

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

**SYLLABUS**  
**IN**  
**PHARMACOTHERAPY**

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

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

# PHARMACOTHERAPY

## Syllabus

Discipline	Final exam/ semester	According to the Faculty of Pharmacy curriculum of MU-Plovdiv Academic hours				ECTS	Academic hours in semester			
		Auditorium	Lectures	Practices	Non-auditorium		..... semester		..... semester	
							L	P	L	P
Pharmacotherapy	IX	150	45	45	90	6,0	3	3		
			30	30	93	6,1			2	2

**DISCIPLINE:**

PHARMACOPHARAPY

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

**REQUIREMENTS:**

Mandatory

**LEVEL OF QUALIFICATION:**

Master /M/

**FORMS OF TRAINING:**

Regular training - lectures, exercises/seminars, self-training

**YEAR OF TRAINING:**

IV – V year

**DURATION OF TRAINING:**

Two semesters - VIII and IX

**ACADEMIC HOURS:**

75 hours of lectures, 75 hours of exercises/seminars

**TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:**

Multimedia presentations, videos, seminars, discussion of a therapeutic problem, discussion of reprints, clinical case studies on paper - interpretation and drug selection, meta-analysis for personal /P/ drug selection, clinical case demonstration seminars, preparation and presentation of an abstract, instrumental methods for disease diagnosis and control of the disease.

**FORMS OF EVALUATION:**

Ongoing assessment, conducting colloquiums and seminars, testing on the choice of personal /P/ drug and adverse drug reactions, preparation of an abstract.

**EVALUATION CRITERIA:**

An average current grade is formed for each semester from a test, two colloquiums and a prepared essay.

**ASPECTS OF EVALUATION CRITERIA:**

Participation in discussions, solving tests and case studies, making an essay.

**SEMESTER EXAM:**

Yes /entrance test, written and oral exam/.

**STATE EXAM:**

Preparation of an essay on assigned topics during the six-month internship with confirmation at a colloquium.

**LECTURER:**

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

**DEPARTMENT:**

Pharmacology, toxicology and pharmacotherapy, Clinical units of MU-Plovdiv and hospital pharmacy.

## **ANNOTATION**

The pharmacotherapy course provides students with systematic theoretical and practical knowledge in the field of clinical medicine and applied pharmacology. The program is built on the concept of diseases as a set of co-occurring pathogenetically related syndromes and is adapted to the needs of pharmaceutical practice. The part of pharmacotherapy, taught by the Department of Pharmacology and Drug Toxicology, examines the fundamental principles of drug therapy, common symptoms and syndromes characteristic of different disease entities, and specific disease syndromes in internal medicine with their pathogenesis, etiological factors, and treatment guidelines. In the part taught by the clinical departments, the separate nosological units and the course of the disease in hospitalized patients are considered with a demonstration and analysis of the cases.

Course objectives: mastering fundamental and practical knowledge about diseases and their treatment, developing skills and knowledge for monitoring therapy and adverse drug effects.

### **BASIC AIMS OF THE DISCIPLINE AND EXPECTED RESULTS**

At the end of this training course, students should have the following knowledge and skills:

1. To know the common symptoms and syndromes in internal medicine and the necessary therapeutic behavior with the selection of OTC products or prescribed medications.
2. To describe the pathophysiological processes and clinical symptoms of the diseases, in order to orient themselves correctly to the disease symptoms, as well as to the treatment guidelines. Such medico-biological knowledge creates an opportunity for proper professional communication of the pharmacist in his pharmacy and hospital practice and for participation in monitoring the effectiveness and safety of pharmacotherapy.
3. To describe the role of OTC products, prescription drugs and non-pharmacological therapy in the control of socially significant diseases.
4. To know the factors that influence the choice of medicine and dosage form for the individual patient.
5. To have in-depth and analytical knowledge of monitoring the beneficial and undesirable effects of drug therapy.

# LECTURES – THESES

## MODULE-I

### *"FUNDAMENTAL BASICS OF PHARMACOTHERAPY"*

**Lectures 1, 2, 3, 4, 5, 6 and 15 are presented in the VIII semester**

#### **VIII. 1. Basic principles of rational pharmacotherapy. Therapeutic strategies.**

- Introduction – subject of pharmacotherapy and teaching methods
- Definition of rational pharmacotherapy. Therapeutic purposes
- Factors that affect the therapeutic efficacy of drugs
- Principles of rational pharmacotherapy and examples
- "benefit/risk" and "relative risk" indicators and meta-analysis of clinical data on the example of anticoagulant therapy
- Comparative assessment of the pharmacological safety profile of drugs
- Assessment of drug interactions
- Individualization of drug therapy and therapeutic monitoring
- Pharmacoeconomic analysis and assessment of the treatment outcome of the example of anticoagulant therapy.
  - Medical, simulation, technological center at the MU Plovdiv.

#### **VIII. 2. Evaluation of the therapeutic efficacy of drugs.** Clinical and laboratory indicators of therapeutic effect

- Classic and new guidelines for individualizing drug therapy
- Biomarkers – definition, types, specificity and sensitivity
- Biomarkers of inflammation, thrombosis and endothelial activation in stable angina pectoris.
- Biomarkers in diabetes and liver damage
- Tumor biomarkers
- Drug therapy approaches based on changes in the function of physiological targets and based on pathogenetic/molecular targets.

#### **VIII. 2. Risk groups of patients - therapeutic behavior. Pharmacotherapy during pregnancy and lactation.**

- Peculiarities of pharmacotherapy during pregnancy and lactation
- Benign changes during pregnancy and possible drugs to use
- Bacterial infections and risk category anti-infective drugs
- Medicines affecting milk secretion
- Women's Health Status - According to the National Women's Health Network
- Risk factors for cardiovascular diseases, breast tumors, osteoporosis, depressive syndrome, autoimmune, gynecological diseases and rules for reducing risk
- Control over reproduction - methods and hormonal contraception.

#### **VIII. 3. Clinical trial design – clinical pharmacology trial principles, procedures, phases, metrics, data analysis and reporting documentation.**

- Nature of clinical study and findings - judgment of \*Source Boston Consulting Group”, research teams
- Methods of clinical research
- Requirements for the clinical trial, reporting documentation and clinical file
- Types of clinical-pharmacological studies
- Clinical trial design and evaluation metrics

- Phase I, II, III and IV - objectives and conducted studies
- Types of survey errors
- Basic principles – according to GCP, Human Protection, Ethics Committee and others.
- Study monitoring
- Examples: in relation to generic drugs, drugs for the treatment of multiple sclerosis and new drugs for acute myocardial infarction /fondaparinux/.

**VIII. 4. Chronopharmacology and chronotherapy. Pharmacotherapeutic problems in genetic polymorphism of drug-metabolizing enzyme systems. Pharmacotherapeutic considerations in patients with renal and hepatic insufficiency.**

**VIII. 5. Therapeutic drug monitoring. Monitoring the safety of drug therapy - types of ADRs and factors influencing the frequency, severity and severity of the adverse reaction. Types of monitoring and example.**

- Chronological data on drug monitoring
- Types of adverse drug reactions - type A, B, C, D, E and F; severe and serious ADRs
- Factors affecting the frequency, severity and severity of the adverse reaction
- Monitoring systems and monitoring programs.
- Regulatory and methodical institutions
- Recommendations for safe pharmacotherapy of WHO, CDC and IMMP
- Drug safety in chemotherapy of bacterial infections /APUA/
- Analysis of ADRs from the Postmarketing Study of Serotonin Reuptake Inhibitors (SSRIs) - Summary Results
- Analysis of ADRs from the postmarketing study of new statins and glitazones
- Role of the pharmacist in monitoring ADRs
- Drug allergy and allergenic drugs.
- Pharmacogenetic enzyme polymorphism and liver toxicity
- Renal ischemia and nephrotoxicity – NSAIDs, short-acting ACE inhibitors, aminoglycosides, cytostatics, immunosuppressants, etc.
  - Cardiomyopathies and heart rhythm disorders - anthracyclines, TCA, phenothiazines, non-sedating antihistamines, sympathomimetic psychostimulants, glycosides, etc.
- Damage to hematopoiesis – cytostatics, pyrazolone derivatives, etc.
- PNS damage - Vinca alkaloids, isoniazid, etc.
- Myositis and rhabdomyolysis – statins, fibrates, etc.

**VIII. 15. Chemotherapy resistance – types, mechanisms of occurrence, classical and modern therapeutic strategies.**

- Antimicrobial resistance – epidemiological data and chronological analysis
- Factors for the emergence of resistance
- Types of resistance – primary and secondary
- Genetically conditioned resistance - sources of resistant genes and mechanisms of gene transfer
- Biochemical mechanisms of resistance
- Efflux-resistance and transporters
- Types of resistance depending on the antimicrobial effect
- Methicillin-resistant St.aureus (MRSA) and multi-drug resistance (MDR)
- MDR modulators
- Clinical and microbiological indicators of resistance
- Methods for determining bacterial resistance
- Antibiotic policy

**MODULES II to IV**  
**"SYNDROMES AND DISEASES IN INTERNAL MEDICINE -**  
**NON-DRUG AND DRUG THERAPY"**

**In the VIII-th semester, lectures from 7, 8, 9, 10 and from 12 to 15 are presented, and in the IX-th semester lectures from 1 to 15 are presented**

**Lectures in the IX-th semester**

**VIII. 7. Non-infectious-inflammatory syndrome - essence of the autoimmune reaction, types of autoimmune diseases and guidelines for treatment**

- Immune system and autoantibodies
- Model of the autoimmune response
- Type of autoimmune diseases
- Epidemiological data
- Etiological factors
- Nature and manifestations of the autoimmune reaction
- Non-pharmacological methods of treatment
- Therapeutic goals of pharmacological control
- Corticosteroid therapy and pulse treatment scheme
- Analgesic and anti-inflammatory therapy
- Immunosuppressive therapy

**VIII. 8. Allergic diseases - essence of the allergic reaction, clinical manifestations and anti-allergic drugs**

- Definition of allergy and allergic diseases, mechanism of occurrence
- Allergens - types, targets of allergens
- Types of allergic reactions
- Acute and chronic allergic reaction - mediators and Th1/Th2 imbalance
- Clinical and clinical-pathogenetic classification of allergic diseases
- Exogenous etiological factors of atopy
- Endogenous factors – IgE phenotype
- Genetic factors for atopy and involvement of MIIH and HL
- Drug therapy – antihistamines, corticosteroids, decongestants
- Diagnosis of allergies and allergens that are tested. Immunotherapy.
- Prevention of allergies and control with additional measures

**VIII. 9. Infectious-inflammatory syndrome - principles for a rational choice of antibiotic pharmacotherapy.**

- Common feature.
- General principles of anti-infective therapy – empirical, semi-empirical and rational drug selection
- Golden rule of antibiotic therapy – six indicators
- Individualization of drug therapy
- Approaches – monotherapy, combined therapy, sequential therapy

**VIII. 10. Pneumonias – etiological factors, pathogenesis and anti-infective therapy**

- Respiratory infections - etiology and therapeutic problems
- Types of pneumonia - causes of infection
- Pathogenesis of pulmonary inflammation

- Pharmacotherapy in community-acquired pneumonias - choice of antibiotic
- Pharmacotherapy in severe pneumococcal lung infection
- Atypical pneumonias - causes, clinical manifestations and treatment
- Nosocomial pneumonias – source of infection and mechanisms of transmission, three schemes of combined chemotherapy.
- Staphylococcal and Enterobacter respiratory infections – treatment approaches.

#### **VIII. 11. Latent tuberculosis infection and tuberculosis disease. Classic and new guidelines for prevention and combined drug treatment**

- Tuberculosis as a socially significant health problem - epidemiological data
- Mycobacterial infection - causative agents
- WHO program for monitoring global resistance and resistant strains
- Combined regimens of treatment with tuberculostatic drugs - first-line drugs; second-line drugs.
- Fluoroquinolones as a new approach in resistant infection
- New Antimycobacterial Drug Candidates
- Prevention and control – BCG vaccine and tuberculin reaction

#### **VIII. 12. Chronic obstructive diseases of the respiratory system /COPD/ - algorithm of treatment in stable COPD and in case of an infectious impulse. Modern expectorants**

- Definition and components of COPD
- Clinical manifestations
- Indicators for assessment of respiratory function
- COPD – pathophysiology and essence of the process; course and complications
- Etiological factors – endogenous and environmental factors
- Therapeutic purposes
- Non-pharmacological methods of treatment
- Algorithm for the treatment of COPD according to the National Consensus
- Treatment of COPD during exacerbation - choice of antibiotic and components of the drug scheme
- Types of expectorants and clinical data on the efficacy of some of them in COPD.

#### **VIII. 13. Bronchial asthma - etiological factors, types, clinical manifestations. Pharmacological control and therapeutic behavior in asthma attack and chronic asthma.**

- Common feature
- Nature of the process and clinical sequence of chronic inflammation
- Epidemiological data
- Etiology – genetic and exogenous factors
- Pathogenesis – mediators of inflammation and allergy, immune factors – asthma as a Th2 determined process
- Clinical manifestations and course
- Types of asthma
- Therapeutic purposes
- Non-drug therapy
- Pharmacological control of bronchial asthma - zonal control system and indicators for evaluating the effect
- Aerosol therapy, types of inhalers and indicators of efficacy of inhaled drugs
- Beta 2 agonists – short- and long-acting
- Anticholinergic drug therapy



- Additive therapy with cromolyns
- Corticosteroid therapy – the most effective pharmacological control
- Combined anti-asthmatic drugs
- New guidelines for treatment with leukotriene modulators and monoclonal antibodies
- Basic principles of bronchial asthma treatment. Medicines of choice for acute attack and chronic asthma
- Risk groups of patients and specific risk groups – training for the prevention of an acute asthma attack

#### **VIII. 14. Acid-peptic diseases - etiological factors, pathogenesis, clinical manifestations, therapeutic goals and treatment - H2 blockers, proton inhibitors, cromolyns, antacids and anti-helicobacter therapy**

- Upper dyspeptic syndrome – definition and nosological units
- Etiopathogenetic factors, types of mucosal damage and possible complications
- Clinical manifestations of acid-peptic diseases and relapses
- Antihelicobacter "triple" therapy
- Anti-ulcer drugs – proton inhibitors, H2-receptor antagonists, cytoprotectors and antacids

#### **Lectures in the IX-th semester**

##### **IX. 1. Dyslipidemic syndrome - clinical significance, prevention and treatment.**

- Definition and clinical-laboratory indicators of dyslipidemia
- Etiological factors and clinical significance of dyslipidemia
- Risk groups of patients
- Fredrickson classification
- Therapeutic purpose
- Diet therapy
- Modern therapeutic concept of pharmacological control
- Treatment with statins – pharmacological effect and therapeutic results
- Treatment with fibrates – choice of drug, beneficial and adverse effects
- Nicotinic acid and derivatives - Niacin slow release and combination products
- New guidelines for combination therapy - inhibitors of cholesterol-ester-transfer protein (CETP)-mediated reverse cholesterol transport

##### **IX. 2. Arterial hypertension – epidemiology, etiological factors, pathogenesis, stages and possible complications. Therapeutic goals and principles of antihypertensive treatment (with the participation of Boehringer Ingelheim - AT2-receptor blockers)**

- Definition and indicators
- Epidemiological data
- Etiological factors – external and hereditary
- Pathogenetic factors – RAAS, sympathetic tone, endothelial dysfunction, vascular hypertrophy and remodeling, insulin resistance
- Types of hypertension and stages - INC7 classification of arterial pressure in adults
- Complications and cardiovascular risk indicators
- Prevention of arterial hypertension
- Principles of antihypertensive therapy and treatment algorithm
- Non-drug treatment
- Pharmacological control - therapeutic goals and rules of antihypertensive therapy

- Groups of antihypertensive drugs and recommendations for selection in the presence of accompanying disease
- Direct arterial vasodilators and their application in hypertensive crisis
- New medications and combined products for the treatment of arterial hypertension
- Strategy for initial combined treatment vs monotherapy

**IX. 3. Coronary heart disease /CHD/ - etiological factors, pathogenesis, clinical manifestations and therapeutic behavior**

- Cardiac ischemia syndrome
- Epidemiological data
- Pathogenesis. Etiological factors
- Risk groups of patients
- Clinical forms of myocardial ischemia and types of angina
- Stable angina pectoris - clinical manifestations, course and goals of treatment.
- Groups of antianginal drugs - useful and undesirable effects; choice of drug in angina pectoris
- Reasons and benefits of using medications that reduce heart rate
- Unstable angina - clinical manifestations, ECG changes, therapeutic behavior
- Groups of medications for the treatment of unstable angina
- Acute myocardial infarction - etiological factors, clinical manifestations, ECG changes
- Acute myocardial infarction - Therapeutic goals and therapeutic behavior analgesia, sedatives, thrombolysis, antiplatelet and anticoagulant therapy

**IX. 4. Rhythm and conduction disorders of the heart - types of arrhythmias, etiological factors and mechanisms of occurrence, antiarrhythmic therapy**

- Heart pumping function and electrical activity. Excitation-wire system.
- Definition of cardiac arrhythmia and ECG characteristics
- Clinical manifestations of the arrhythmia and possible consequences
- Mechanisms of cardiac arrhythmia
- Treatment approaches
- Sinus arrhythmia and treatment guidelines - atrial extrasystoles, pathological bradycardia, tachycardia, atrial fibrillation, paroxysmal tachycardia
- Disturbances in AV conduction and AV block
- Ventricular arrhythmias and treatment guidelines – extrasystoles, tachycardia and ventricular fibrillation
- Adverse effects of antiarrhythmic drugs and basic concepts of their use

**IX. 5. Heart failure - etiology, pathogenesis, functional classification, clinical manifestations and therapeutic behavior in acute left ventricular and congestive heart failure**

- Definition and clinical manifestations
- Etiological factors
- Factors regulating cardiac function and compensatory mechanisms
- NYHA functional classification
- Non-drug therapy according to ANA recommendations
- Drug treatment - goals and guidelines for pharmacotherapy
- Digoxin therapy and factors affecting the effect of digitalis glycosides
- Diuretic therapy – treatment rules, choice of diuretic and diuretic resistance
- Vasodilators – nitrates, long-acting ACE inhibitors, AT2-blockers

- Therapeutic behavior in acute and congestive heart failure – specificity in the choice of drugs and treatment approaches

**IX. 6. Deep venous thrombosis (DVT) and pulmonary thromboembolism - nature, etiological factors, clinical manifestations and therapeutic behavior. Advantages of low molecular weight heparins.**

- Thrombosis as a pathological process - molecules and factors involved in thrombus formation
- Venous thrombosis – R.Virchov's triad
- Hereditary and acquired etiological factors for deep venous thrombosis
- Pulmonary thromboembolism /PTE/ – forms and clinical manifestations
- Therapeutic goals in PTE and active treatment with fibrinolytics, anticoagulants and antiplatelet agents – beneficial and adverse effects
- Place of low molecular weight heparins in the antithrombotic therapy of DVT - drugs, their preparation, pharmacokinetic and pharmacodynamic features and advantages over unfractionated heparin.
- Prevention of venous thromboembolism in general and orthopedic surgery

**IX. 7. Therapeutic problems in urology and nephrology - infectious-inflammatory diseases**

- Epidemiology and predisposing factors to infection
- Clinical manifestations and clinical-laboratory indicators
- Treatment of uncomplicated urinary tract infections according to CDC recommendations
- Complicated urinary tract infection - acute pyelonephritis - treatment according to CDC
- Pharmaco-economic analysis "price-effectiveness" of treatment regimens

**IX. 8. Therapeutic problems in nephrology - immune and autoimmune diseases with renal localization**

- Glomerulonephritis – definition, morphology and essence of intraglomerular inflammation
- Pathogenesis – autoimmune mechanisms
- Most common clinical manifestations and laboratory parameters. Chronic glomerulonephritis (CGN): nephrotic and nephritic syndrome
- Classification depending on the clinical manifestations and depending on the course and prognosis. Clinical-morphological classification
- Types of rapidly progressive CGN - main characteristics and clinical manifestations, complications and prognosis
- Principles of therapeutic behavior and treatment guidelines
- Pathogenetic therapy – immunosuppressants /corticosteroids, cytostatics/, anticoagulants and antiaggregants
- Symptomatic treatment and protection of renal function

**IX. 9. Therapeutic problems in hepatology - viral hepatitis: prevention and treatment**

***Acute hepatitis***

- Epidemiological data.
- Etiology – types of hepatitis viruses and their pathogenicity.
- Clinical course – incubation period, prodromal symptoms, icteric phase
- Laboratory indicators.
- Hepatitis A (HAV infection).
- Hepatitis B (HBV) infection - transmission, risk groups, clinical manifestations and course HBV antigens and viral markers.
- Hepatitis C (HCV) infection – detection, epidemiological data and clinical manifestations
- Predictions for viral hepatitis.

- Preventive measures and immunization - available vaccines.
- Guidelines for the treatment of acute viral hepatitis - antiviral drugs, Interferon-alpha and hepatoprotectors.

#### ***Chronic hepatitis***

- Causes, histopathology, clinical manifestations and consequences.
- Consensus on the diagnosis, treatment and follow-up of patients with chronic viral hepatitis – monotherapy and combined therapy.

### **IX. 10. Therapeutic problems in hematology – disorders in erythropoiesis and their treatment (organic iron-containing drugs)**

- Hematopoietic system - function and mechanisms of self-renewal; peripheral blood cells; hematopoietic growth factors
  - Erythropoiesis – differentiation of cells of the erythroid order and cofactors; hemoglobin synthesis; mechanisms of iron resorption
  - Anemia - definition, laboratory indicators
  - Etiology and causes of anemia
  - Clinical manifestations and signs
  - Types of anemia - macrocytic, microcytic and hypochromic, hemolytic; mild, moderate and severe
  - Iron-deficiency anemia – epidemiological data, etiological factors, risk groups
  - Iron-deficiency anemia - treatment: iron salt products, organic iron products, parenteral products - adverse effects and drug interactions
  - Vitamin B12/folate-deficiency anemia – cell morphology, laboratory parameters, treatment
  - Hemolytic anemias - types, causes and treatment
- Anemia in chronic diseases - pathogenesis and treatment. Social significance of anemia. Prevention and control - programs of WHO and UNICEF

### **IX. 11. Goiter. Hypo- and hyperthyroidism. Hashimoto's thyroiditis.**

### **IX. 12. Diabetes mellitus type I and type II**

- Definition and types of diabetes mellitus
- Epidemiological data and distribution of morbidity by age; at-risk populations of the population
- Etiological factors
- Pathogenesis and importance of protein glycosylation
- Clinical manifestations and laboratory indicators. Diagnostic criteria
- Micro- and macrovascular complications; other complications
- Therapeutic purposes
- Principles of diet therapy
- Type I diabetes – genetic and immunological markers, consequences of autoimmunity; treatment - types of insulins and rules for administering insulins
- Type II diabetes - risk factors and pathogenesis.
- Treatment of type II diabetes - sulfanylureas, biguanides, thiazolidinediones, alpha-glucosidase inhibitors. Combination treatment regimens and combination antidiabetic products
- Recommendations of NICE, 2009 for the treatment of diabetes mellitus type II.
- NIDDK Diabetes Prevention Program (DPP) and Results 2009. Diabetes Screening and Prevention.

**IX. 13. Targeted therapy in oncology. Solid malignant tumors – carcinogenesis, biological features and guidelines for neoadjuvant and adjuvant chemotherapy.**

- Types of solid tumors and epidemiological data
- Etiological factors and carcinogenesis
- Tumor-specific mutations and biomarkers for tumor detection
- TNM classification of solid tumors and disease stages
- Clinical manifestations
- Complex therapy of tumors - components
- Adjuvant, neoadjuvant and independent combined chemotherapy - principles of construction of the combined schemes
- High-dose and regional chemotherapy
- Factors influencing the therapeutic effect of cytostatics
- A new strategy for combination regimens with antiangiogenic drugs

**IX. 14. Sexually transmitted infections and anti-infective drugs. HIV infection and AIDS – prevention and treatment.**

- Types of STIs. WHO epidemiological data.
- Syphilis - etiology, ways of infection and clinical course. Treatment
- Gonorrhea - etiology and pathogenesis, treatment of uncomplicated and complicated gonorrhea according to the recommendations of the CDC.
- Chlamydial infections – general characteristics, life cycle, tropism and cellular effects of chlamydial species
- Risk age groups
- Clinical picture
- Therapeutic goals and features of pharmacotherapy – tetracyclines, macrolides, fluoroquinolones
- Prevention and reduction of the risk of chlamydial infections
- HIV infection and AIDS – epidemiology and target groups
- Types of HIV and biological markers: structure, tropism, mutability and mode of entry of the virus into cells
- Target cells and cellular effects of HIV
- Clinical manifestations of AIDS and laboratory indicators for virus detection and changes in immune status
- Stages of HIV infection according to WHO
- Antiretroviral therapy for HIV infection
- Protease inhibitors as a component of combined chemotherapy
- Programs for the prevention of HIV-transmission

**IX. 15. Shock states - types, therapeutic behavior. Anaphylactic shock.**

- Epidemiology
- Symptoms
- Pathogenesis
- Clinical forms
- Treatment
- Prevention

# EXERCISES – THESES

## Exercises/Seminars – VIII-th semester

### **1. Logic and stages of rational pharmacotherapy. WHO concept and criteria for P-/personal/ drug selection: efficacy, safety, suitability and cost**

- Logic and stages of rational pharmacotherapy.
- Review and analysis of the WHO concept of P-drug selection.
- Evaluation of antianginal drugs according to the criteria of efficacy, safety, suitability and price.

### **2. Pain – pharmacological control and therapeutic strategies**

Analysis and interpretation of scientific articles on the topic, analysis of the understanding of the analgesic leader and methods for the evaluation of analgesic, antihyperalgesic and anti-inflammatory effects

- Mechanisms and mediators of pain
- Antinociceptive system and function of opioid peptides
- Types of pain
- Therapeutic goals in pain syndrome
- Analgesic drugs from the group of NSAIDs: non-selective, selective COX-2 inhibitors and preferential - choice and safety profile
- Adjuvant analgesics – antidepressants, anticonvulsants
- Opioid analgesics – weak and strong opioid agonists
- WHO step-scheme for treatment of tumor/intense pain
- Concept of balanced analgesia
- Risk groups and a specific strategy for the treatment of risk groups of patients

### **3. Osteoarthritis and painful osteoarthritis**

- risk factors, essence of the process and treatment. Osteoporosis - clinical forms and manifestations, prevention and treatment.
- Osteoporosis - clinical forms and pathogenesis. Drug-induced osteoporosis
- Prophylactic concept for the prevention of osteoporosis
- Medical treatment – hormone replacement therapy, treatment with bisphosphonates, vitamin D and calcium
- 2012 French guideline for drug treatment of postmenopausal osteoporosis
- Osteoarthritis - etiology and nature of the process. Non-pharmacological and pharmacological methods of treatment. Chondroprotectors.
- Painful osteoarthritis - risk factors, essence of the process and treatment

### **4. Headache and migraine - etiology, clinical manifestations and pharmacological control**

- International classification of headache /2005/
- Migraine headache - mechanisms, course and clinical manifestations
- Non-pharmacological therapy and basic guidelines for drug treatment
- Pharmacological control of an acute migraine attack
- Multitarget combined therapy – adjuvant properties of caffeine
- Prophylactic migraine therapy - choice of drugs
- Tension-type headache - clinical manifestations and treatment
- Cluster headache – pathophysiology, clinical manifestations and treatment
- Analysis and interpretation of case studies representing the different types of headache

### **5. Nausea and vomiting; antiemetic drugs**

- Definitions and causes - gastrointestinal disorders, neurological and psychiatric disorders, Meniere's syndrome, travel vomiting, psychogenic and postoperative vomiting, drug-induced vomiting, etc.
- Pathophysiology and trigger zones. Neurotransmitters associated with vomiting
- Non-pharmacological methods of treatment
- Pharmacological control – antacids, H<sub>2</sub> antagonists, anticholinergic antiemetics, corticosteroids, butyrophenones, neurokinin receptor antagonists /aprepitant, fosaprepitant/, cannabinoids.
- Specific antiemetic therapy during cytostatic therapy – setrons, corticosteroids and combinations

### **6. Acid-peptic diseases and anti-ulcer drugs**

- Upper dyspeptic syndrome – definition and nosological units
- Etiopathogenetic factors and possible complications
- Clinical manifestations of acid-peptic diseases and relapses
- Anti-ulcer drugs – proton inhibitors, H<sub>2</sub>-receptor antagonists, cytoprotectors and antacids
- Antihelicobacter therapy

### **7. Diarrheal syndrome and antidiarrheal drugs. Constipation - prevention and treatment guidelines.**

- Diarrheal syndrome – secretory and osmotic diarrhea, gluten-sensitive enteropathy, exudative and motility diarrhea, bacterial and viral gastroenteritis and other infections, antibiotic-induced diarrhea
- Chronic diarrhea - causes: ulcerative colitis, Crohn's disease, celiac disease, and others.
- Diarrhea syndrome control – rehydration, anti-infective drugs, adsorbents, anti-secretory drugs, anti-motility drugs, antispasmodics
- Alternative therapy with probiotics in acute infectious diarrhea and antibiotic-induced diarrhea
- Constipation - definition and causes
- Epidemiological data on primary and drug-induced constipation
- Treatment approaches in adults and children
- Laxative drugs - groups and medicinal products
- Adverse effects and laxative dependence syndrome
- Prevention and treatment effectiveness

### **8. Seminar**

- Theoretical question on exercises 1-8.
- Solving a case study from exercises 1-8.

### **9. Fever – mechanisms of body temperature increase, etiological factors and therapeutic behavior.**

- Thermoregulation, hyperthermia and hypothermia
- Clinical manifestations of elevated body temperature
- Mechanisms – exogenous and endogenous pyrogens
- Causes of hyperthermia and fever
- Drug-induced hyperthermia
- Consequences of fever and risks in children
- Non-pharmacological approaches to treatment
- Pharmacological control – paracetamol and combined products, ibuprofen and aspirin
- Risk groups of patients

### **10. Exercise in Nervous Clinic.**

- Visit, analysis of clinical cases with various neurological disorders.

### **11. Bronchial asthma – etiological factors, types, clinical manifestations. Pharmacological control and therapeutic behavior in asthma attack and chronic asthma.**

- Etiology – genetic and exogenous factors
- Pathogenesis – mediators of inflammation and allergy, immune factors
- Clinical manifestations and course
- Types of asthma
- Therapeutic purposes
- Pharmacological control of bronchial asthma - zonal control system and indicators for evaluating the effect
- Aerosol therapy, types of inhalers and indicators of efficacy of inhaled drugs
- Anti-asthmatic drugs - releasing and controlling
- Basic principles of bronchial asthma treatment. Medicines of choice for acute attack and chronic asthma
- Risk groups of patients and specific risk groups – training for the prevention of an acute asthma attack

### **12. COPD – therapeutic behavior in stable COPD and in case of infectious impulse.**

- Definition and components of COPD
- Clinical manifestations
- Indicators for assessment of respiratory function
- Pathophysiology; course and complications
- Etiological factors – endogenous and environmental factors
- Therapeutic purposes
- Algorithm for treatment of COPD
- Treatment of stable COPD
- Treatment of COPD during exacerbation - choice of antibiotic and components of the drug scheme
- Many expectorants and clinical data on the efficacy of some of them in COPD.

### **13. Cough syndrome - etiological factors, types of cough and therapeutic behavior.** Antitussives and expectorants.

Visit to a simulation center. Practical solving of cases on the respiratory system.

- Cough as a symptom and algorithm of chronic cough. Consequences.
- General causes, respiratory causes and others
- Therapeutic behavior for dry cough - antihistamines, decongestants, antipyretic analgesics and cough suppressants /antitussives/
- A specific strategy for the treatment of dry cough in children
- Treatment of chronic cough according to the cause
- Types of expectorants and choice of medicinal product
- Professional pharmacist communication and preventive measures
- Visit to a simulation center and practical solving of cases on asthma and COPD.

### **14. Respiratory infections - analysis of pharmacotherapy and selection of anti-infective drugs.**

- Types of pneumonia - causes of infection
- Pharmacotherapy in community-acquired pneumonias - choice of antibiotic
- Atypical pneumonias - causes, clinical manifestations and treatment
- Nosocomial pneumonias – source of infection and mechanisms of transmission, schemes of combined chemotherapy
- Characteristics of anti-infective drugs used in respiratory infections.

### **15. Sleep and its disorders - causes and therapeutic guidelines for treatment.**

- Insomnia – epidemiological data, factors for insomnia, drug-induced insomnia
- Non-pharmacological methods of treatment



- Pharmacotherapy of insomnia – benzodiazepines, non-benzodiazepines, antidepressants, OTS H1 antihistamines, natural products. Therapeutic strategies for short-term and chronic insomnia

### **Exercises/Seminars – IX-th semester**

#### **1. Atherosclerosis – etiology, pathogenesis, complications. Antidyslipidemic drugs.**

- Atherosclerosis – definition, risk factors, clinical manifestations and complications
- Cerebral atherosclerosis, coronary atherosclerosis, sclerotic changes in the vessels of the limbs
- ANA recommendations for reducing the risk of cardiovascular and cerebrovascular complications
- Case studies on paper – analysis and interpretation

#### **2. Blood pressure monitoring - methods and practical rules for measuring blood pressure, round-the-clock monitoring. Hypertensive disease - therapeutic approaches and therapy. Pharmacotherapeutic behavior in hypertensive crises.**

- Methods and rules for measuring blood pressure and their application. Video film and practical classes.
- Hypertensive crisis – blood pressure values and therapeutic behavior. Drugs of choice in hypertensive crisis and methods of intensive treatment

#### **3. Coronary heart disease. ECG changes and hemodynamic indicators in angina pectoris and heart attack. Anti-anginal drugs.**

- Myocardial infarction – biomarkers /troponin, C-reactive protein, creatinine/ and ECG-changes /three areas of damage and the corresponding deviations in the ECG/.
- Imaging methods in cardiology and angiology - sonography
- Hemodynamic indicators. ANA recommendations for early treatment

#### **4. Rhythm and conduction disorders. Analysis of ECG changes in atrial and ventricular arrhythmias. Antiarrhythmic therapy.**

- Heart failure. Therapeutic approaches and therapy.
- Cardiac arrhythmias – analysis of ECG changes in atrial and ventricular arrhythmias and guidelines for drug treatment. Management of ventricular tachycardia - amiodarone, implantable cardioverter-defibrillator, vasopressor therapy
- Heart disease and heart failure - overview and discussion of the problem.

#### **5. Visit to a simulation center. Practical solving of cases on CCS.**

#### **6. Colloquium on exercises 1-5.**

- Theoretical question on CCS (exercises 1-5).
- Solving a case study on CCS (exercises 1-5).

#### **7. Exercise in Skin Clinic. Dermatitis: contact dermatitis, atopic dermatitis, seborrheic dermatitis, etc. Clinical manifestations and treatment guidelines.**

- seminar with case demonstration

#### **8. Exercise in Skin Clinic. Infectious dermatoses - types and guidelines for treatment. Psoriasis - clinic and treatment. Acne and rosacea - clinic and treatment.**

- seminar with case demonstration

#### **9. Exercise in Skin Clinic. Drug-induced skin reactions: non-allergic and allergic skin reactions, photosensitivity (phototoxic reactions).**

- seminar with case demonstration

#### **10. Exercise in a hospital pharmacy – Introduction to clinical pharmacy, role of the clinical pharmacist; aseptic services, drug control.**

- Device of the hospital pharmacy, supply and prescription of medicines

- Safety when working with cytostatics and under sterile conditions - aseptic services and laminar box.

- Ways of storing medicines and control over their correct use

**11. Exercise in an Endocrinology Clinic.** Therapeutic problems of the thyroid gland.

- Hypothyroidism and hyperthyroidism – treatment approaches

**12. Exercise in an Endocrinology Clinic.** Training course on therapy of diabetes mellitus.

- Diabetes control training course.

- Types of insulins and methods of their administration and storage

**13. Exercise in the Department of Microbiology** – 1. Autoantibodies. 2. Antibiotic resistance.

- Methods for determining sensitivity/resistance to antibiotics /antibiogram/

- Autoimmune antibodies – types and detection

**14. Presentation and discussion of abstracts on antihypertensive and antianginal drugs** /pharmacological and adverse effects/. Selection of P-medicine with a view to individualizing the therapy.

**15. Final test with general questions on the studied therapeutic problems.** Analysis of information.

## BIBLIOGRAPHY

### Main literature:

1. Lecture course on pharmacotherapy - Prof. Dr. L. Peychev, MU Plovdiv, 2021-2022.
2. Pharmacotherapy: A Pathophysiologic Approach, 11th Edition 2020 by McGraw Hill. [www.pharmacotherapyonline.com](http://www.pharmacotherapyonline.com).
3. Pharmacotherapy, ed. S. Konstantinov, G. Momekov, Ed. Softtrade, 2019, 908 p.
4. Pharmacotherapy (ed. M. Karaivanova). Ed. "Softtrade", Sofia, Second revised edition, 2012.
5. General symptoms and syndromes in internal medicine and therapeutic behavior. M. Karaivanova. Ed. "Softtrade", Sofia, 2010.
6. Clinical medicine for pharmacists (ed. Z. Krastev), Sofia, 2003.

### Additional sources

- A Quantitative and Narrative Evaluation of Goodman and Gilman's Pharmacological Basis of Therapeutics. BJ Piper, AA Alinea, JR Wroblewski, SM Graham, et al. Pharmacy, 2020 - [mdpi.com](http://mdpi.com)
- Textbook of Therapeutics. Drug and Disease Management. Eds. E. Herfindal, D. Gourley. 10th ed. int., 2016.

## **CONSPECTUS ON PHARMACOTHERAPY**

### **Fundamentals of Pharmacotherapy. Common symptoms and syndromes.**

1. Basic principles of rational pharmacotherapy. Contemporary therapeutic issues and therapeutic strategies.
2. WHO guidelines for rational pharmacotherapy. Criteria for choosing a P-drug: efficacy, safety, convenience and cost.
3. Assessment of therapeutic efficacy. Clinical and laboratory indicators. Biomarkers for evaluating the effect of drug treatment.
4. Pharmacotherapy during pregnancy and lactation.
5. Clinical trial design – procedures, phases, metrics, data analysis and reporting documentation.
6. Therapeutic drug monitoring.
7. Monitoring of adverse drug reactions (ADRs) - types of ADRs and factors influencing the frequency, severity and seriousness of the adverse reaction. Types of monitoring - examples.
8. Chrono-pharmacology and chrono-pharmacotherapy.
9. Pharmacotherapeutic problems with genetic polymorphism of drug-metabolizing enzyme systems. Pharmacotherapeutic considerations in patients with renal and hepatic insufficiency.
10. Drug-induced pathological conditions – immune-mediated reactions.
11. Drug-induced toxicity to the liver, kidneys, cardiovascular system, nervous system and others.
12. Principles for a rational choice of antibiotic pharmacotherapy.
13. Antimicrobial resistance and clinical indicators of resistant infection. Antibiotic policy and therapeutic strategies.
14. Pain and analgesia – types and mechanisms of the pain syndrome. Therapeutic strategies – non-opioid and opioid analgesics, adjuvant analgesics. A specific strategy for the treatment of pain in elderly patients.
15. Therapeutic strategies for acute and chronic pain – drug selection. WHO step-scheme for the treatment of chronic/tumor pain.
16. Therapeutic strategies for inflammatory joint pain (painful osteoarthritis, rheumatoid arthritis, etc.)
17. Headache - primary and secondary headache and clinical characteristics. Migraine and antimigraine drugs - principles and rules of treatment.
18. Fever – general characteristic of the febrile reaction, causes of fever. Temperature curves as a diagnostic marker. Therapeutic behavior in the state of increased body temperature.
19. Nausea and vomiting – etiological factors, pathogenesis and pharmacological control with antiemetic drugs.
20. Prevention and therapy of vomiting during cytostatic chemotherapy.
21. Diarrheal syndrome – etiological factors, general measures and pharmacological control with etiological and symptomatic antidiarrheal drugs.
22. Constipation – primary and symptomatic, prevention and treatment guidelines.

23. Insomnia - etiological factors, non-pharmacological, pharmacotherapeutic and alternative methods of treatment.

### **Skin and eye diseases**

24. General dermatology – structure of the skin and types of rash units. Peculiarities of dermatological drugs in relation to their permeability and extent of systemic resorption.

25. Skin diseases – contact dermatitis, atopic dermatitis, seborrheic dermatitis and other eczemas – clinical manifestations and treatment guidelines.

26. Infectious dermatoses – types and guidelines for treatment.

27. Drug-induced skin reactions – non-allergic and allergic reactions, photosensitivity/phototoxic reactions.

28. Psoriasis – clinic and treatment.

29. Acne and rosacea – clinic and treatment.

30. Eye disorders and diseases of the orbit, eyelids, lacrimal system and conjunctiva - guidelines for treatment. Specificity of application of ophthalmic drugs.

31. Glaucoma – types, clinical manifestations and drug treatment.

### **Diseases and syndromes in internal medicine**

32. Acute inflammatory diseases of the upper respiratory tract with cough syndrome - etiological factors, types of cough and therapeutic behavior. Antitussives and expectorants.

33. Types of pneumonia and therapeutic behavior depending on the causative agent and the severity of the infection.

34. Tuberculosis - etiology, clinical forms and manifestations, guidelines for drug treatment and prevention.

35. Chronic obstructive pulmonary diseases – types, etiological factors, clinical manifestations and possible complications. Therapeutic targets and the National Consensus for the treatment of COPD.

36. Bronchial asthma – main characteristics, etiological factors, pathogenesis, clinical manifestations and types of asthma.

37. Bronchial asthma – therapeutic goals and principles of pharmacological control in acute asthma attacks and in chronic asthma.

38. Non-infectious-inflammatory syndrome – types of autoimmune diseases and guidelines for treatment - anti-inflammatory, analgesic and immunosuppressive therapy; disease-modifying antirheumatic drugs.

39. Allergic diseases - types, essence of the allergic reaction, exogenous etiological factors and genetic factors of atopy. Clinical manifestations and drug treatment – antihistamines, cromolyns, decongestants and corticosteroids.

40. Dyslipidemia - clinical significance, prevention and treatment.

41. Arterial hypertension – etiological factors, pathogenesis, stages and possible complications. Therapeutic goals and principles of antihypertensive treatment.

42. Drug treatment of arterial hypertension - pharmacological groups of drugs; rules and strategies for optimal blood pressure control.

43. Coronary-vascular disease - pathogenesis, etiological factors and types of myocardial ischemia. Stable angina pectoris – clinical manifestations, therapeutic goals and treatment.

44. Unstable angina - clinical manifestations and medical treatment: anticoagulant, antithrombotic and antianginal therapy.
45. Acute coronary syndrome – pathogenetic essence, clinical manifestations and possible complications. Therapeutic goals and treatment approaches – analgesia and sedation, thrombolysis, antiplatelets and anticoagulants, anti-ischemic drugs.
46. Heart failure – functional classification, therapeutic goals and approaches to the treatment of acute left ventricular and congestive heart failure.
47. Cardiac arrhythmia – etiological factors and mechanisms of occurrence, types and antiarrhythmic drugs for atrial, atrio-ventricular and ventricular arrhythmia. Basic principles, benefit and risk of antiarrhythmic therapy.
48. Thromboembolic syndrome: deep venous thrombosis and pulmonary embolism - essence, etiological factors, clinical manifestations and drug treatment.
49. Acid-peptic diseases - etiological factors, pathogenesis, clinical manifestations, therapeutic goals and treatment – H<sub>2</sub>-blockers, proton inhibitors and anti-helicobacter therapy.
50. Dyspepsia and drug-induced erosive gastritis – antacid drugs and cytoprotectors.
51. Goiter. Hypo- and hyperthyroidism. Hashimoto's thyroiditis.
52. Diabetes mellitus – epidemiology, etiological factors, pathogenesis, clinical and laboratory indicators and diagnostics, possible complications of the disease. Type 1 diabetes treatment and insulin administration rules.
53. Diabetes mellitus type-2 – therapeutic goals, non-pharmacological and pharmacotherapeutic approaches – sulfanylurea drugs, biguanides, thiazolidinediones, alpha-glucosidase inhibitors. Combined therapeutic regimens.
54. Therapeutic problems in hepatology. Viral hepatitis – causes, types and treatment guidelines - antiviral drugs and hepatoprotectors.
55. Therapeutic problems in nephrology – meaning of pain, problems with urination and changes in urine output. Kidney stone disease.
56. Therapeutic problems in nephrology – infectious-inflammatory diseases and autoimmune diseases with renal localization.
57. Therapeutic problems in hematology. Iron-deficiency anemia – causes of iron deficiency and iron-containing anti-anemic drugs. Drug modulation of hematopoiesis.
58. Megaloblastic anemia – causes, symptoms and medication effects.
59. Hemolytic anemias – types and drug effects.
60. Shock conditions – types, therapeutic effect. Anaphylactic shock.
61. Sexually transmitted infections – syphilis, gonorrhea, chlamydia, HIV infection and AIDS. Prevention and treatment.

## **INSTRUCTIONS FOR THE PREPARATION OF THE PRE-GRADUATE INTERNSHIP AND FOR THE COLLOQUIUM AFTER THE COMPLETION OF THE INTERNSHIP**

Preparation and submission of a handwritten paper abstract of up to 10 pages on one of the topics listed below, containing the necessary information on drugs used in a specific therapeutic area. The abstract has the following structure: (1) Introduction with brief information about the nosological unit or syndrome, etiological and pathogenetic factors, important clinical manifestations; (2) Drug groups and representatives – for selected drugs, the INN, indications, warnings, adverse drug reactions, contraindications, usual dosage regimens and method of administration are described sequentially. (3) Commercial products permitted in our country, medicinal forms.

### **TOPICS FOR PRE-GRADUATE INTERNSHIP AND POST-INTERNSHIP COLLOQUIUM**

#### **1. Pulmonology**

Acute respiratory diseases - selection of OTC products and antitussive drugs (expectorants).

Bacterial and atypical pneumonias - choice of drug and combined regimens in severe infections.

Chronic bronchitis, pulmonary emphysema and COPD – beta 2 agonists, M-cholinolytics, theophyllines, corticosteroids, expectorants.

Latent tuberculosis infection and tuberculosis disease – prevention and combined therapy with tuberculostatic drugs.

#### **2. Allergology**

Bronchial asthma – beta-2 agonists, M-cholinolytics, xanthine derivatives, cromolyns, corticosteroids and combination products.

Allergic diseases and allergens - antihistamines of the 1st or 2nd/3rd generation, cromolyns, decongestants, corticosteroids.

#### **3. Cardiology**

Acute coronary syndrome - anticoagulants, thrombolytics, antiplatelet agents (Aspirin/Ticlopidine and Clopidogrel), antianginal drugs, analgesics/anxiolytics.

Stable angina - organic nitrates, beta blockers/calcium blockers, metabolotropic drugs, antiplatelet agents

Arterial hypertension – diuretics, ACE-inhibitors/AT2-receptor blockers, beta-blockers, calcium antagonists or combinations

Cardiac arrhythmias - sodium channel blockers, beta blockers, drugs that prolong the refractory period, calcium antagonists and others.

Heart failure – digoxin therapy/dopamine agonists, diuretics, vasodilators (nitrates, ACE inhibitors, direct vasodilators and adrenergic blockers) Deep vein thrombosis and pulmonary embolism – Heparin and low molecular weight heparins

#### **4. Rheumatology**

Autoimmune diseases – corticosteroids, immunosuppressants (antiproliferative, calcineurin inhibitors, monoclonal antibodies), modulators of the disease process (Auranofolin, Penicillamine, Chloroquine, Leflunomide; Cladribine)

Osteoarthritis – non-opioid analgesics. Safety profile of NSAIDs

## **5. Nephrology**

Chronic glomerulonephritis with autoimmune genesis – corticosteroid pulse treatment, anticoagulants, immunosuppressants (Azathioprine, Cyclophosphamide, Chlorambucil, Cyclosporin A)

## **6. Gastroenterology**

Gastroesophageal reflux disease (GERD) - antacids, proton inhibitors/H<sub>2</sub>-receptor antagonists, prokinetic medications (Cisapride)

Ulcer disease – H<sub>2</sub>-receptor antagonists/proton inhibitors, cytoprotectors, anti-helicobacter drugs and others.

Hepatic steatosis, chronic hepatitis and liver failure - antiviral drugs (Roferon, Lamivudine/Ribavirin), antioxidants and hepatoprotectors, infusion solutions

## **7. Endocrinology**

Diabetes mellitus type I and type II - insulins, oral antidiabetic drugs

## **8. Hematology and oncology**

Iron deficiency, megaloblastic and hemolytic anemias - inorganic and organic iron-containing products; vitamin B<sub>12</sub> and folic acid

Bone marrow aplasia and agranulocytosis - recombinant hematopoietic growth factors, corticosteroids and symptomatic therapy

Chronic tumor pain – opioid analgesics and adjuvant analgesics. WHO's stepwise scheme for pain management.

## **9. Dermatology and venereology**

Medicinal skin hypersensitivity reactions - topical antihistamines, topical and systemic corticosteroids

Dermatitis /eczema/ and infectious dermatoses - local corticosteroids, local antibacterial and antiviral drugs, antimycotics

Sexually transmitted infections - antiviral drugs for HIV infection

## **10. Ophthalmology**

Ophthalmic drugs - features, types and therapeutic application.

## **11. Otorhinolaryngology**

Medicines used in ENT

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