

**Министерство здравоохранения Украины  
Национальный медицинский университет  
имени А.А. Богомольца**

**WORKBOOK  
for independent work of students  
Dentistry**

**Учебная дисциплина «Клиническая фармакология»**

**Направление Стоматология**

**Кафедра клинической фармакологии и клинической  
фармации**

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**Утверждено** на заседании кафедры от \_\_\_\_\_ 2015 г., Протокол № \_\_\_\_\_

**Рассмотрены и утверждены:** ЦИК по терапевтическим дисциплинам

от «\_\_\_\_\_» 2015 года, протокол № \_\_\_\_\_

Entry.

More than 50% of all medicines are prescribed, let or sell irrationally, while about 50% of patients use them incorrectly.

The purpose of teaching the discipline "Clinical pharmacology" is to prepare specialists who have sufficient theoretical knowledge and practical skills to perform maximally rational drug therapy in a specific patient. Discipline will help to learn the methodology of choosing the most effective and safe medicines and their combinations, taking into account the individual characteristics of the patient, the course and form of the disease, presence of comorbidity, based on the data of evidence-based medicine.

Working through the tasks of the workbook, the student will be step by step to get knowledge of personalized drug therapy.

Because of the discipline there is only 4 working days, for learning new skills is important to work out all the tasks of the workbook. The tasks that were overly complex, it is necessary to pay special attention during practical classes.

All the acquired skills in the individualization of drug therapy the student have the ability to check when preparing a "Protocol evaluation of the efficacy and safety of medicines".

The teacher at the beginning of the working classes checks the status of the execution of tasks on IWS (printed or represented in electronic form, sent by e-mail, etc.).

Assessment on a task results in the workbook included in the evaluation of current control and is 0-4 points.

**Topic 1.** The subject and tasks of clinical pharmacology. The main provisions of the pharmacokinetics and pharmacodynamics

***Objective: to learn the methodology of individualization of drug therapy***

***The student should know:***

- Define the basic concepts of clinical pharmacology;
- Parameters of clinical pharmacokinetics;
- Basic mechanisms of absorption, distribution, biotransformation and excretion of drugs;
- The classification of undesirable side reactions;
- The main problems of interaction of medicines;
- Features of the clinical pharmacology of drugs in individuals of different age, pregnant and lactating women

**The student should be able to:**

- To identify drugs with a narrow range;
- To assess the risk of interaction of medicines;
- Identify expected and unexpected adverse reactions when prescribing medications.

## Basic concepts topics:

Clinical pharmacokinetics is the ...

Clinical pharmacodynamics is ...

Evidence-based medicine is ...

Pharmacogenetics is ...

## Recommended reading

- 1) Clinical pharmacology: textbook / red.authors: edited by O. Y. Babak, A. N. Bilovol, I. S. Chekman. - K. : CSI "Medicine", 2012. - 726 p. (p. 5-64).
- 2) Clinical pharmacology / ed. by V. G. Kukes, D. A. Sychev. - Fifth ed., Revised and enlarged. - M. : GEOTAR-MED, 2015. - one thousand twenty-four. p. (p. 17-251)
- 3) Ritter J. M. et al. A Textbook of Clinical Pharmacology and Therapeutics. Fifth Edition. in +2008 by Hodder Arnold, an imprint of Hodden Education, part of Hachette Livre UK 465 p. (p.6-85).
- 4) Katzung B. G., Masters S. B., Trevor A. J. Basic and Clinical Pharmacology. 2012. 12 Edition. The McGraw-Hill Companies. (p.5-68).
- 5) Raymon L. P. et al. USMILE. Step 1. Lecture notes. Pharmacology. Caplan Medical 2009. 334 p. (p.3-38).

## Tasks for independent work themes

1. The stages of pharmacokinetics 2. Mechanisms of absorption and. the flow of drugs

b. \_\_\_\_\_

V. \_\_\_\_\_

G. \_\_\_\_\_

D. \_\_\_\_\_

and. passive diffusion

b. \_\_\_\_\_

V. \_\_\_\_\_

G. \_\_\_\_\_

D. \_\_\_\_\_

3. Phase of biotransformation 4. The mechanisms of elimination of drugs in the kidney

and. \_\_\_\_\_

b. \_\_\_\_\_

and. passive glomerular filtration

b. \_\_\_\_\_

V. \_\_\_\_\_

1. 1. **The parameters** of pharmacokinetics

parameter	Name	Clinical significance
(T <sub>1/2</sub> )	<b>the half-life</b>	To determine the amount of time needed to achieve C <sub>ss</sub> (3-5 T <sub>1/2</sub> ), and estimates of elimination (less accurate than ground clearance)
V <sub>d</sub>		
Cl		
C <sub>ss</sub>		
T <sub>max</sub>		
F		
AUC		

6. % protein binding reflects \_\_\_\_\_-PM

7. Bioavailability of drugs depends on \_\_\_\_\_

8. T<sub>1/2</sub> indicates \_\_\_\_\_ PM

9. Clearance of drugs by the kidneys depends at \_\_\_\_\_

10. **The cytochrome P450 isoforms**, their substrates, inhibitors and inducers

Cyp450	substrates	inductors	inhibitors	genetic polymorphism
1A2	theophylline caffeine clozapine acetaminophen	Smoking broccoli the food is grilled	fluoroquinolones macrolides cimetidine amiodarone fluvoxamine	No

2C9				
2C19				
2D6				
2E1				
3A4				

### 10. Types of receptors

Type I. Receptors - ion channels.

Type II \_\_\_\_\_

Type III. \_\_\_\_\_

Type IV. \_\_\_\_\_

### Topic 2. Clinico-pharmacological characteristics of antihypertensive drugs.

Objective: to Learn the effective and safe individual pharmacotherapy of hypertension

#### The student should know:

- A General semiotics of hypertension;
- Etiopathogenesis and diagnostic criteria for hypertension;
- Evidence-based data on antihypertensive therapy;
- Parameters of the pharmacokinetics and pharmacodynamics of major antihypertensive drugs.

#### The student should be able to:

- To choose necessary drugs, adequate dosage form and dosing regimen, route of administration in the appointment of patients with hypertension;
- To identify the main methods of clinical examination of patients to assess the efficacy and safety of antihypertensive drugs and analyze the results;
- Use the main parameters of the pharmacokinetics to a rational use of antihypertensive drugs;

- Anticipate the potential interactions and side effects antihypertensive drugs.

**Basic concepts topics:**

**Blood (symptomatic) hypertension is ....**

Recommended reading

- 1) Clinical pharmacology: textbook / red.authors: edited by O. Y. Babak, A. N. Bilovol, I. S. Chekman. - K .: CSI "Medicine", 2012. - 726 p. (p. 65-100).
- 2) Clinical pharmacology / ed. by VG Kukes - 3-e Izd., - M .: GEOTAR-Media, 2006. - 944 p. (p. 219-311).
- 3) Raymon L. P. et al. USMILE. Step 1. Lecture notes. Pharmacology. Caplan Medical 2009. 334 p. (p.93-98).
- 4) A Guide to Clinical Decision-Making: The PSAP Algorithms Online Handbook Fourth Edition American College of Clinical Pharmacy. 2 008 (1-2).

**The task for independent work topics:**

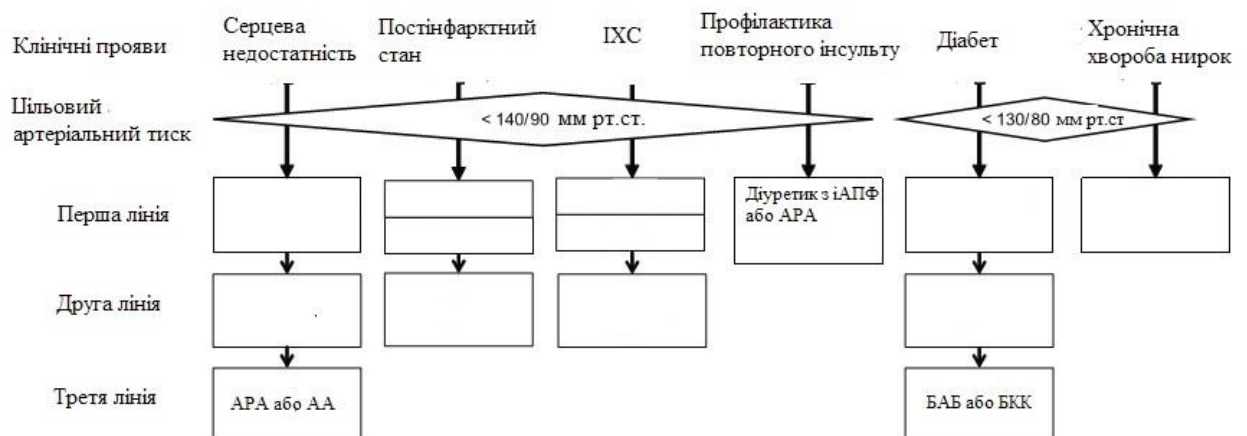
Task 1.

First line antihypertensive drugs (to give an example)

- 1) Beta blockers (bisoprolol)
- 2) calcium channel Blockers(\_\_\_\_\_)
- 3) \_\_\_\_\_
- 4) \_\_\_\_\_
- 5) \_\_\_\_\_

**Task 2.**

Fill in the blank fields in the algorithm of treatment of hypertension depending on comorbidities



where:

iAPF – APF inhibitors

I - aldosterone antagonists

APA - antagonists of receptors of angiotensin II

BAB - beta blocker

BCC - calcium channel blocker

### Task 3

The most frequent side effects:

BAB

---

I

APF

---

BCC

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Thiazide diuretics

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### Task 4

What caused the appearance of dry cough in the patient, which long time for the treatment of hypertension took lisinopril?

- A. inhibition of angiotensin
- B. increase in the level of aldosterone in the blood
- C. depletion of norepinephrine
- D. increased concentration of bradykinin

### Task 5

The patient suffering from bronchial asthma, diagnosed with arterial hypertension. What antihypertensive medication is contraindicated?

- A. Verapamil
- B. Hydrochlorothiazide
- C. Propranolol
- D. Captopril
- E. Losartan

### Task 6

The patient, 43 years old, was admitted to the cardiology Department with complaints of palpitations, dizziness, emotional lability, irritability, shallow sleep. Normal blood pressure = 130/85 mm Hg.PT. In the last 4-5 years on the background of psycho-emotional stress BP went up to 180/100 mm Hg.PT. On an electrocardiogram showed sinus tachycardia, left ventricular hypertrophy. Pathological changes of other organs were found. Of the following groups of drugs determine the drugs of choice for the patient.

- A. calcium antagonists
- B-blockers
- C. diuretics
- D. ACE inhibitors
- E. myotropic antispasmodics

### Task 7

A patient aged 42 years, complains of intense headache, thirst, frequent urination, bouts of severe weakness and pain in the muscles of both legs. Objectively: BP = 200/120 mm Hg.CT., the expansion of borders of heart, voiceless heart tones. Potassium serum - 2,9 mmol / L. What means will be most effective for blood pressure control?

- A. Doxazosin
- V. Propranolol
- S. Adelfan
- D. Nifedipine
- E. Verospiron

Task 8.

The family doctor examines a patient aged 45 years complains on sharp pulsating pain in the head, "fog" before eyes, sensation of heat, nausea, pain in the heart. HELL = 210/100 mm Hg.CT., pulse - 78 beats / min. the Patient associates the condition with conflict situations at work. The patient was diagnosed with hypertensive crisis and was caused by the ambulance. Drug home kit from the patient, which can be used by the Clinician for emergency care before the arrival of the ambulances? To specify the route of administration.

- A. amlodipine tablets
- B. clonidine tablets
- C. hydrochlorothiazide tablets
- D. nifedipine tablets
- E. tincture of Valerian drops

**Topic 3.** Clinical and pharmacological characteristics antianginal, anti-ischemic and lipid-lowering agents

**Objective:** to Learn the effective and safe use of anti-anginal, anti-ischemic and lipid-lowering agents.

***The student should know:***

Common presentations of ischemic heart disease and myocardial infarction;

- Evidence-based data about the use of anti-anginal, anti-ischemic and lipid-lowering agents

- Parameters of the pharmacokinetics and pharmacodynamics of the main anti-anginal, anti-ischemic and lipid-lowering agents.

**The student should be able to:**

- Choose your LZ, adequate dosage form and dose injection mode in the appointment of patients with angina pectoris;

- to identify the main methods of clinical examination of patients to assess the effectiveness and safety of using antianginalnyh, anti-ischemic and lipid-lowering drugs and analyze the results;

- use the basic parameters of pharmacokinetics with the aim of rational use of anti-anginal, anti-ischemic and lipid-lowering agents;



- anticipate the potential interactions and adverse events the use of anti-anginal, anti-ischemic and lipid-lowering agents.

**Basic concepts topics:**

Stable angina is a ....

Unstable angina is ...

**Recommended reading**

1) Clinical pharmacology: textbook / red.authors: edited by O. Y. Babak, A. N. Bilovol, I. S. Chekman. - K .: CSI "Medicine", 2012. - 726 p. (p. 226-256).

1. Clinical pharmacology / ed. by VG Kukes, 3rd ed., – M.: GEOTAR-Media, 2006. – 944 p. (p. 475-485).

2. Raymon L. P. et al. USMILE. Step 1. Lecture notes. Pharmacology. Caplan Medical 2009. 334 p. (p.103-106, 113-116).

**Tasks for independent study of the topic:**

**Task 1.**

The main groups of antianginal drugs (to bring an example of 1-2 products)

A) nitrates (nitroglycerin, Mononitrate isosorbide)

In) \_\_\_\_\_

With) \_\_\_\_\_

**Task 2**

**The introduction** of nitrates into the organism

A)

In) \_\_\_\_\_

With) \_\_\_\_\_

**Task 3**

**Pharmacodynamics of antianginal drugs**

Group	Mechanism of action	Side effect
Nitrates		

**Task 4**

**Clinical pharmacology lipid-LZ**

Group	The representative	Pharmacodynamics	Side effect	Interaction
Statin	Simvastatin			


**Theme 4: Clinical pharmacology of drugs affecting the blood's ability to clot (thrombolytics, anticoagulants, antiplatelet drugs, coagulants)**

**Objective:** to Master the skills of individualization of drug therapy in bleeding disorders

**The student should know:**

1. Phases and factors of blood coagulation.
2. Clinical and pharmacological properties of drugs that affect platelet aggregation, blood coagulation and fibrinolysis.
3. Indications for use drugs.

***The student should be able to:***

1. To estimate the ratio of benefit / risk when using medicines that affect platelet aggregation, blood coagulation and fibrinolysis.
2. To anticipate side effects and interactions when prescribing drugs that affect blood clotting.
3. To assist the patient in overdose means that affect blood clotting.
4. The use of prescription drugs that affect platelet aggregation, blood coagulation and fibrinolysis and to conduct their pharmacological analysis.

**Basic concepts topics:**

Fibrinolysis –

Coagulation –

Hemostasis –

**Recommended reading**

- 1) **Clinical pharmacology: textbook / red.authors: edited by O. Y. Babak, A. N. Bilovol, I. S. Chekman. - K. : CSI "Medicine", 2012. - 726 p. (p. 199-225).**
- 2) **Clinical pharmacology / ed. by VG Kukes - 3-e Izd., - M. : GEOTAR-Media, 2006. - 944 p. (p. 445-474).**

3) Raymon L. P. et al. USMILE. Step 1. Lecture notes. Pharmacology. Caplan Medical 2009. 334 p. (p.257-270).

The task for independent work topics:

**Task 1**

**Prescription:**

- acetylsalicylic acid in tablets
- ticlopidine tablets
- heparin in vials
- warfarin tablets
- Protamine sulfate in the ampoule
- thrombin in bottles
- etamzilat in tablets and ampoules
- menadione (menadione) in tablets and ampoules
- streptokinase ampoules
- aminocaproic acid in bottles
- 

**Task 2.**

Fill in the table.

Drugs	Indications for use	Side effects
Acetylsalicylic acid		
Ticlopidine		
Heparin		
Warfarin		
Protamine sulfate		
Thrombin		
Etamzilat		
Menadion		
Streptokinase		

Aminocaproic acid		

**Task 3**

Among the listed drugs, click tools, having the property to inhibit platelet aggregation:

- A. Heparin
- B. Alteplase
- C. Dipyridamole
- D. Clopidogrel
- E. Ticlopidine
- F. Aminocaproic acid
- G. Acetylsalicylic acid

**Task 4**

Among these tools, select local implantation steps:

- A. Calcium chloride
- B. Menadion
- C. Aminocapronic acid
- D. Acetylsalicylic acid
- E. Thrombin
- F. hemostatic Sponge
- G. Etamzilat

**Task 5.**

Specify the mechanisms of action of antifibrinolytic aminocaproic acid:

- A. Acts directly on fibrin, stabilizing it
- B. Blocks the activators of plasminogen
- C. Inhibits the conversion of plasminogen to plasmin
- D. Inhibits the action of fibrinolysin
- E. Reduces the activity of trypsin and kallikrein

**Task 6.**

Fill in the table

Pathological conditions	The main clinical manifestations	Groups of drugs assigned
Thrombocytopenia		
Hypercoagulability		
Hypocoagulation		

Haemorrhagic syndrome in newborns		
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**Task 7.**

Violation platelet level:

A. clinical manifestations

B. etiological factors

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**Task 8. Disorders of coagulation link:**

A. clinical manifestations B. etiological factors

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**Task 8.** Disorders of coagulation link:

A. clinical manifestations B. etiological factors

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**Task 10**

Fill in the table

Gemostatics	Anticoagulants	Fibrinolytics

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**Topic 5.** Clinico-pharmacological characteristics of drugs that affect the bronchial patency. Clinical pharmacology of anti-inflammatory drugs.

**Objective:** to Learn the effective and safe use of medicines that affect the bronchial patency and anti-inflammatory drugs

**The student should know:**

Common presentations of acute and chronic bronchitis, bronchial asthma, chronic obstructive pulmonary diseases, systemic diseases of connective tissue;

- Etiology, pathogenesis and diagnostic criteria of these diseases;
- Principles of the pharmacotherapy of these conditions;

Clinical pharmacology of drugs used in this pathology (classification, pharmacodynamics, pharmacokinetics, side effects, interaction);

- Features of the clinical pharmacology data of drugs in individuals of different age, pregnant and lactating women.

**The student should be able to:**

- To choose necessary drugs, adequate dosage form and dosing regimen in patients with broncho-obstructive pathology
- To identify the main methods of clinical examination of patients to assess the efficacy and safety of drugs that affect airway patency and analyze the results;
- Use the basic parameters of pharmacokinetics with the aim of rational use of drugs that affect the airway;
- To foresee the consequences of the interaction of drugs;
- Choose a nonsteroidal anti-inflammatory drugs (NPLS), the appropriate dosage form and dosage;
- To identify the main methods of clinical examination of patients to assess the efficacy and safety purpose NPLS;
- Interview patients to gather medical history and to foresee possible complications of pharmacotherapy when using drugs that affect airway patency and NPLS.

**Basic concepts topics:**

Methods of delivery of bronchodilators -

The syndrome of a ricochet is.

Syndrome locks -.

**Monitoring** the effectiveness of bronchodilation therapy –

**Recommended reading**

1) Clinical pharmacology: textbook / red.authors: edited by O. Y. Babak, A. N. Bilovol, I. S. Chekman. - K .: CSI "Medicine", 2012. - 726 p. (p. 354-432)

- 2) Clinical pharmacology: a national guide / under the editorship of Yu. b. Belousov, V. Kukes, V. K. Lepakhin, V. I. Petrov. - M.: GEOTAR-Media, 2012. - 976 p. (P. 748-782)
- 3) Clinical pharmacology by Goodman and Gilman. Moscow. - Ed.home "Practice". - 2006. - second book. - p. 502-566
- 4) Bertram G. Katzung. Basic and clinical pharmacology: in 2 vol, Volume 2; published by "Dialect", 2008. - 784 p. (p. 69-103)

The task for independent work topics:

**Task 1.**

The Ambroxol possible:

- A. just before bedtime
- B. For 15 minutes before bedtime
- C. For 30 minutes before bedtime
- D. 1:00-sleep
- E. 2:00-sleep

**Task 2.**

Simultaneous administration of salbutamol and propranolol is happening:

- A. Increase neurotoxicity
- B. Increase hepatotoxicity
- C. Increase nephrotoxicity
- D. Reduction in pharmacological effect
- E. Improving bronchodilatation

**Task 3.**

Bronchodilation when using salmeterol continues:

- A. To 2:00
- B. 4:00
- C. To 10:00
- D. By 8:00
- E. To 12:00

**Task 4.**

The mechanism of action of montelukast is associated with:

- A. Stimulation of alpha - adrenergic receptors
- B. Stimulation of beta - adrenergic receptors
- C. Blockade of alpha and beta adrenergic receptors
- D. Blockade of cholinergic receptors
- E. Blockade of leukotriene receptors

**Task 5.**

When prescribing prednisone to the patient with diabetes mellitus type 2 **increases the risk:**

- A. Hypoglycemia
- B. hyperglycemia
- C. Gipokaliemii
- D. Hypercalcemia

E. Hyponatremia

**Task 6.**

Osteoporosis with long-term use of prednisolone is associated with:

- A. Increased output of potassium
- B. Increased output of magnesium
- C. Increased output of calcium
- D. Delayed excretion of potassium
- E. Delay the excretion of calcium

**Task 7.**

Name the drug that preferentially blocks COX - 2:

- A. Diclofenac sodium
- B. Acetaminaphen
- C. Metamizole sodium
- D. Meloxicam
- E. Acetylsalicylic acid

**Task 8.**

If a paracetamol overdose antidote are:

- A. Unithiol
- B. calcium Tetatsin
- C. Acetylcysteine
- D. Sodium thiosulfate
- E. Deferoxamine

**Task 9.**

Fill in the table

Drugs	glucocorticoid activity	mineralocorticoid activity	duration of action
Cortisone	1	1	
Prednisolone	4	0,3	
Triamcinolone	5	0	
Betamethasone	25	0	
Dexamethasone	30	0	

**Task 10**

Fill in the table

Mucaactive medicines

Mechanism of action	Drug	
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Direct mucolytic		
Direct monohidrat		
Indirect mucoregulator		
Surface-active and Rasizade		
The bronchodilator		
Drugs that stimulate reflex gastroplasty		
Drugs that modify the activity of the bronchial glands		

### Task 11

Fill in the table

Sekretomotornym medicines

Group	Drug
Sympathomimetics and methylxanthines	
Essential oils	
Drugs that stimulate reflex gastroplasty	
Benzylamine	

### Task 12

Fill in the table of classification of NSAIDs according to the severity and anti-inflammatory activity

NSAID with pronounced anti-	NSAIDs with weak anti-
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inflammatory activity	inflammatory activity
Indomethacin	Mefenamic acid

**Task 13**

Complete the table of main events control long-term use of NSAIDs

System/organ	control measures
Gastrointestinal tract	Every 1-3 months fecal occult blood test, periodically conduct a gastroduodenoscopy
The Kidney	
The liver	
Hematopoiesis	

**Task 14**

Fill in the table the influence of NSAID on the effect of other drugs

The drug	Action	Recommendations
Indirect anticoagulants	Inhibition of metabolism in the liver, increased anticoagulant effect	Strict control of coagulation; avoid joint appointment with NSAIDs
Antibiotics-aminoglycosides		
Diuretics		
Hypoglycemic drugs ((derivatives Sulfonylureas)		

**Task 12**

Fill in the table

Bronchodilators

		Group	
I. Stimulants bronchiectasis	A. Adrenergic means	Selective stimulants of the B2-adrenoceptor	
		Selective stimulators B1, B2-adreno re ceptor	
		Stimulants b, B1, B2-adrenoceptor	
	B. Methylxanthines		
II. Inhibitors bronchospasm			
III. Combined bronchodilators			

## Topic 6. Clinico-pharmacological characteristics of antibacterial drugs and antibiotics.

Objective: to Learn the principles of clinico-pharmaceutical approach to the choice of antibacterial drugs, monitoring efficacy and safety .

### The student should know:

- the semiotics of infectious and inflammatory diseases and their complications;
- etiology, pathogenesis and diagnostic criteria of these diseases;
- basic principles of rational antibiotic therapy;
- clinical pharmacology of antibacterial drugs and antibiotics, the mechanism of their action, principles of selection, complications of therapy, age-related features of the application, interaction with other drugs.

### The student should be able to:

- **make a selection of the** most active and least toxic medicines on the basis of knowledge of pharmacokinetics, pharmacodynamics, interactions with other drugs;
- to select the optimal dosage form, dose, method of administration of the drug taking into account the severity and localization of the infectious process;
- the duration of the course of antimicrobial therapy and monitor the effectiveness and security;
- to prevent adverse reactions;
- in case you need to replace one MS to another.

**Basic concepts topics:**

Rational antibiotic therapy - it ...

Antibiotics are ...

Bactericidal activity is ...

Bacteriostatic action is ...

The sensitivity of the pathogen is ...

Resistance of the pathogen is ...

**Recommended reading**

**Tasks for independent work topics:**

**Task 1**

Fill in the table the Main properties of specific groups of antimicrobial drugs and antibiotics .

The group of antibiotics and antimicrobial drugs	Drugs (1-2)	Mechanism of action	Antimicrobial spectrum	Side effects
Sulfanilamide				
Nitrofurans				
Fluoroquinolones				

Penicillins			
Cephalosporins			
Carbapenem			
Glycopeptides			
Aminoglycosides			
Macrolides			
Tetracyclines			
Amphenicol			

### Task 2

Intern doctor appointed the patient with enterocolitis at the same time receiving a fluoroquinolone (ciprofloxacin) and enveloping means (sucralfate). Head of the Department considers this an error. This is because the combination of these medicines:

- A. Increases toxicity of fluoroquinolones
- B. Decreases the absorption of fluoroquinolones
- With Fluoroquinolones increase their Allergy symptoms
- D. Increases the risk of renal failure
- E Increases the ability of sucralfate cause constipation

### Task 3

To prevent cristallurii in the appointment of sulfonamides, it is recommended to appoint:

- A. Alkaline mineral water
- V. Acidic mineral water
- C. Diuretics
- D. Trace Elements

E. Acetylsalicylic acid

#### **Task 4**

**Frequent complications** of therapy with penicillins:

And Acute glomerulonephritis

In Allergic reactions

With Cardiac arrhythmias

D Erosive gastritis

E hypertension

#### **Task 5**

**The bactericidal effect** of fluoroquinolones is due to:

A. Effect on the tricarboxylic acid cycle

V. Antagonism with para-aminobenzoic acid

C. Inhibition of the respiratory chain of microorganisms

D. inhibition of the enzyme DNA gyrase

E. the Violation of the synthesis of the cell wall of the microorganism.

#### **Task 6**

Which of the following antibacterial drugs can cause nephro - and **ototoxicity**?

A. Penicillin

V. Chloramphenicol

C. Gentamicin

D. Ampicillin

E. Spiramycin

#### **Task 7**

Which antibiotics and antibacterial drugs is hepatotoxic:

A. Chloramphenicol

V. Biseptol

C. Gentamicin

D. Tetracycline

E. Ampicillin

#### **Task 8**

**The appointment** which of the following antibiotics require dose adjustment taking into account the function of the glomerular apparatus of kidneys (creatinine clearance):

A. Penicillins

V. Cephalosporin

C. Macrolides

D. Aminoglycosides

E. Chloramphenicol

#### **Task 9.**

What group of antibiotics is hepatotoxic:

And Penicillin

In Tetracyclines

With Macrolides

D Cephalosporins

**Task 10** Complete the table Age peculiarities of the use of antibacterial drugs and antibiotics

The group's antibiotics and antimicrobial drugs	Drugs	Age limits for their use	What is the limit
Sulfonamides			
Nitrofurans			
Fluoroquinolones			
Penicillins			
Cephalosporins			
Carbapenem			
Glycopeptides			
Aminoglycosides			
Macrolides			
Tetracyclines			



Amphekami			
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