

**MEDICAL UNIVERSITY – PLOVDIV**  
**FACULTY OF PHARMACY**

**SYLLABUS**  
**IN**  
**PHARMACOLOGY**

**Approved by the Department Council Protocol №11/23.10.2024**

**Confirmed by the Faculty Council - Protocol № 9/13.11.2024**

Name of the Discipline  
**PHARMACOLOGY**

Syllabus

Discipline	Final exam/ semester	According to the Faculty of Pharmacy curriculum of MU-Plovdiv Academic hours				ECTS	Academic hours in semester			
		Auditorium	Lectures		Non-auditorium		V semester		VI semester	
			Practices				L	P	L	P
PHARMACOLOGY	VI	180	45	45	90	6,0	3	3	3	3
			45	45	96					

**DISCIPLINE:**

„Pharmacology“

**TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:**

Mandatory

**LEVEL OF QUALIFICATION:**

Master /M/

**FORMS OF TRAINING:**

Lectures, exercises/seminars, self-training

**YEAR OF TRAINING:**

III-th course

**DURATION OF TRAINING:**

Two semesters – V and VI

**ACADEMIC HOURS:**

90 hours of lectures, 90 hours of exercises

**TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:**

Multimedia presentations, discussions, seminars, demonstration of preparations and medicines, solving tests and prescription tasks, making an abstract.

**FORMS OF EVALUATION:**

Ongoing assessment, conducting colloquiums and seminars, testing on the classifications of medicinal products, preparing an abstract.

**EVALUATION CRITERIA:**

A running grade average is generated for each semester.

**ASPECTS OF EVALUATION CRITERIA:**

Participating in discussions, solving tests and recipe tasks, making an abstract.

**SEMESTER EXAM:**

Yes (Entrance test, written and oral exam).

**INTERNSHIP:**

Successfully passed colloquium.

**STATE EXAM:**

Yes (written and oral exam jointly with Toxicology).

**LECTURER:**

Qualified teacher from the Department of "Pharmacology, Toxicology and Pharmacotherapy"

**DEPARTMENT:**

Pharmacology, Toxicology and Pharmacotherapy, Faculty of Pharmacy, Medical University of Plovdiv

## **ANNOTATION**

The discipline "Pharmacology" provides the opportunity to acquire knowledge and skills in general pharmacology, routes of administration of drugs, types of dosage forms, pharmacokinetic and pharmacodynamic features of drugs, drug interactions, phenomena with combined and repeated administration of drugs, adverse drug reactions and toxic effects of drugs. In the section on special pharmacology, drugs are considered by pharmacological groups, and for each of them, up-to-date information on classification, pharmacokinetics, main pharmacological effects, mechanism of action, interaction with other drugs, adverse drug reactions is provided.

### **BASIC AIMS OF THE DISCIPLINE**

Acquisition of knowledge and skills about pharmacodynamic and pharmacokinetic features of drugs from different pharmacological groups:

- resorption of medicines
- distribution of medicines
- metabolism of medicinal products
- excretion of medicinal products
- mechanism of action of medicinal products
- phenomena with repeated and combined administration of medicinal products
- factors influencing the medicinal effect
- drug interactions
- application of medicinal products in clinical practice
- adverse drug reactions

### **EXPECTED RESULTS**

After completing the studies, students should have the following knowledge and skills:

- to classify medicinal products according to different criteria
- to know the main classic and modern preparations - representatives of all pharmacological groups
- to know the pharmacokinetic characteristics of medicinal products
- to know the pharmacodynamic features of medicinal products
- to know the risks associated with the administration of the drugs in case of a changed physiological or genetic background in the patient
- to be able to write the medicines in a prescription, observing orthographic formal requirements
- to be able to search and use up-to-date and express medicinal information

## LECTURES – THESES

### *Lecture No. 1*

#### **OBJECT AND TASKS OF PHARMACOLOGY. DEFINITION OF DRUG. PHASES IN DRUG DISCOVERY. ROUTES OF DRUG ADMINISTRATION.**

1. Subject and tasks of pharmacology as a science and academic discipline.
2. Branches of modern pharmacology.
3. Concept of medicine.
4. Phases in drug development.
5. Routes of drug administration.

### *Lecture No. 2*

#### **GENERAL PHARMACOLOGY. PHASES OF PENETRATION AND MOVEMENT OF THE DRUG IN THE BODY. PHARMACOKINETICS – DRUG ABSORPTION, DISTRIBUTION, METABOLISM, EXCRETION. MAIN PHARMACOKINETIC INDICATORS.**

1. Phases of penetration and movement of the drug in the body.
2. Absorption, transmembrane transport and distribution of drugs in the body. Protein binding of drugs. Barrier systems.
3. Metabolism.
4. Elimination (pathways of radiation). Importance for practice.
5. Main pharmacokinetic indicators.

### *Lecture No. 3*

#### **GENERAL PHARMACOLOGY. PHARMACODYNAMICS. DRUG ACTION AND DRUG EFFECT. TYPES OF DRUG EFFECTS. ADVERSE DRUG REACTIONS. FACTORS AFFECTING DRUG PHARMACOKINETICS AND PHARMACODYNAMICS: A) DRUG FACTORS; B) HOST INFLUENCES; C) ENVIRONMENTAL INFLUENCES.**

1. Action and effect of medicinal products. Types of drug effects. Mechanism of action (receptor and non-receptor).
2. Adverse drug reactions.
3. Factors from the side of the medicinal product - dose, physico-chemical properties, chemical structure and others.
4. Factors from the body - age, weight, gender, etc.
5. Environmental factors – ambient temperature, food, atmospheric pressure and others.

### *Lecture No. 4*

#### **GENERAL PHARMACOLOGY. PHENOMENA WITH REPEATED AND COMBINED APPLICATION OF MEDICINES. DRUG INTERACTIONS.**

1. Phenomena during combined administration of medicinal products - synergism, potentiation, antagonism, incompatibility.
2. Phenomena with repeated administration of the medicinal products in the body: tolerance, drug dependence, allergy, accumulation, etc.
3. Drug interactions.

## **SPECIAL PHARMACOLOGY**

### ***Lecture No. 5***

#### **PRINCIPLES OF RATIONAL THERAPY AND PROPHYLAXIS WITH ANTIMICROBIAL DRUGS. ANTIBIOTICS THAT INHIBIT CELL WALL SYNTHESIS: BETA-LACTAM (PENICILLINS, CEPHALOSPORINS, MONOBACTAMS, CARBAPENEMS) AND GLYCOPEPTIDE ANTIBIOTICS.**

##### 1. Antibiotics:

##### 1.1. Classification

##### 1.2. Mechanism of action

##### 1.3. Type of action (bacteriostatic and bactericidal)

##### 1.4. Spectrum

##### 1.5. Pharmacokinetic features

##### 1.6. Adverse drug reactions

##### 1.7. Drug interactions.

##### 2. Principles of rational therapy and prophylaxis with antimicrobial drugs.

3. Penicillins - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.

4. Cephalosporins - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.

5. Carbapenems and monobactams - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.

6. Glycopeptide antibiotics - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.

### ***Lecture No. 6***

#### **ANTIBIOTICS THAT INHIBIT PROTEIN SYNTHESIS: AMINOGLYCOSIDES, TETRACYCLINES, MACROLIDES, LINCOSAMIDES, AMPHENICOLS.**

1. Aminoglycosides - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.

2. Tetracyclines - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.

3. Macrolides - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.

4. Lincosamides, chloramphenicol - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.

5. Amphenicols - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.

### ***Lecture No. 7***

#### **CHEMOTHERAPEUTIC AGENTS: SULFONAMIDES, QUINOLONES, NITROIMIDAZOLES, ANTIFUNGAL, ANTIVIRAL AND ANTITUBERCULAR DRUGS. UROANTISEPTICS.**

1. Sulfonamides - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.
2. Quinolones - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.
3. Nitroimidazoles - classification, mechanism of action, type of action, spectrum of action, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.
4. Antimycotics - classification, mechanism of action, type of action, spectrum of action, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.
5. Antivirals - classification, mechanism of action, type of action, spectrum of action, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.
6. Antituberculosis agents - classification, mechanism of action, type of action, spectrum of action, resistance, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.
7. Uroantiseptics - classification, mechanism of action, type of action, spectrum of action, pharmacokinetics, indications, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration.

### ***Lecture No. 8***

#### **ANTISEPTICS AND DISINFECTANTS**

1. Definition of antiseptics and disinfection.
2. Classification of antiseptics and disinfectants.
3. Oxidizers, halogen preparations, detergents - mechanism of action, indications for use, toxicity, preparations.
4. Phenols, aldehydes, alcohols - mechanism of action, indications for use, toxicity, preparations.
5. Synthetic dyes, essential oils, phytopreparations, salts of heavy metals and acids - mechanism of action, indications for use, toxicity, preparations.
6. Local preparations for oral hygiene and therapy - definition, classification, composition and action.

### ***Lecture No. 9***

#### **CNS DEPRESSANTS: SEDATIVE DRUGS, HYPNOTICS AND ANTIPILEPTIC DRUGS.**

1. Nature, structure and disorders of sleep.
2. Sedatives - definition, classification, mechanism of action, pharmacological effects, pharmacokinetics, adverse drug reactions, drug interactions, medicinal preparations.
3. Hypnotics - definition, classification, mechanism of action, pharmacological effects, pharmacokinetics, adverse drug reactions, drug interactions, drug preparations.
4. Anticonvulsants - definition, classification, mechanism of action, pharmacological effects, pharmacokinetics, adverse drug reactions, drug interactions, preparations.

***Lecture No. 10***

**CNS DEPRESSANTS: ANTIPSYCHOTICS, ANXIOLYTICS AND ANTIPARKINSONIAN DRUGS.**

1. Neuroleptics - definition, classification, mechanism of action, pharmacological effects, pharmacokinetics, adverse drug reactions, drug interactions, drug preparations.
2. Anxiolytics - definition, classification, mechanism of action, pharmacological effects, pharmacokinetics, adverse drug reactions, drug interactions, drug preparations.
3. Antiparkinsonian agents - definition, classification, mechanism of action, pharmacological effects, pharmacokinetics, adverse drug reactions, drug interactions, drug preparations.

***Lecture No. 11***

**OPIOID ANALGESICS. ANALGESICS-ANTIPIRETTICS. NON-STEROIDAL ANTI-INFLAMMATORY DRUGS.**

1. Theory of nociception.
2. Opioid analgesics: definition, general characteristics. Natural and synthetic opioid analgesics - main representatives. Mechanism of action and pharmacological effects. Pharmacokinetics. Indications. Adverse drug reactions, contraindications and drug interactions. Poisoning with opioid analgesics and treatment of opioid intoxication.
3. Analgesics - antipyretics - classification according to their chemical structure. Main representatives of the groups. Mechanism of action and pharmacological effects. Pharmacokinetics. Indications. Adverse drug reactions and contraindications . Drug interactions.
4. NSAIDs - classification according to their chemical structure. Main representatives of the groups. Mechanism of action and pharmacological effects. Pharmacokinetics. Indications. Adverse drug reactions and contraindications . Drug interactions.

***Lecture No. 12***

**CNS STIMULANTS: ANTIDEPRESSANTS, PSYCHOSTIMULANTS AND NOOTROPIC DRUGS.**

1. Antidepressants - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations.
2. Psychostimulants - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations.
3. Nootropic drugs - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations.

***Lecture No. 13***

**LOCAL ANAESTHETICS.**

1. Types of local anesthesia.
2. Natural and synthetic local anesthetics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations.

***Lecture No. 14***

**DRUGS AFFECTING THE AUTACOIDS (HISTAMINE, SEROTONIN, PROSTAGLANDINS, LEUKOTRIENES, ANGIOTENSIN, ETC.).**



1. Histamine - types of histamine receptors, pharmacological effects of histamine.
2. Antihistamines - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations.
3. Serotonergic mediation and its pharmacological influence.
4. Medications to treat a migraine attack.
5. Medications for migraine prevention.
6. Eicosanoids (prostaglandins and leukotrienes) – physiological effects and pharmacological influence.
7. Renin-angiotensin-aldosterone system – physiology and pharmacological control.
8. Kininergic mediation and its pharmacological influence.

***Lecture No. 15***

**ANTICANCER DRUGS. IMMUNOMODULATORS – IMMUNOSTIMULATORS AND IMMUNOSUPPRESSIVE DRUGS.**

1. Classification of the main groups of cytostatics.
2. Mechanism of action of cytostatics.
3. Adverse drug reactions of cytostatics.
4. Immunomodulators.

***Lecture No. 16***

**CHOLINERGIC NEUROTRANSMISSION. CHOLINOMIMETICS AND CHOLINOLYTICS. CENTRALLY AND PERIPHERALLY ACTING MUSCLE RELAXANTS.**

1. Cholinergic mediation: synthesis and degradation of acetylcholine. Types of receptors, location of cholinergic receptors. Classification of cholinotropic agents.
2. Cholinomimetics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations.
3. Cholinolytics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations.
4. Neuromuscular blockers - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations.

***Lecture No. 17***

**ADRENERGIC NEUROTRANSMISSION. ADRENOMIMETICS.**

1. Adrenergic mediation: synthesis and degradation of the adrenergic mediator. Types of receptors, location of presynaptic and postsynaptic adrenergic receptors.
2. Classification of adrenotropic agents.
3. Adrenomimetics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations.

***Lecture No. 18***

**ADRENOLYTICS.**

1. Presynaptic adrenolytics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations.
2. Postsynaptic adrenolytics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations.

*Lecture No. 19*

**DRUGS AFFECTING THE CARDIOVASCULAR SYSTEM: CARDIAC GLYCOSIDES AND ANTIARRHYTHMIC AGENTS.**

1. Cardiac glycosides - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, drug interactions, medicinal preparations, doses for children and adults, routes of administration. Poisoning with cardiac glycosides.
2. Antiarrhythmic agents - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

*Lecture No. 20*

**DRUGS AFFECTING THE CARDIOVASCULAR SYSTEM: ANTIANGINAL DRUGS AND PERIPHERAL VASODILATORS. ANTIDYSLIPIDEMIC, CAPILLAROTONIC AND VENOTONIC DRUGS.**

1. Antianginal drugs: classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
2. Peripheral vasodilators - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
3. Antidyslipidemic agents - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
4. Capillarotonic and venotonic agents - classification, pharmacodynamics, adverse drug reactions, indications and routes of administration.

*Lecture No. 21*

**DRUGS AFFECTING THE CARDIOVASCULAR SYSTEM: ANTIHYPERTENSIVE DRUGS.**

1. Pharmacological mechanisms for influencing arterial pressure.
2. Antihypertensive agents - classification.
3. Sartans, ACE-inhibitors, beta-blockers, calcium antagonists, diuretics, alpha<sub>1</sub>-blockers, presynaptic adrenergics and other antihypertensive agents: classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

*Lecture No. 22*

**DRUGS AFFECTING THE URINARY SYSTEM: DIURETICS.  
DRUGS AFFECTING THE UTERINE MOTILITY.**

1. Diuretics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
2. Uterokinetics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
3. Uterotonics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

4. Tocolytics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

***Lecture No. 23***

**DRUGS AFFECTING COAGULATION: COAGULANTS, ANTICOAGULANTS, FIBRINOLYTICS, ANTIFIBRINOLYTICS, ANTIPLATELET DRUGS.**

1. Coagulants - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

2. Anticoagulants - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

3. Antifibrinolytics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

4. Fibrinolytics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

5. Antiplatelet agents - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

***Lecture No. 24***

**DRUGS AFFECTING HEMOPOIESIS. ANTIANEMIC DRUGS.**

1. Drugs for the treatment of iron deficiency anemia - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

2. Drugs for the treatment of megaloblastic anemias - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

3. Hematopoietic growth factors - classification, pharmacodynamics, adverse drug reactions, indications, indications, medicinal preparations, routes of administration.

***Lecture No. 25***

**DRUGS AFFECTING THE RESPIRATORY SYSTEM.**

1. Antiasthmatic agents - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

2. Antitussives and expectorants - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

***Lecture No. 26***

**DRUGS AFFECTING THE GASTROINTESTINAL TRACT.**

1. Antiulcer drugs - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

2. Antiemetics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
3. Appetite suppressants and appetite stimulants - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
4. Laxatives, antidiarrheal and carminative agents - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
5. Hepatoprotectors - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
6. Medicines affecting the secretory and motor activity of the gallbladder and extrahepatic bile ducts - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
7. Pancreatic enzyme preparations - classification, composition, pharmacodynamics, indications, adverse drug reactions, drug interactions.
8. Spasmolytic agents - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

***Lecture No. 27***

**DRUGS AFFECTING THE ENDOCRINE SYSTEM: ANTIDIABETIC AND ANTIHYPOGLYCEMIC DRUGS.**

1. Insulin - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
2. Oral and other antidiabetic agents - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
3. Antihypoglycemic drugs.

***Lecture No. 28***

**DRUGS AFFECTING THE ENDOCRINE SYSTEM: CORTICOSTEROIDS, DRUGS AFFECTING THE THYROID GLAND.**

1. Corticosteroids - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
2. Mineralocorticoids - classification, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
3. Drugs affecting the thyroid gland:
  - 3.1 Thyromimetics - preparations containing thyroid hormones - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
  - 3.2. Thyrostatics - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

**Lecture No. 29**

**DRUGS AFFECTING THE ENDOCRINE SYSTEM: SEX HORMONES. CONTRACEPTIVES.**

1. Sex hormones - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
2. Contraceptives - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

**Lecture No. 30**

**VITAMINS**

1. Fat-soluble vitamins - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.
2. Water-soluble vitamins - classification, pharmacokinetics, pharmacodynamics, adverse drug reactions, indications and contraindications, drug interactions, medicinal preparations, routes of administration.

**PRACTICALS – THESES**

**Practical #1**

**PRESCRIPTION. SOLID DOSAGE FORMS.**

1. Concept of drug and dosage form.
2. Sources for obtaining the medicinal products:
  - 2.1. Plant
  - 2.2. Animal
  - 2.3. Mineral
  - 2.4. Synthetic
3. Pharmacopoeia, prescription:
  - 3.1. Parts of the prescription
  - 3.2. Types of prescriptions
  - 3.3. Abbreviations in prescriptions
  - 3.4. Units of measurement in prescription and dosing devices
4. Powders – types.
5. Tablets – types. Dragee.
6. Capsules.
7. Granules.
8. Rules for prescribing solid dosage forms.

**Practical #2**

**LIQUID, SEMISOLID AND GASEOUS DOSAGE FORMS.**

1. Solution and mixture.
2. Drops. Tincture. Eye drops. Emulsion. Suspension.
3. Parenteral dosage forms.
4. Infusions and decoctions.
5. Rules for prescribing liquid dosage forms.
6. Types of basement foundations.
7. Ointment, cream, gel and paste.

8. Patches.
9. Suppositories. Ovuli.
10. Rules for prescribing soft dosage forms.
11. Aerosol dosage forms. Rules for prescribing gaseous dosage forms.

***Practical #3***

**BASIC PHARMACOLOGY - PHARMACOKINETICS**

1. Conducting tests.
2. Discussion of the routes of drug administration and the processes of absorption, transmembrane transport, distribution, metabolism and excretion of drugs.

***Practical #4***

**BASIC PHARMACOLOGY - PHARMACODYNAMICS**

1. Conducting tests.
2. Discussion of the pharmacodynamics of drugs, the factors affecting drug pharmacokinetics and pharmacodynamics, the phenomena of repeated and combined drug administration, drug interactions.

***Practical #5***

**COLLOQUIUM ON PRESCRIPTION AND BASIC PHARMACOLOGY**

1. Writing prescriptions.
2. Theoretical question on Basic Pharmacology.

***Practical #6***

**PRINCIPLES OF RATIONAL THERAPY AND PROPHYLAXIS WITH ANTIMICROBIAL DRUGS. ANTISEPTICS AND DISINFECTANTS. BETA-LACTAM AND GLYCOPEPTIDE ANTIBIOTICS.**

1. Conducting tests.
2. Discussion of the pharmacological characteristics of  $\beta$ -lactam antibiotics and glycopeptides,
3. Familiarization with preparations.
4. Writing prescriptions with the more important examples.
5. Conducting tests on antiseptics and disinfectants.
6. Classification and familiarization with the more important examples of the different groups of antiseptics and disinfectants.
7. Writing prescriptions with antiseptics and disinfectants.

***Practical #7***

**ANTIBIOTICS: AMINOGLYCOSIDES, TETRACYCLINES, MACROLIDES, LINCOSAMIDES, AMPHENICOLS.**

1. Conducting tests.
2. Discussion of the pharmacological characteristics of aminoglycosides, tetracyclines, macrolides, lincosamides and chloramphenicol.
3. Familiarization with preparations.
4. Writing prescriptions.

***Practical #8***

**CHEMOTHERAPEUTIC AGENTS: SULFONAMIDES, QUINOLONES, NITROIMIDAZOLES, ANTIFUNGAL, ANTIVIRAL AND ANTITUBERCULAR DRUGS. UROANTISEPTICS.**

1. Conducting tests on sulfonamides, quinolones, nitroimidazoles and uroantiseptics.
2. Classification of the drugs used.
3. Writing prescriptions with the more important representatives.
4. Conducting tests on antiviral and antifungal preparations.
5. Classification of the drugs used.
6. Writing prescriptions.
7. Conducting tests on synthetic antitubercular agents.
8. Discussion of the pharmacological characteristics of antitubercular agents.
9. Familiarization with more important preparations.
10. Writing prescriptions.

***Practical #9***

**COLLOQUIUM – ANTIMICROBIAL DRUGS.**

1. Theoretical question on antimicrobial drugs.
2. Writing 6 prescriptions.

***Practical #10***

**SEDATIVE DRUGS. HYPNOTICS. ANTIPILEPTIC DRUGS.**

1. Conducting tests on hypnotics, sedatives and antiepileptic drugs.
2. Discussion of the pharmacological characteristics of hypnotics, sedatives and antiepileptics.
3. Writing prescriptions for:
  - different forms of epilepsy.
  - different types of sleep disorders.

***Practical #11***

**ANTIPSYCHOTICS. ANXIOLYTICS. ANTIPARKINSONIAN DRUGS.**

1. Conducting tests on antiparkinsonian drugs, neuroleptics and anxiolytics.
2. Discussion of the pharmacological characteristics of antiparkinsonian agents, neuroleptics and anxiolytics.
3. Writing prescriptions for Parkinson's syndrome.
4. Prescription of the main representatives of neuroleptics and anxiolytics.

***Practical #12***

**OPIOID ANALGESICS. ANALGESICS-ANTIPYRETICS. NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAID).**

1. Conducting tests.
3. Discuss the pharmacology of opioid analgesics, analgesic-antipyretics, and non-steroidal anti-inflammatory drugs.
4. Prescription of natural and synthetic opioid analgesics (yellow and green prescription) and non-steroidal anti-inflammatory drugs.

***Practical #13***

**CNS STIMULANTS: ANTIDEPRESSANTS, PSYCHOSTIMULANTS AND NOOTROPIC DRUGS.**

1. Conducting tests.
2. Discussion of the pharmacological characteristics of psychostimulants, nootropic drugs and antidepressants.
3. Familiarization with preparations.
4. Writing prescriptions for psychostimulants, antidepressants and nootropics.

***Practical #14***

**COLLOQUIUM – DRUGS AFFECTING THE CNS.**

1. Theoretical question on drugs affecting the CNS.
2. Writing 6 prescriptions.

***Practical #15***

**ANTICANCER DRUGS. IMMUNOMODULATORS.**

1. Conducting tests.
2. Discussion of the classification, mechanism of action and adverse drug reactions of the main groups of cytostatics.
3. Discussion of the indications for use, the mechanism of action and the side effects of the most commonly immunomodulators used in practice.
4. Writing prescriptions.

***Practical #16***

**THE PRESCRIPTION – REVISION. LOCAL ANAESTHETICS.**

1. The prescription – revision.
2. Discussion of the pharmacological characteristics of local anesthetics.
3. Conducting tests.
4. Familiarization with preparations.
5. Writing prescriptions.

***Practical #17***

**DRUGS AFFECTING THE AUTACOIDS.**

1. Conducting tests.
2. Discussion of the drugs affecting the autacoids (histamine, serotonin, prostaglandins, leukotrienes, angiotensin, etc.).
3. Familiarization with preparations.
4. Writing prescriptions.

***Practical #18***

**CHOLINERGIC DRUGS. CENTRALLY AND PERIPHERALLY ACTING MUSCLE RELAXANTS.**

1. Conducting tests on cholinergic drugs.
2. Discussion of the pharmacological characteristics of drugs affecting cholinergic mediation.
3. Discussion of the pharmacological characteristics of neuromuscular blocking agents.
4. Writing prescriptions for cholinomimetics, cholinolytics and neuromuscular blockers.

***Practical #19***

**ADRENERGIC DRUGS.**

1. Conducting tests on adrenergic mediation and adrenergic agents.
2. Discussion of modern adrenergic agents.
3. Writing prescriptions for adrenergic agents.

***Practical #20***

**COLLOQUIUM – DRUGS AFFECTING THE AUTONOMIC NERVOUS SYSTEM.**

1. Theoretical question on drugs affecting the autonomic nervous system.
2. Writing 6 prescriptions.



***Practical #21***

**CARDIAC GLYCOSIDES. ANTIARRHYTHMIC DRUGS.**

1. Conducting tests on cardiac glycosides and antiarrhythmics.
2. Discussion of the pharmacological characteristics of cardiac glycosides and antiarrhythmics.
3. Familiarization with preparations containing cardiac glycosides and antiarrhythmics
4. Writing prescriptions.

***Practical #22***

**ANTIANGINAL DRUGS. ANTIDYSLIPIDEMIC DRUGS. PERIPHERAL VASODILATORS. CAPILLAROTONIC AND VENOTONIC DRUGS.**

1. Conducting tests.
2. Discussion of the pharmacological characteristics of antianginal, peripheral vasodilator, antidyslipidemic, capillarotonic and venotonic agents.
3. Familiarization with preparations.
4. Writing prescriptions.

***Practical #23***

**ANTIHYPERTENSIVE DRUGS. DIURETICS.**

1. Conducting tests.
2. Discussion of the pharmacological characteristics of the different groups of antihypertensive agents and diuretics.
3. Familiarization with preparations.
4. Writing prescriptions.

***Practical #24***

**COLLOQUIUM – DRUGS AFFECTING THE CARDIOVASCULAR SYSTEM.**

1. Theoretical question on drugs affecting the cardiovascular system.
2. Writing 6 prescriptions.

***Practical #25***

**DRUGS AFFECTING HEMOPOIESIS, COAGULATION AND FIBRINOLYSIS.**

1. Conducting tests on drugs affecting hemopoiesis, coagulation and fibrinolysis.
2. Discussion of modern anti-anemic agents, local and systemic haemostatics, direct and indirect anticoagulants, fibrinolytics, antifibrinolytics, antiplatelet drugs.
3. Writing prescriptions with drugs affecting hemopoiesis, coagulation and fibrinolysis..

***Practical #26***

**DRUGS AFFECTING THE RESPIRATORY SYSTEM: DRUGS USED TO TREAT ASTHMA, DRUGS USED TO TREAT COUGH.**

1. Conducting tests on drugs affecting the respiratory system.
2. Discussion of modern antitussives, expectorants and combined preparations.
3. Discussion of the pharmacological characteristics of the drugs used for the treatment of bronchial asthma.
4. Writing prescriptions with drugs affecting the respiratory system.

***Practical #27***

**DRUGS AFFECTING THE GASTROINTESTINAL TRACT.**

1. Conducting tests on agents affecting the gastrointestinal tract.

2. Discussion of the pharmacological characteristics of appetite stimulants; anorexic drugs; antiulcer drugs; pancreatic enzyme preparations; antiemetics; laxatives, antidiarrheal and carminative agents; choleretics, cholekinetic and hepatoprotective agents; spasmolytics.
3. Writing prescriptions.

***Practical #28***

**ANTIDIABETIC DRUGS. CORTICOSTEROIDS.**

1. Conducting tests.
2. Discussion of the pharmacological characteristics of insulin, oral and other antidiabetic agents.
3. Discussion of the pharmacological characteristics of gluco- and mineralocorticoids.
4. Writing prescriptions.

***Practical #29***

**SEX HORMONES. DRUGS AFFECTING THE THYROID GLAND.**

1. Conducting tests.
2. Discussion of the pharmacological characteristics of thyroid hormones and their antagonists.
3. Discussion of the pharmacological characteristics of sex hormones, their antagonists and contraceptives.
4. Writing prescriptions.

***Practical #30***

**VITAMINS**

1. Conducting tests on vitamins.
2. Discussion of vitamin-containing preparations.
3. Writing prescriptions.

## **BIBLIOGRAPHY**

1. Lecture course in Pharmacology for Pharmacy students – for the academic year 2024/2025.
2. Basic & Clinical Pharmacology with toxicology. Edited by Nadka Boyadjieva, ARSO, 2021.
3. Pharmacology handbook for medical and dental students. Eds. Assoc. Prof. Kostadinov and Assoc. Prof. Delev, Plovdiv, 2018.
4. Pharmacology. Ed. Michael A. Clark et al. - 5th ed.- Balingen : Lippincott Williams & Wilkins, 2012.
5. Basic & Clinical Pharmacology, 13e, 2015; Bertram G. Katzung, Anthony J. Trevor (<https://dl.pezeshkamooz.com/pdf/dglibrary/book/medical/poisoning/clinical-pharmacology-13th.pdf>).
6. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 12e, 2011; Laurence L. Brunton, Bruce A. Chabner, Björn C. Knollmann.
7. Rang & Dale's Pharmacology, 10th Edition, ELSEVIER, 2023; James M. Ritter, Rod J. Flower, Graeme Henderson, Yoon Kong Loke, David MacEwan, Emma Robinson, James Fullerton.
8. Color Atlas of Pharmacology by Albrecht Ziegler, Mohr, Bieger and Lullmann, 2000.

## **TOPICS FOR ABSTRACTS**

1. Drug interactions of statins.
2. Neuroprotective effect of statins.
3. Modern classification and mechanisms of action of antidepressants.
4. Adverse drug reactions of androgenic anabolic steroids. Methods for hepatoprotection.
5. Adverse drug reactions of antiepileptic drugs.
6. Medicines for the treatment of Alzheimer's disease.
7. Medicines to influence neuropathic pain.
8. New antidiabetic drugs.
9. Medicines and plants affecting the release of stem cells.

## **SYLLABUS**

### **IN PHARMACOLOGY**

### **FOR THIRD YEAR PHARMACY STUDENTS**

#### **I. Basic Pharmacology**

1. Medicines and medicinal products. Stages and phases of drug development..
2. Routes of drug administration..
3. Branches of Pharmacology. Absorption and transmembrane transport of drugs.
4. Drug distribution. Plasma protein binding. Barrier systems.
5. Drug biotransformation (metabolism). Enzyme inhibitors and enzyme inducers.
6. Drug excretion.
7. Pharmacodynamics. Non-receptor and receptor mechanisms of drug action. Drug receptors and major receptor families. Agonists and antagonists.
8. Drug factors affecting drug pharmacokinetics and pharmacodynamics. Dose - definition. Types of doses. Therapeutic window and therapeutic index.
9. Factors of the patient affecting drug pharmacokinetics and pharmacodynamics
10. Phenomena occurring after repeated drug administration.
11. Combined drug administration. Levels and mechanisms of drug interactions. Examples.
12. Antiseptics and disinfectants. Definition. Mechanism of action. Oxidants. Essential oils.
13. Antiseptics and disinfectants. Halogens, dyes and detergents.
14. Antiseptics and disinfectants: salts of heavy metals, alcohols, phenols, aldehydes.
15. Water – soluble vitamins.
16. Fat - soluble vitamins.
17. Female sex hormones and their antagonists.
18. Contraceptive preparations.
19. Male sex hormones and their antagonists. Anabolic agents.
20. Thyroid and antithyroid drugs.
21. Drugs affecting the functions of the uterine muscle: uterokinetic, uterotonic and tocolytic agents.

## II. Special Pharmacology

1. Principles of rational therapy and prophylaxis with antimicrobial drugs.
2. Beta-lactam antibiotics: penicillins, cephalosporins, monobactams, carbapenems. Glycopeptide antibiotics. Fosfomycin.
3. Aminoglycoside antibiotics and tetracyclines,
4. Macrolides, lincosamides and amphenicols.
5. Sulfonamides and Trimethoprim. Quinolones. Nitroimidazoles. Uroantiseptics.
6. Antiviral drugs.
7. Antifungal drugs.
8. Antitubercular drugs.
9. Hypnotics. Sedatives.
10. Antiepileptic drugs.
11. Neuroleptics.
12. Anxiolytics. Central muscle relaxants.
13. Antiparkinsonian drugs.
14. Antidepressants.
15. Psychostimulants. Nootropic drugs.
16. Opioid analgesics.
17. Analgesics-antipyretics.
18. Non-steroidal anti-inflammatory drugs (NSAIDs).
19. Drugs affecting the autacoids histamine, serotonin, prostaglandins and leukotrienes.
20. Local anaesthetics.
21. Cholinergic neurotransmission. Cholinergic drugs. Neuromuscular blocking drugs.
22. Adrenergic neurotransmission. Adrenergic drugs.
23. Cardiac glycosides.
24. Antiarrhythmic drugs.
25. Antihypertensive drugs.
26. Diuretics.
27. Antianginal drugs.
28. Peripheral vasodilators. Venotonic and capillary stabilizing agents.
29. Antidyslipidemic drugs.
30. Antianemic drugs.
31. Drugs affecting coagulation: coagulants, anticoagulants, fibrinolytics and antifibrinolytics. Antiplatelet drugs.
32. Antiasthmatic drugs.
33. Antitussive agents and expectorants.
34. Drugs affecting appetite – stimulants and suppressors. Antiemetics.
35. Drugs used to treat peptic ulcer disease.
36. Laxatives and antidiarrheal agents. Carminative agents. Spasmolytic agents.
37. Hepatoprotective drugs. Pancreatic enzyme supplements. Choleric and cholekinetic agents.
38. Antidiabetic drugs.
39. Glucocorticoids and mineralocorticoids.
40. Anticancer drugs.
41. Immunomodulators: immunostimulators and immunosuppressive drugs.

### Recommended literature:

1. Lecture course in Pharmacology for Pharmacy students – for the academic year 2024/2025.
2. Basic & Clinical Pharmacology with toxicology. Edited by Nadka Boyadjieva, ARSO, 2021.
3. Pharmacology handbook for medical and dental students. Eds. Assoc. Prof. Kostadinov and Assoc. Prof. Delev, Plovdiv, 2018.
4. Pharmacology. Ed. Michael A. Clark et al. - 5th ed.- Balingen : Lippincott Williams & Wilkins, 2012.
5. Basic & Clinical Pharmacology, 13e, 2015; Bertram G. Katzung, Anthony J. Trevor (<https://dl.pezeshkamooz.com/pdf/dglibrary/book/medical/poisoning/clinical-pharmacology-13th.pdf>).
6. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 12e, 2011; Laurence L. Brunton, Bruce A. Chabner, Björn C. Knollmann.
7. Rang & Dale's Pharmacology, 10th Edition, ELSEVIER, 2023; James M. Ritter, Rod J. Flower, Graeme Henderson, Yoon Kong Loke, David MacEwan, Emma Robinson, James Fullerton.
8. Color Atlas of Pharmacology by Albrecht Ziegler, Mohr, Bieger and Lullmann, 2000.

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Approved by: .....

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(Assoc. Prof. V. Kokova, PhD)

## **INSTRUCTIONS FOR THE PREPARATION OF STUDENTS DURING THE UNDERGRADUATE INTERNSHIP AND FOR THE COLLOQUIM AFTER THE END OF THE INTERNSHIP**

The requirements for the colloquiums in the disciplines of pharmacology, pharmacotherapy and toxicology are aimed at acquiring knowledge necessary for the State Examination and are held after the completion and certification of the pre-diploma internship. With a positive evaluation, the colloquium ends with a certification of the semester by an assistant and qualified teacher in the relevant discipline.

The goal of the combined program, built on the teaching of pharmacology, pharmacotherapy and toxicology, is to create an integrated knowledge of the drug, relating to the pharmacological effect, adverse effects and possible drug damage, and the therapeutic application of drugs in various diseases and pathological conditions. By preparing the students during the pre-graduate internship, the following goals are achieved:

- Directed self-training to obtain in-depth knowledge of medicinal products from various pharmacological groups and their use in various therapeutic areas.
- Creating skills and a model for comprehensive characterization of the medicinal product and its therapeutic application
- Targeted systematic preparation for the State exam
- Practical preparation for future professional realization.

## **Pharmacology Colloquium Requirements**

A written exam is taken on one of the specified topics.

### **1. Drugs depressing the CNS**

Sleep-inducing and sedative drugs. Antiepileptic and antiparkinsonian drugs  
Antipsychotics and anxiolytics.

### **2. Medicinal products stimulating the CNS**

Psychostimulants and nootropic drugs. Antidepressants and antimania drugs.

### **3. Analgesics**

Opioid analgesics; non-opioid analgesics; local anesthetics.

### **4. Autacoids**

Histamine and H1- and H2-histamine receptor antagonists. Arachidonic acid metabolites:  
prostaglandins, thromboxanes and leukotrienes and their antagonists.

### **5. Nonsteroidal anti-inflammatory drugs**

### **6. Medicines affecting the sympathetic tone**

Adrenomimetics and adrenergic antagonists.

### **7. Medicines affecting the parasympathetic tone**

Cholinomimetics and cholinolytics. Neuromuscular blockers.

### **8. Medicines affecting the cardiovascular system**

Cardiotonic drugs. Peripheral vasodilators. Venotonic and capillarotonic drugs.  
Antidyslipidemic drugs.

### **9. Antiarrhythmic drugs**

### **10. Anti-angina drugs**

### **11. Antihypertensive drugs**

### **12. Diuretics**

**13. Medicines affecting hematopoiesis.** Antianemic and leukopoiesis-stimulating drugs.

**14. Medicines affecting the processes of blood coagulation and thrombosis.** Hemostatics  
with local and general action; antifibrinolytics. Anticoagulants and antiplatelet agents.

**14. Medicines affecting the respiratory system.** Antitussives and expectorants. Anti-  
asthmatic drugs.

**15. Medicines affecting the digestive system.** Anti-ulcer drugs. Appetite-stimulating and  
appetite-suppressing drugs.

Emetic and antiemetic drugs. Antispasmodics.

### **16. Medicines affecting the digestive system**

Laxatives, antidiarrheal, choleric, cholekinetic, hepatoprotective agents. Medicines acting on the pancreas.

### **17. Hormonal medicinal products**

Insulin and oral antidiabetic drugs. Sex hormones and their antagonists. Contraceptive drugs. Corticosteroids. Thyroid and antithyroid drugs.

### **18. Antimicrobial agents for the treatment of bacterial, mycotic and viral infections**

Chemotherapeutic agents from the quinolone group. Antimycotic drugs. Antiviral drugs.

### **19. Beta-lactam antibiotics**

### **20. Aminoglycosides and glycopeptide antibiotics**

### **21. Tetracyclines, macrolides and lincosamides**

### **22. Antitumor drugs and immunosuppressants**

## **SYLLABUS**

### **FOR STATE EXAMINATION**

### **IN PHARMACOLOGY AND TOXICOLOGY**

#### **PHARMACOLOGY**

1. Pharmacodynamics – types of receptors, receptor agonists and antagonists. Physiological targets for drug action - receptors, ion channels, enzymes, transport molecules.
2. Pharmacokinetics: routes of introduction, transmembrane transport, absorption, distribution and elimination of drugs.
3. Drug metabolism. Factors influencing metabolic processes – genetic polymorphism of enzyme systems. Enzyme inducers and enzyme inhibitors of drug metabolism.
4. Pharmacokinetic parameters: bioavailability, bioequivalence, volume of distribution, equilibrium plasma concentration of drugs, elimination clearance of drugs.
5. Factors influencing the action and kinetics of drugs: childhood, old age, pregnancy and lactation.
6. Phases in preclinical and clinical testing of new drugs. Biomarkers and clinical-laboratory indicators for evaluating the drug effect.
7. Mediator systems in the CNS. Anxiolytics - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
8. Antipsychotic drugs - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
9. Antidepressants - classification, pharmacological characteristics, side effects, therapeutic application.
10. Psychostimulants and nootropic drugs - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
11. Antiepileptic drugs - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
12. Antiparkinsonian drugs - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.

13. Sleeping pills and sedatives - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
14. Opioid analgesics - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
15. Non-opioid analgesics - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
16. Autocoids - definition, classification. Antihistamines - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
17. Inflammation and the arachidonic acid cycle possibilities for pharmacological influence: non-steroidal anti-inflammatory drugs - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
18. Cardiac glycosides - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
19. Peripheral vasodilators - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
20. Anti-anginal drugs - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
21. Antiarrhythmic drugs: classification, pharmacological characteristics, side effects and therapeutic application.
22. Antihypertensive drugs: pharmacological and pharmacotherapeutic characteristics, adverse drug effects.
23. Diuretics - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
24. Antidyslipidemic drugs: classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
25. Antiasthmatic drugs - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
26. Antitussive drugs and expectorants - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
27. Antiulcer agents - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
28. Agents acting on the digestive system: antiemetics, appetite suppressants and appetite stimulants - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
29. Chologogic, choloretic and hepatoprotective agents - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
30. Endocrine pancreas and drugs affecting carbohydrate metabolism: insulin-containing drugs - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
31. Drugs affecting carbohydrate metabolism: oral antidiabetic drugs - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
32. Hematopoietic system, anti-anemic drugs and drugs affecting erythropoiesis - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
33. Phases of blood coagulation and possibilities for pharmacological influence. Hemostatic agents - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
34. Antithrombotic agents: anticoagulants, fibrinolytics and platelet antiaggregants - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.



35. Mineral- and glucocorticosteroid drugs - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
36. Medicines containing androgens, antiandrogens and anabolic agents - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
37. Medicines containing estrogens, anti-estrogens, hormonal contraceptives - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
38. Beta lactam antibiotics - classification, antibacterial spectrum, pharmacokinetic features, side effects and therapeutic application.
39. Aminoglycoside and glycopeptide antibiotics - classification, antibacterial spectrum, pharmacokinetic features, adverse drug reactions, therapeutic application.
40. Tetracyclines, macrolides, lincosamides and amphenicols - classification, antibacterial spectrum, mechanism of action, pharmacokinetic features, adverse drug reactions, therapeutic application.
41. Quinolones and sulfonamides - classification, antibacterial spectrum, mechanism of action, pharmacokinetic features, adverse drug reactions, therapeutic application.
42. Antiviral drugs and immunomodulators - classification, pharmacological characteristics, adverse drug reactions, therapeutic application.
43. Antitumor drugs: classification, mechanism of action, adverse drug reactions and opportunities for chemoprotection and stimulation of leukopoiesis.
44. Medicines used in ophthalmology - classification, pharmacological characteristics, adverse drug reactions and therapeutic application.
45. Medicines used in dermatology - classification, pharmacological characteristics, side effects and therapeutic application.
46. Medicines used in otorhinolaryngology - classification, pharmacological characteristics, side effects and therapeutic application.

## **TOXICOLOGY**

47. Basic concepts and processes – xenobiotics, toxins, poison, poisoning, acute and chronic poisoning, delayed toxicity. Classifications of toxic substances.
48. Toxicity. Toxicity criteria. Methods for assessing the toxic effect of chemical compounds. Quantitative characteristics (LD50, ED50, TD50, TI).
49. Relationship between structure, chemical and physical properties of substances and their toxicity.
50. Factors influencing the toxicity of xenobiotics during their absorption, distribution, metabolism and excretion.
51. Entry of poisons into the body ("entrance doors") and resorption. Specificity related to the route of entry. Fate of the xenobiotic that has entered the body.
52. Distribution, biotransformation and excretion of xenobiotics. Possibilities of pharmacologically influencing toxicity.
53. Mechanisms of toxic action of xenobiotics - direct cytotoxicity and free-radical processes. Examples. Paracetamol toxicity - mechanism, manifestations and treatment. Antioxidants.
54. Mechanisms of toxic action of xenobiotics - interaction with thiol groups and specific receptor proteins. Enhancement of the toxic effect. Cyanide intoxications - routes of administration, mechanism, manifestations and treatment.
55. Delayed and remote toxic manifestations – immunotoxicity, immune suppression and immune-mediated hypersensitivity reactions. Xenobiotics-allergens.
56. Delayed and remote toxic manifestations - reproductive toxicity, mutagenic and carcinogenic effects of poisons.
57. Natural (physiological) detoxification protection - elements, forms and mechanisms.

58. Organization of toxicological assistance. Basic detoxification methods - general and specialized. Medicines for the treatment of poisonings - infusion solutions, organoprotectors, symptomatic agents.
59. Medicines for the treatment of poisoning - antidotes. Types, mechanism of action. Examples.
60. Organ toxicity - liver toxicity, toxic mechanisms. Examples - medicines, technical products, biological poisons. Amanita phalloides intoxication - manifestations and treatment.
61. Organ toxicity - poisons with mainly neurotropic action. Types, mechanisms, examples. Drug poisoning - benzodiazepines, neuroleptics, opioid analgesics. General characteristics and principles of treatment.
62. Organ toxicity - poisons with mainly cardiovascular toxicity. Types, mechanisms, typical intoxicants. ADR and toxicity of sympathomimetics, digitalis glycosides, beta blockers, calcium antagonists. Principles of treatment of intoxications.
63. Organ toxicity – poisons with mainly gastrointestinal toxicity. Types, mechanisms, typical intoxicants. Examples. Drug poisoning – NSAIDs, salicylates, iron salts, etc. Manifestations, treatment and prevention.
64. Organ toxicity – hemotoxic xenobiotics. Disruption of hemostasis and safety profile of anticoagulants. Xenobiotics with hematopoiesis-suppressing action.
67. Organ toxicity – poisons with mainly pulmonary toxicity. Mechanisms of occurrence. Poisoning with carbon monoxide, chlorine, nitrogen and sulfur gases.
68. Poisoning with opioid analgesics, psychostimulants and hallucinogens. Manifestations and life-saving measures.
69. Poisoning with ethyl alcohol, methyl alcohol and ethylene glycol. Manifestations, treatment and prevention.
70. Toxoallergic/anaphylactic shock. Causes, manifestations and life-saving measures. Poisoning by reptiles and insects - locally toxic and general toxic manifestations.

#### **BASIC LITERATURE:**

1. Pharmacology and Drug Toxicology, Volume I and Volume II, ed. R. Nikolov and S. Surcheva. Arbilis 2022; 1219 p.
2. Pharmacotherapy, ed. S. Konstantinov, G. Momekov, Softtrade, 2019, 908 p.
3. Pharmacology for assistant pharmacists, nurses and midwives. Ed.: L. Peychev. I. Kostadinova, Ed. Exact 93 Ltd., 2019; 298 p.
4. Drug interactions. Ts. Karaivanova, L. Peychev, S. Georgiev. TEA Design Ltd., 2018, 460 p.
5. Pharmacology and toxicology. Ed.: N. Boyadzhieva. Sofia: ARSO, 2017. - 750 p.
6. Drug reference book 2016. M. Karaivanova, L. Peychev, S. Georgiev. Sofia: TEA Design OOD, 2016; 496 p.
7. Pharmacology. Ed.: M. Karaivanova. Sofia: Softtrade, 2016. - 504 p.
8. Propaedeutics of clinical toxicology. Ya. Iliev. ed. Laksbuk, Plovdiv, 2014. 189 p.
9. Illustrated pharmacology. N. Boyadzhieva. Sofia: ARSO, 2014. - 552 p.
10. Drug reference book. Art. Milenkov. ed. Plovdiv: Lax Book, 2014. - 1120 p.
11. Pharmacotherapy and problems of clinical pharmacy. In 2 parts. Ed.: M. Karaivanova, Sofia: Softtrade, 2014; Part 1. – 228 p.; Part 2. – 502 p.
12. Toxicology for pharmacy students (ed. V. Tsankova and A. Astrug), FF of MU- Sofia Sofia, 2014.
13. Propaedeutics of clinical toxicology. Ya. Iliev. ed. Laksbuk, Plovdiv, 1014
14. Clinical pharmacology: for medical students. D. Terziivanov and others. - Sofia: UI "St. Kliment Ohridski", 2013. - 429 p.

15. Pharmacokinetics. A textbook for students of pharmacy. Ed.: I. Doichinova and others. – Sofia, MI "ARSO", 2012. - 178 p.
16. Narcotics. Medico-biological and social aspects. N. Danchev, M. Micheva, R. Ovcharov (ed.) ed. TEMPTO, Sofia, 2006
17. Medicines, pregnancy and breastfeeding, N. Boyadzhieva, I. Lambrev and others. Ed. Arso, Sofia, 2006
18. The selection and use of essential medicines: Report of the WHO Expert committee, 2013 (including the 18th WHO model list of essential medicines and the 4th WHO model list of essential medicines for children). Geneva: WHO, 2014, - 219 p. - (WHO technical report series ; 985)
19. Nanopharmaceutical carriers for targeted delivery of anticancer drugs: Recent advances and rationale for future developments. G. Momekov et al. - Plovdiv: Makros, 2013. - 95 p.
20. Basic and clinical pharmacology with toxicology. Edit.: N. Boyadjieva, Sofia: ARSO, 2012. - 372 p.
21. Clinical pharmacology. Peter N. Bennett et al. - 11th ed. - Edinburgh : Saunders & Elsevier, 2012. - 667 p.
22. Pharmacology / Ed. Michael A. Clark et al. - 5th ed. - Balingen : Lippincott Williams & Wilkins, 2012. - 612 p.
23. Principles of clinical pharmacology. Arthur J. Atkinson et al. - 3rd ed. - San Diego : Elsevier, 2012. - 626 p.
24. Clinical Pharmacy and Therapeutics. Edit.: R. Walker, C. Whittlesea, Churchill Livingstone, Elsevier 2012, 983 p.
25. The international pharmacopoeia [CD-ROM]. - 4th ed. - Geneva : WHO, 2011
26. Goodman and Gilman pharmacological basis of therapeutics / Ed. Laurence L. Brunton et al.– 12th ed. New York: McGraw-Hill, 2011. 2084 p. + DVD.

#### **BOOKS ON ELECTRONIC MEDIA**

1. Basic & Clinical Pharmacology, 13e, 2015; Bertram G. Katzung, Anthony J. Trevor
2. Katzung & Trevor's Pharmacology: Examination & Board Review, 11e, 2015; Anthony J. Trevor, Bertram G. Katzung, Marieke Kruidering-Hall.
3. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 12e, 2011; Laurence L. Brunton, Bruce A. Chabner, Björn C. Knollmann.
4. Harrison's Manual of Medicine, 19e, 2016; Dennis L. Kasper, Anthony S. Fauci, Stephen L. Hauser, Dan L. Longo, J. Larry Jameson, Joseph Loscalzo; Chapter 5: Principles of Clinical Pharmacology; Dan M. Roden.

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