence of assessments and judgments; d) stylistic unity of the text, the unity of genre features.

**The degree of disclosure of the question essence:** a) the plan compliance with an essay; b) compliance with the content of topic and plan of an essay; c) completeness and depth of knowledge on the topic; d) the validity of the methods and techniques of work with the material; e) ability to generalize, draw conclusions, compare different points of view on one issue (problem).

**The validity of the source choice:** a) evaluation of the used literature: whether the most famous works on the research topic are involved (including recent journal publications, recent statistics, reports, references, etc.)

**Compliance with the requirements for registration:** a) How true are the references to the used literature, quotes; b) assessment of literacy and presentation culture (including spelling, punctuation, stylistic culture), knowledge of terminology; c) compliance with the requirements for the volume of essay.

**The reviewer should clearly state** the remarks and questions, preferably with references to the work (possible on specific pages of the work), to research and evidence that the author did not take into account.

**The reviewer may also indicate:** whether student has addressed the topic earlier (essays, written works, creative works, olympic works, etc.) and whether there are any preliminary results; how the graduate has conducted the work (plan, intermediate stages, consultation, revision and processing of the written or lack of a clear plan, rejection of the head recommendations).

**The student submits** an essay for review no later than a week before the defense. The reviewer is the teacher. Experience shows that it is advisable to acquaint the student with the review a few days before the defense. Opponents are appointed by the teacher from the students. For an oral presentation a student needs about 10–20 minutes (approximately as long as he answers with tasks for the exam).

**Grade 5** is given if all the requirements for writing and defending an essay are fulfilled: the problem is indicated and its relevance is justified, a brief analysis of different points of view on the problem under consideration is made and one's own position is logically presented, conclusions are formulated, the topic is fully

disclosed, the volume is met, external requirements are met design, given the correct answers to additional questions.

**Grade 4** is given if the basic requirements for the essay and its defense are met, but there are some shortcomings. In particular, there are inaccuracies in the presentation of the material; or there is no logical sequence in the judgments; not sufficient volume of the essay; there are omissions in the design; additional questions for the defense are accompanied with incomplete answers.

**Grade 3** is given if there are significant deviations from the requirements for referencing. In particular: the topic is covered only partially; factual errors in the content of an essay or when answering additional questions; there is no output c.

**Grade 2** - the topic of an essay is not disclosed, a significant misunderstanding of the problem is found.

**Grade 1** - student's essay is not presented.

### **Case tasks for independent self-work**

1. The edges of the wound were treated with 10% iodine solution due to the injury to the patient for the first time, the edges of the wound were treated with 10% iodine solution. In places of contact with the skin the blisters appeared, such as burns. What is the term for this phenomenon?
2. A doctor was called to the patient which was diagnosed with morphine poisoning and washed the stomach and intestines with the addition of activated carbon. What is the term for this therapy?
3. Within the preoperative period, 1 ml of 1% morphine hydrochloride solution was injected into the patient in order to suppress pain sensitivity. Then the patient was given anesthesia. In what direction the effect of the drug will change?
4. A patient with a bladder atony was prescribed a medicine by a doctor, the dose of which the patient independently exceeded. Urination normalized, but there was increased sweating, profuse salivation, frequent stools, muscle spasms. Which drug

group was assigned to the patient? What is the cause and mechanism of the complications? List the drugs of this group.

5. In order to study the background of patient, a drug from the group of M-anticholinergics was introduced into the conjunctival sac. The doctor warned the patient that he would not be able to read and write for a week. What drug was administered to the patient? What group of drugs does it belong to? Explain the mechanism of its action on the eye.

6. A patient with an attack of bronchial asthma, who has comorbid diseases of hypertension and angina, was prescribed an M-acetyl choline blocker. Which M-acetyl choline blocker should be preferred?

7. A patient with asthmatic bronchitis, with a history of complaints of heart palpitations, went to a doctor. He was prescribed a drug. Tachycardia disappeared, but the patient began to be disturbed by attacks of asphyxiation. What drug from the group of beta-blockers was prescribed? What is the cause of choking?

8. The patient was taken by an ambulance to the cardiology department with a diagnosis of "arrhythmia." From the anamnesis, the patient suffers from heart failure for many years and receives a cardiac glycoside, which led to a heart rhythm disorder. A cardiologist have prescribed an antiarrhythmic agent from a group of local anesthetics. What drug was prescribed by the doctor in this case? Explain the mechanism of antiarrhythmic action of this drug.

9. A patient with a hypertensive crisis was administered an antihypertensive agent by ambulance doctor. Blood pressure has decreased. The patient got out of bed, but immediately turned pale, his head began to spin, and he lost consciousness. The patient was put to bed. After 2 hours, the adverse symptoms disappeared. What is the cause of the complication? What drugs have a similar effect? What groups do they belong to?

10. To eliminate an attack of bronchial asthma, the patient was given a drug. Bronchospasm was stopped, but tachycardia, pain in the heart area, tremor

appeared. What adrenomimetics was assigned to the patient? What group of drugs does it belong to? What drugs are preferable to use to reduce the risk of such complications and why?

11. A 0.25% solution of novocaine was injected into the patient at the site of the planned tissue incision, the patient suddenly became covered with red spots, profuse sweating, tachycardia, edema of the mucous membrane, bronchospasm occurred. What is the cause of the complications? Indicate the measures of assistance.

12. The patient was taken to hospital with a broken arm. For the prevention of pain shock analgesics introduced. The pain decreased, but nausea and vomiting began. What analgesics are used for traumatic pains?

13. The patient went to the doctor about the exacerbation of gastric ulcer: there were pains in the epigastric region, nausea, black stools (melena), weakness. As it turned out from the anamnesis, the patient during the week took an analgesic drug in connection with a cold, accompanied by fever and headache. What drug was taken by the patient?

14. After a four-day intake of a sleeping pill, a patient suffering from insomnia began to notice that the effect of the medication began to weaken. This prompted the patient to increase the dose of the drug. What kind of sleeping pills did the patient take and what is the possible reason for the development of tolerance towards him?

15. A patient was prescribed a drug due to Parkinson's disease to reduce muscular rigidity, after which the patient had muscular stiffness decreased. However, the patient paid attention to dry mouth, increased heart rate, deterioration of near vision, constipation. What drug was taken by the patient?

16. Patient K., 40 years old, suffering from peptic ulcer, was admitted to the hospital with gastric bleeding. From the anamnesis, it is known that he got sick

with the flu 7 days ago and took the drug X to lower the temperature. What drug could the patient take? What is the development of bleeding?

17. A patient with arterial hypertension, who had been taking a diuretic for a long time, developed the following symptoms: muscle weakness, paresthesias, and interruptions in the heart. Extrasystoles are recorded on the ECG. What drug could take the patient? What do these symptoms indicate? How to prevent their occurrence?

18. Patient B., 40 years old, was treated with an antibiotic for tuberculosis. After some time, the patient felt that he became ill hear. It was not possible to restore hearing even after prolonged treatment. Drugs of which antibiotic group are of relative toxicity?

19. A patient was admitted to the infectious diseases clinic - a diagnosis of typhoid fever. A broad-spectrum antibiotic has been prescribed. The patient's condition improved, but changes in the blood picture were noted - leukopenia, agranulocytosis. The drug is canceled. What antibiotics can be prescribed to the patient and why?

20. A patient with a diagnosis of "pyelonephritis" was treated for a long time with a sulfonamide drug, sulfadimezine, without taking a sufficient amount of liquid while taking the drug. Suddenly he developed severe back pain, urinary retention. Radiography of the kidneys revealed the presence of small stones in both kidneys. What is the cause of the complication?

21. The patient with chronic tonsillitis decided to take a chemotherapeutic agent, which is similar in chemical structure and is a competitive para-aminobenzoic acid antagonist. After 10 days, the patient had symptoms of intoxication. From the side of the central nervous system - dizziness, headaches, nausea, vomiting and complications from the blood: leukopenia, anemia. What group drugs did the patient take?

## **Methodical recommendations for the preparation of presentations**

General presentation requirements:

- presentation should not be less than 10 slides;
- the first sheet is the title page on which the following must be presented:  
the name of the project; surname, name, patronymic of the author;
- the next slide should be the content, where the main stages (moments) of the presentation are presented; it is desirable that you can go to the necessary page from the content by hyperlink and return to the content again;
- design ergonomic requirements: color compatibility, a limited number of objects on the slide, text color;
- The final presentation slides should be a glossary and bibliography.



MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION  
Federal state autonomous educational institution  
of higher education  
**« Far Eastern Federal University »**  
(FEFU)

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**SCHOOL OF BIOMEDICINE**

**ASSESSMENT FUND**  
**on discipline «Pharmacology»**  
**Specialty 31.05.01 General medicine**  
**Form of study: full time**

**Vladivostok**

**2016**

## Fund of assessment tools passport

This part of the program is filled in accordance with the Regulations on the Funds of assessment tools of educational programs of higher education - undergraduate, specialist's and master's programs of Far Eastern Federal University, approved by order of the rector of 12.05.2015 №12-13-850.

Code and formulation of competence	Stages of competence formation	
GPC-8 - readiness for the medical use of drugs and other substances and their combinations in solving professional problems;	<b>To know</b>	Typical pathological processes in the human body and the mechanisms of their development
	<b>Be able to</b>	Explain changes in the patient's body based on knowledge of typical pathological processes.
	<b>To master</b>	Skills of interpretation of disorders in the patient's body to explain the correction of existing violations
GPC-9 - ability to assess morphological and functional, physiological states and pathological processes in the human body to solve professional problems	<b>To know</b>	<ul style="list-style-type: none"> <li>- basic concepts of pharmacokinetics and pharmacodynamics;</li> <li>- mechanisms responsible for development of drug resistance;</li> <li>- the basic principles of an individualized approach to the pharmacological treatment of diseases;</li> </ul>
	<b>Be able to</b>	<ul style="list-style-type: none"> <li>- explain the mechanisms of the main pathological processes;</li> <li>- explain the mechanisms of action studied during the course of drugs.</li> </ul>
	<b>To master</b>	<ul style="list-style-type: none"> <li>- the skill of choosing a drug on the basis of its pharmacological properties, mechanisms, and localization of the action and the possibility of replacing it with another drug in the absence;</li> <li>- skills to predict the possible interaction of drugs with the combined use of various drugs;</li> <li>- skills of work with reference and scientific literature, electronic databases, internet resources for</li> </ul>

		solving professional problems; - the basics of measures to provide first aid before emergency and life-threatening conditions, acute poisoning with drugs.
PC-14 - willingness to determine the need for the use of natural therapeutic factors, drug, non-drug therapy and other methods in patients in need of medical rehabilitation and sanatorium-resort treatment.	<b>To know</b>	- current problems and trends in the development of pharmacology; - theoretical and methodological foundations of pharmacology; - rules for prescribing drugs in various dosage forms
	<b>Be able to</b>	- explain the mechanisms of the main pathological process occurrence;
	<b>To master</b>	- the methodology of processing pharmacological, diagnostic information using modern computer technologies.

### MONITORING THE ACHIEVEMENT OF THE COURSE OBJECTIVES

No.	Controlled modules / sections / topics of the discipline	Codes and stages of competence formation		Evaluation tools - name	
				current control	intermediate certification/ exam
1.	Introduction to pharmacology. Basics of medical prescription. General pharmacology	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 1-11
			able to	Colloquium (OA-2)	
			masters	Control work (PW-2)	
2.	Pharmacology of agents affecting the peripheral nervous system	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 12-21
			able to	Colloquium (OA-2)	Tasks 1-11
			masters	Control work (PW-2)	
3.	Pharmacology of drugs affecting the central nervous system	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 39-51
			able to	Colloquium (OA-2)	
			masters	Control work (PW-2)	
4.	Drugs affecting the cardiovascular system and blood	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 22-38, 60-63
			able to	Colloquium	Tasks 12 - 40

	formation			(OA-2)	
			masters	Control work (PW-2)	
5.	Hormone drugs, drugs that affect the respiratory system. Antiallergic and immunotropic drugs	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 52-59
			able to	Colloquium (OA-2)	
			masters	Control work (PW-2)	
6.	Drugs affecting the digestive system	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	Questions 64-75
			able to	Colloquium (OA-2)	
			masters	Control work (PW-2)	
7.	Principles of chemotherapy for microbial and parasitic diseases	GPC-8, GPC-9, PC-14	knows	Interview (OA-1).	
			able to	Colloquium (OA-2)	
			masters	Control work (PW-2)	

### The scale of assessment the level of formation of competences

Code and formulation of competence	Stages of competence formation		criteria	indicators	points
GPC-8 - readiness for medical use of drugs and other substances and their combinations in solving professional problems;	knows (threshold)	Typical pathological processes in the human body and the mechanisms of their development	Knowledge of typical pathological processes in the human body and the mechanisms of their development	Formed knowledge of typical pathological processes in the human body and the mechanisms of their development	100-90
	able to (advance)	- Explain changes in the patient's body	Ability to explain changes in the	Able and ready to explain changes in the patient's body on	100-90

	d)	on the basis of knowledge of typical pathological processes.	patient's body on the basis of knowledge of typical pathological processes.	the basis of knowledge of typical pathological processes.	
	masters (high)	Interpretation of disturbances in the patient's body to explain the correction of existing violations	Skills of interpretation of disturbances in the patient's body to explain the correction of existing violations	Capable to interpret of disturbances in the patient's body to explain the correction of existing violations	100-90
GPC-9 - ability to assess morphofunctional, physiological states and pathological processes in the human body to solve professional problems	knows (threshold)	-The basic concepts of pharmacokinetics and pharmacodynamics; - mechanisms for the development of drug resistance; - the basic principles of an individualized approach to the pharmacological treatment of diseases;	Knowledge of the basic concepts of pharmacokinetics and pharmacodynamics; - mechanisms for the development of drug resistance; - the basic principles of an individualized approach to the pharmacological treatment of diseases;	Formed knowledge of the basic concepts of pharmacokinetics and pharmacodynamics; - mechanisms for the development of drug resistance; - the basic principles of an individualized approach to the pharmacological treatment of diseases;	
	able to (advanced)	explain the mechanisms of the onset of the main pathological processes; - explain the mechanisms of action studied during the	Ability to explain the mechanisms of the onset of the main pathological processes; - explain the mechanisms of action studied	Able and ready to explain the mechanisms of the onset of the main pathological processes; - explain the mechanisms of action studied during	100-90

		course of drugs.	during the course of drugs	the course of drugs	
	masters (high)	- to choose a drug on the basis of its pharmacological properties, mechanisms, and localization of the action and the possibility of replacing it with another drug in the absence;	Skills of choosing a drug on the basis of its pharmacological properties, mechanisms, and localization of the action and the possibility of replacing it with another drug in the absence;	Capable to choose a drug on the basis of its pharmacological properties, mechanisms, and localization of the action and the possibility of replacing it with another drug in the absence;	100-90
PC-14 - willingness to determine the need for the use of natural therapeutic factors, drug, non-drug therapy and other methods in patients in need of medical rehabilitation and sanatorium-resort treatment.	knows (threshold)	-current problems and trends in the development of pharmacology; - theoretical and methodological foundations of pharmacology; - rules for prescribing drugs in various dosage forms	Knowledge of current problems and trends in the development of pharmacology; - theoretical and methodological foundations of pharmacology; - rules for prescribing drugs in various dosage forms	Formed knowledge of current problems and trends in the development of pharmacology; - theoretical and methodological foundations of pharmacology; - rules for prescribing drugs in various dosage forms	100-90
	able to (advanced)	explain the mechanisms of the main pathological processes;	Ability to explain the mechanisms of the main pathological processes;	Able and ready to explain the mechanisms of the main pathological processes;	100-90
	masters (high)	- the methodology of processing pharmacological	Skills to use methodology of processing	Capable to use methodology of processing	100-90

		, diagnostic information using modern computer technology;	pharmacological, diagnostic information using modern computer technology;	pharmacological, diagnostic information using modern computer technology;	
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### **Methodical recommendations determining the procedures for evaluating the results of mastering the discipline**

Current student certification. Current certification of students in the discipline "Pharmacology" is carried out in accordance with the local regulations of FEFU and is mandatory.

The current attestation is carried out in the form of control measures (defense of the test work, testing) for evaluating the actual learning outcomes of students and is carried out by the leading teacher.

Objects of evaluation are:

- academic discipline (activity in the classroom, timeliness of performing various types of tasks, attendance of all types of classes in a certified discipline);
- the degree of assimilation of theoretical knowledge;
- the level of mastery of practical skills in all types of educational work;
- the results of independent work.

For each object, the characteristics of the assessment procedures are given in relation to the evaluation tools used.

Intermediate certification of students. Intermediate certification of students in the discipline "Pharmacology" is carried out in accordance with the local regulations of FEFU and is mandatory.

Depending on the type of intermediate control in a discipline and the form of its organization, various criteria for assessing knowledge and skills can be used. Exam and credit are provided for the discipline, orally, using oral questioning in the form of answers to exam questions, an oral questioning in the form of an interview, making written prescriptions for medicines.

When using final tests at the exam or redits, the scale of interval points corresponding to the final grade, or the number of points sufficient to qualify, as well as the criteria for their assignment in relation to the four-point system - "excellent", "good", "satisfactory", "unsatisfactory" or "passed", and "failed".

The criteria for grading a student at the test / exam in the discipline "Pharmacology":

"Passed" / "excellent"

The grade “excellent” is given to the student if he/she has deeply and firmly mastered the program material, expounds it exhaustively, consistently, clearly and logically in a harmonious way, knows how to closely link theory with practice, freely copes with tasks, questions and other types of knowledge application, and does not find it difficult the answer when modifying assignments, in the response uses the material of monographic literature, correctly substantiates the decision made, has diverse skills and techniques for performing practical tasks.

"Passed" / "good"

The grade “good” is given to the student, if he/she knows the material firmly, correctly and essentially sets it out, avoiding significant inaccuracies in answering the question, correctly applies theoretical principles in solving practical questions and problems, and has the necessary skills and techniques to carry them out.

"Passed" / "satisfactorily"

The grade “satisfactory” is given to the student if he/she has knowledge of only basic material, but has not learned its details, admits inaccuracies, insufficiently correct formulations, violations of the logical sequence in the presentation of the program material, has difficulty in performing the practical work.

"Failed" / "unsatisfactory"

The grade “unsatisfactory” is given to a student who does not know a significant part of the program material, makes significant mistakes, hesitates and does practical work with great difficulty. As a rule, the grade “unsatisfactory” is given to students who cannot continue their studies without additional studies in the relevant discipline.

### **Evaluation tools for intermediate certification**

1. Pharmacology as a science. Its constituent parts: pharmacodynamics and pharmacokinetics.
2. Primary and secondary pharmacological reactions. Target molecule for the drug substance.
3. The role of foreign and Russian scientists in the development of pharmacology.
4. Principles of creating new drugs. Directed search for biologically active compounds.
5. The concept of therapeutic, toxic, main and side effects of the drug substance.
6. Direct, indirect and side effects of drugs
7. The basic concepts of the formulation: medicinal raw materials, medicinal substance, dosage form, drug, drug.
8. Dose, types of doses. Doses in experimental pharmacology and medical formulations
9. Types and nature of action of medicinal substances
10. Ways and methods of introducing drugs into the body.
11. Pharmacokinetics. Absorption, transport, distribution and excretion of drugs.
12. The concept of cumulation. Addiction and dependence on medicinal substances.
13. The combined effect of drugs: synergism and antagonism, their types.
14. Tolerance to medicinal substances. The mechanisms of its development.

15. Transport of medicinal substances by the blood system and through biological membranes.
16. Biotransformation as the first phase of the metabolism of drugs in the body.
17. Conjugation as the second phase of the metabolism of drugs in the body.
18. Intracellular receptors. Their participation in the cell's response to the drug
19. Plasma membrane receptors, their participation in the development of cell response to the drug.
20. The role of membrane proteins and lipids in the mechanism of action of medicinal substances.
21. Physical and chemical bases of interaction of medicinal substances with receptors. Theory of reception of pharmacological substances.
22. The role of secondary messengers in the action of drugs.
23. Basics of written prescription. Solid dosage forms.
24. Basic concepts of written prescription. Semi-solid dosage forms.
25. Basic concepts of written prescription. Liquid dosage forms.
26. Structure and functioning of cholinergic synapse. Pharmacological regulation of the synthesis, deposition and release of acetylcholine.
27. Acetyl choline receptors, their types, localization. Pharmacological properties of acetylcholine.
28. M-acetyl choline receptors, their subtypes, structure, functioning and localization. M-cholinomimetics, their pharmacological properties.
29. M- acetyl choline receptors, their subtypes, structure, functioning and localization. M-acetyl choline blockers, their pharmacological properties.
30. N- acetyl choline receptors, their subtypes, structure, functioning and localization. n-cholinomimetics their pharmacological properties.
31. N-acetyl choline receptors, their subtypes, structure, functioning and localization. Ganglioblockers, their pharmacological properties.
32. N- acetyl choline receptors, their subtypes, structure, functioning and localization Curare-like drugs, their mechanism of action and pharmacological properties.
33. Cholinesterase, its types. Anticholinesterase drugs. Their pharmacological properties and mechanism of action. Cholinesterase reactivators
34. The structure and functioning of the adrenergic synapse. Pharmacological regulation of the synthesis, deposition, release and reuptake of norepinephrine.
35. Adrenoreceptors, their types and distribution in the body. Pharmacological properties of adrenaline.
36.  $\alpha$ -Adrenoreceptors, their structure, subtypes, functioning and distribution in the body. Pharmacological properties of  $\alpha$ -adrenomimetics.
37.  $\alpha$ -Adrenoreceptors, their structure, subtypes, functioning and distribution in the body. Pharmacological properties of  $\alpha$ -blockers.
38.  $\beta$ -Adrenoreceptors, their structure, subtypes. functioning and distribution in the body. Pharmacological properties of  $\beta$ -adrenomimetics.

39.  $\beta$ -Adrenoreceptors, their structure, subtypes, functioning and distribution in the body. Pharmacological properties of  $\beta$ -blockers.
40. Sympathomimetics, their mechanism of action and pharmacological properties.
41. Sympatholitics, their mechanism of action and pharmacological properties.
42. Histamine. Its biosynthesis, metabolism, deposition and release. Histamine receptors. Antihistamines.
43. Serotonin. Its biosynthesis, metabolism, biological role and pharmacological properties. Serotonin receptors. Serotonergic drugs, their properties and use in the clinic.
44. GABA. The role of GABA in the functioning of the central nervous system. GABA receptors, their participation in the realization of the effects of drugs.
45. Glutamic acid as a neurotransmitter. Structure and functioning of NMDA receptors. Their role in the realization of the effects of drugs.
46. Dopamine. The role of dopamine in the functioning of the central nervous system. Dopamine receptors, their role in the implementation of the effects of drugs.
47. Eicosanoids. Their biosynthesis and role in the formation of physiological and pathological reactions of the body. Prostaglandin synthesis inhibitors.
48. Local anesthetics. Molecular mechanisms of their action. Methods of use.
49. Endogenous opioids, their types. Opioid receptors, their participation in the formation of pharmacological reactions to morphine. Agonists and antagonists of opioid receptors
50. Ethyl alcohol. Its use in medicine. Local and resorptive effect of ethanol. Its influence on the central nervous system. Acute and chronic ethanol poisoning.
51. Anesthetic agents. Cellular and molecular mechanisms of action of anesthetic agents.
52. Hypnotic remedies. The mechanism of action on the central nervous system. The mechanism of barbiturate induction of drug metabolism.
53. Anxiolytic drugs. Their classification, mechanism of action and pharmacological properties.
54. Neuroleptics. Their mechanism of action and pharmacological properties.
55. Antidepressants. The mechanism of their action and pharmacological properties.
56. Psychostimulants. Their types, mechanisms of action and pharmacological properties. Features of the pharmacological properties of caffeine.
57. Non-narcotic analgesics and nonsteroidal anti-inflammatory drugs. The mechanism of their action and pharmacological properties.
58. Molecular pharmacology of drugs affecting the blood coagulation system and the fibrinolysis system.
59. Molecular pharmacology of antiplatelet agents.
60. Molecular pharmacology of diuretics.
61. Antihypertensive drugs. The mechanism of their action and pharmacological properties.
62. Drugs used in the treatment of heart failure. Their pathogenetic and molecular mechanisms of action.
63. Antiarrhythmic drugs, the mechanism of their action.

64. Antianginal drugs. Their classification, pathogenetic and molecular mechanisms of action.
65. Anti-atherosclerotic drugs. Their types and mechanism of action.
66. Thyroid hormones. Thyroid hormones. Prothyroid and antithyroid agents.
67. Hormones of the hypothalamus and pituitary. Their role in the regulation of body functions. The use of hormones and their analogues in clinics
68. Hormones of the pancreas. Synthetic hypoglycemic agents.
69. Corticosteroids. Their chemical structure. Molecular mechanisms of action. Biological role and pharmacological properties. Synthetic glucocorticoid drugs.
70. Male sex hormones. Mechanism of action. Anabolic steroid. Antiandrogens.
71. Female sex hormones. Their biological role and pharmacological properties. Synthetic estrogens. Antiestrogens. Hormonal contraceptives.
72. Antibacterial chemotherapeutic agents. Classification by the mechanism of action. Resistance to antibiotics and ways to overcome it.
73. Antineoplastic agents. Targeted drugs. Drugs that reduce the toxicity of cytotoxic antitumor agents
74. Antiviral drugs. Classification by the mechanism of action. Pharmacological properties of interferon preparations.
75. Antifungal agents, their mechanism of action
76. Determination of the parameters of the binding of drugs to target proteins. Scatchard coordinates.
77. Study of the effect of drugs on the physico-chemical properties of plasma membranes on the model of erythrocytes.

### **Case-study tasks for the final exam in pharmacology**

1. 1. A patient with atony of bladder was prescribed a medicine by a doctor, the dose of which the patient independently exceeded. Urination normalized, but there was increased sweating, profuse salivation, frequent stools, muscle spasms. Which drug group was assigned to the patient? What is the cause and mechanism of the complications? List the drugs in this group.
2. 2. Man, 50 years old, treated the garden plot with insecticide. However, soon he felt worse. The patient was taken to the clinic in a serious condition, with complaints of headache, dizziness, fear, and abdominal pain. During the day, there were several times vomiting, loose stools. The examination revealed the following symptoms: sharp pupil constriction, bradycardia, muffled heart sounds, decreased blood pressure, difficult breathing, muscle twitching, hallucinations. Which group of substances does this insecticide belong to by the mechanism of action? What is the cause of these symptoms of poisoning? What measures of assistance apply in this case.
3. 3. A patient with an attack of renal colic was given a drug ambulance doctor. Since the pain syndrome did not stop, the drug was readministered. After some time, the pain decreased, but there was a headache, dizziness, hoarseness, difficulty in swallowing, the face reddened, pulse quickened. What drug was administered to the patient? What group of drugs does it belong to? What other drugs from this group can be prescribed?

4. In order to study the eye fundus of the patient, a drug from the group of M-acetyl choline blockers was injected into the conjunctival sac. The doctor warned the patient that he would not be able to read and write for a week. What drug was administered to the patient? What group of drugs does it belong to? Explain the mechanism of its action on the eye.
5. An ambulance doctor administered an antihypertensive agent to a patient with a hypertensive crisis. Blood pressure has decreased. The patient got out of bed, but immediately turned pale, his head began to spin, and he lost consciousness. The patient was put to bed. In 2 hours, the adverse symptoms disappeared. What is the cause of the complication? What drugs have a similar effect? What groups do they belong to?
6. The patient underwent a long surgical operation under endotracheal anesthesia with the introduction of muscle relaxant. The operation was successful, however, independent breathing was fully restored only after the administration of neostigmine. What mechanism of action does a muscle relaxant use during anesthesia? Name the drugs in this group. What is neostigmine used for?
7. A patient was given a therapeutic dose of a muscle relaxant during a short-term operation, which, in contrast expectations, caused prolonged apnea. What is the possible cause of a developing condition? Name the drug. What is the doctor's tactic in this situation?
8. Patient A, a patient with glaucoma, was prescribed a drug that lowers intraocular pressure, causes mydriasis and slight changes in accommodation. Patient B, who is also receiving treatment for glaucoma, was prescribed a drug that lowers intraocular pressure, causes miosis and accommodation spasm. Drugs of which groups have a similar effect? Give examples of drugs. Explain the mechanisms of their action on the eye.
9. To eliminate an attack of bronchial asthma, the patient was given a drug. Bronchospasm was stopped, but tachycardia, pain in the heart area, tremor appeared. What adrenomimetic was assigned to the patient? What group of drugs does it belong to? What drugs are preferable to use to reduce the risk of such complications and why?
10. The musician was taken from the concert hall to the intensive care unit with a condition of suffocation. The examination revealed the following symptoms: arterial hypotension, bradycardia, atrioventricular block, diarrhea. From the patient's medical history, it turned out that he took several pills in order to relieve the excitement before the concert. What drug group could take the patient? Justify your answer.
11. Examination of a 30-year-old patient revealed: hypertension, tachycardia, weight loss, hyperglycemia, increased excretion of catecholamines in the urine. Diagnosed with pheochromocytoma. In terms of treatment a surgery was performed. What drugs should be prescribed for the treatment of arterial hypertension and tachycardia in preparation for the removal of the tumor? Which groups of drugs do they belong to? Justify their mechanisms of action.
12. Patient K., 40 years old, suffering from peptic ulcer, was admitted to the hospital with gastric bleeding. From his anamnesis, it is known that he got sick with the flu 7 days ago and took the drug X to lower the temperature. What drug could the patient take? What is the development of bleeding?
13. A patient with rheumatoid arthritis was given anti-inflammatory therapy. Six months after the start of treatment, the patient began to notice sleep disorders, abdominal pain, weight gain. During the examination - hypertension, hyperglycemia, glycosuria, lymphocytopenia, eosinopenia. What kind of anti-inflammatory therapy could a patient receive? What are the causes of the complications?
14. After a long course of anti-inflammatory therapy, the patient had developed Cushing syndrome, irritability and pain in the epigastric region. The drug use was canceled, however,

- after that, the patient's condition deteriorated sharply: blood pressure decreased, a weakening of the heart activity was noted. What drug could make him sick? Explain the reason for the deterioration.
15. A 2-year-old child with a viral infection, the mother gave the drug X as an antipyretic. The child developed Ray's syndrome. What drug could trigger this condition? What other side effects are possible when taking this tool?
  16. A patient, 30 years old was admitted to the hospital in a serious condition. Temperature 39°C, leukocytosis  $12 \times 10^9 / l$ . From the anamnesis: 2 days ago, the patient had panaritium (felon), to eliminate the inflammation of the patient used an ointment containing the drug X. Which drug was part of the ointment? What caused the patient to deteriorate?
  17. An ambulance arrived on a call to a 14-year-old patient suffering from diabetes. During the examination: the patient is depressed, answers monosyllabically to the questions, her lips are chapped, the oral mucosa is dry, the tendon reflexes are lowered, the pulse is increased, the blood pressure is reduced, the smell of acetone in exhaled air. Diagnosed with hyperglycemic coma. What drug should be prescribed? Explain why it is to be used.
  18. The patient came to the endocrinological center with complaints of fever, constant feeling of heat, weight loss, palpitations, and mood swings. The examination revealed an increase in blood pressure, tachycardia, exophthalmos. Diagnosed with thyrotoxicosis. What drug should be prescribed? Explain the main mechanism of its action.
  19. A patient with a gastric ulcer was prescribed a drug. Shortly after regular use, he had developed dry mouth, blurred vision, palpitations, difficult urinating, constipation. What drug was used by the patient? Why are its undesirable effects?
  20. The patient, who was often disturbed by epigastric pain and heartburn, took remedy X for a long time to relieve symptoms. For a short time, the pain subsided, but there was a burp air ("champagne phenomenon"). Recently, he began to be disturbed by abdominal distention, edemas appeared, his general state of health worsened. The patient was hospitalized. During examination, he was diagnosed with metabolic alkalosis. What drugs did the patient take to relieve pain and heartburn? Explain the mechanism of development of side effects.
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The final control of the discipline is carried out by conducting an exam. Examination list consists of three theoretical questions on discipline and written prescription for a drug.

### **Evaluation tools for current certification**

#### **Choose the correct answer:**

1. The halogen-containing antiseptics include:

1. hydrogen peroxide
2. boric acid
3. preparations of chlorine and iodine
4. furacyline

2. Oxidizers include:

1. furacyline
2. ethyl alcohol
3. hydrogen peroxide
4. ethacridine lactate
5. potassium permanganate

3. The drug from the group of detergents:

1. furaciline
2. brilliant green
3. alcohol solution of iodine
4. cerygel

4. Nitrofurantoin derivatives include:

1. dermatol
2. furaciline
3. ethacridine lactate
4. brilliant green

5. Drugs of silver and mercury belong to the group:

1. detergents
2. alcohols and aldehydes
3. oxidizing agents
4. metal compounds

6. The drug from the group of dyes:

1. furaciline
2. alcohol solution of iodine
3. brilliant green
4. boric acid

7. Cleavage of atomic oxygen explains the effect of:

1. ethyl alcohol
2. hydrogen peroxide
3. chloramine B
4. potassium permanganate

8. Sulfhydryl groups of enzymes of microorganisms are blocked by:

1. oxidizers
2. dyes
3. metal compounds
4. halogenated compounds

9. The principle of antiseptic action of ethyl alcohol:

1. violation of protein synthesis of microorganisms
2. dehydration of the microbial protoplasm protein
3. oxidation of protein microorganisms

10. Indications for the use of brilliant green:

1. current disinfection
2. processing of medical tools
3. treatment of pustular skin diseases
4. burn treatment
5. treatment of postoperative sutures

11. Alcohol iodine solution is used for:

1. processing the surgical field and the surgeon's hands
2. treatment of pustular skin diseases
3. treatment of wound edges
4. disinfection medical tools

12. For disinfection of secretions of infectious patients are used:

1. xeroform
2. furacilin
3. chloramine B
4. ammonia

13. Furacilin is used to treat:

1. skin diseases and scabies
2. processing the hands of medical personnel and the operating field
3. disinfection of patient care items
4. treatment of purulent wounds

14. current disinfection is performed with:

1. furacilin
2. chloramine B

3. potassium permanganate

4. ethyl alcohol

15. Ethyl alcohol in a concentration of 70% is used:

1. for treatment of mucous membranes, treatment of purulent wounds, burns

2. for hand disinfection, surgical field

3. for disinfecting medical instruments and items of care

16. Mercury dichloride (sublimite) is used for:

1. treatment of purulent wounds

2. skin treatment, scabies

3. scratch processing, abrasion

4. processing of linen, patient care items

17. For the treatment of parasitic skin diseases (scabies, versicolor) we use:

1. furacilin

2. formaldehyde

3. potassium permanganate

4. birch tar

18. Silver nitrate is used for:

1. current disinfection

2. treatment of wounds

3. treatment of skin diseases

4. cauterization of excess granulations, warts

19. Antiseptic that contributes to the granulation of tissues and wound healing:

1. brilliant green

2. furacilin
3. boric acid
4. birch tar

20. For disinfection of water the following agents are used:

1. boric acid
2. chloramine B
3. pantocide
4. silver nitrate

21. For the primary treatment of wounds the following agents are used:

1. hydrogen peroxide
2. furacilin
3. silver nitrate
4. potassium permanganate

22. For treatment of the oral cavity and throat mucosa in infections of any etiology, the following agents are use:

1. 3% hydrogen peroxide solution
2. furacilin solution
3. silver nitrate
4. hexoral

23. It is characteristic of Hexoral:

1. selectivity of antimicrobial action
2. non-selectivity of antimicrobial action
3. used to disinfect instruments, rooms and discharge of patients
4. used to destroy pathogens on the mucous membranes of the mouth and throat

24. Antiseptic, contraindicated for infants:

1. boric acid
2. furacilin
3. potassium permanganate
4. brilliant green

25. Medicinal products used for the destruction of microorganisms on the skin and mucous membranes are called:

1. disinfectants
2. antiseptics
3. chemotherapeutics
4. antimicrobials

26. Medicinal products that destroy microorganisms in the environment and on the objects:

1. disinfectants
2. antiseptics
3. chemotherapeutics
4. antimicrobials

27. Halogen-containing antiseptics:

1. slow down the growth and reproduction of microorganisms
2. violate the formation of folic acid
3. coagulate proteins of the cell membrane of microorganisms

## Make written prescription

1 variant

Prescribe the finest powder containing 125,000 U of benzylpenicillin sodium salt (Benzylpenicillinum - Natrium) and 5.0 etazol (Aethazolium). Apply for spraying into nose.

Prescribe 10 powders containing 0.015 g of codeine phosphate (Codeini phosphas) and 0.3 g of sodium bicarbonate (Natrii hydrocarbonas). Take 1 powder 3 times a day.

Prescribe 10 gelatin capsules of doxycycline hydrochloride, 0.1 g each. Take 1 capsule daily after a meal.

Prescribe 10 tablets containing 100 mg of Nimesulide (Nimesulide). Take orally 100 mg 2 times a day.

Prescribe 10.0 of ointment on lanolin and petrolatum (equally) containing 5% aceclidine. Eye ointment.

Prescribe 50.0 of pastes on lanolin and petrolatum containing 15.0 anesthesine (Anesthesinum). Apply onto the affected skin.

Variant 2

Prescribe 60.0 of powder containing equally sodium bicarbonate (Natrii hydrocarbonas), sodium benzoate (Natrii benzoas) and sodium chloride (Natrii chloridum). Dilute 1 teaspoon per glass of water.

Prescribe 10 powders containing 0.02 g papaverine hydrochloride (Papaverini hydrochloridum) and 0.003 g platyphylline hydrotartrate (Platyphyllini hydrotartras). Take 1 powder 2 times a day.

Prescribe 50 capsules of "Ketonal" containing 50 mg of ketoprofen. Take orally 1 capsule for pain, but not more than 4 capsules per day. Take after meals.

Prescribe 50 tablets containing 0.05 g of diclofenac-sodium (Diclofenac-natrium). Take 1 tablet 3 times a day.

Prescribe 60 ml of liniment consisting of equal amounts of purified turpentine oil (Oleum Terebinthinae rectificatum), chloroform (Chloroformium) and methyl salicylate (Methylii salicylas). Apply for rubbing into the affected joint.

Prescribe 100.0 pasta containing 2.0 salicylic acid (Acidum salicylicum) and 25.0 zinc oxide (Zinci oxydum) and starch. For application onto the affected skin.

## **Examples of tasks for medical prescription:**

### **Make a prescription:**

1. Drugs for eliminating intestinal spasms.
2. A substance that reduces vestibular disorders.
3. Substance potentiating effect of anesthetic agents.
4. M-acetyl choline blocker with the most pronounced antispasmodic action.
5. Synthetic M-acetyl choline blocker to reduce the secretion of salivary glands ..
6. Drug for the treatment of bronchial asthma.
7. The drug used to treat gastric ulcer.
8. Drug to combat hypertensive crisis.
9. Antidepolarizing muscle relaxant.
10. Depolarizing muscle relaxant.
11. Drug used for spastic paralysis.

## **Evaluation tools for current certification**

### **Oral questioning**

1. OA-1 Interview. A form of control, organized as a special conversation between a teacher and a student on topics related to the discipline being studied, and designed to ascertain the student's knowledge of a specific section, topic, problem, etc. Questions by subject / sections of discipline
2. OA-2 Colloquium. A form of controlling the learning of a subject's material, section or sections of a discipline, organized as an educational lesson in the form of an interview with a teacher. Questions by subject / sections of discipline

### **Written work**

1. PW-1 Test A system of standardized tasks, allowing to automate the procedure for measuring the level of knowledge and skills trainee. Fund of test tasks.
2. PW-2 Examination. A forms of testing the ability to apply the knowledge for solving problems of a particular type by topic or section. A set of control tasks for each variant.