

Ministry of Health of Ukraine
**DANYLO HALYTSKYI LVIV NATIONAL MEDICAL
UNIVERSITY**

Endocrinology Department

**Methodical guidelines for practical classes on discipline of
CLINICAL PHARMACOLOGY
For 5th year students of medical faculty
(Magister level)**

Lviv 2019

Methodological guidelines are compiled in accordance with the educational and qualification characteristics and educational professional programs of training specialists, experimental curriculum, developed on the principles of credit transfer system and approved At a meeting of the cyclic methodical Commission on therapeutic disciplines of Danylo Halytskyi Lviv National Medical University (Protocol No. 5 from 04.04.2019).

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LIST OF CLASS STUDIES OF CLINICAL PHARMACOLOGY
5th year of study, medical faculty

№	Theme	Hours
1.	Introduction in clinical pharmacology. Main principles of clinical pharmacology: pharmacokinetics, pharmacodynamics. Clinical pharmacology of hypolipidemic drugs. Clinical pharmacology of antianginal and antiischemic drugs.	4
2.	Clinical pharmacology of antihypertensive medications	4
3.	Drugs that affect the respiratory system. Anti-inflammatory drugs	4
4.	Clinical pharmacology of antimicrobial drugs.	4
5.	Clinical pharmacology of hormones. Clinical pharmacology of agents that effect on intestinal motility and secretion, on pancreatic diseases and liver diseases. Credit.	4
	All	20

LIST FOR OUSIDE READING
CLINICAL PHARMACOLOGY
5th year of study, medical faculty

№	Theme	Hours
	Preparing for class studies	7
1.	<ul style="list-style-type: none"> • Clinical pharmacology of anticoagulants and coagulants • Clinical pharmacology of antiarrhythmic drugs. • Clinical pharmacology of antiallergic drugs. 	1 1 1
		10

Each practical lesson is organized in a certain way (table 1)

Table 1

Plan and structure of the lesson:

#	Main stages of the lesson, their functions and content	Methods of study and assessment	Methodological materials	Timing
I The preparatory stage				
1	Organizing the class.			1-3 min.
2	Defining educational goals. Assessment of the initial knowledge level (relevant to the topic):	1.Initial theoretical rapid survey	Tables, flow-charts	10%
3	The subject and tasks of clinical pharmacology. The main principles of pharmacokinetics and pharmacodynamics. Clinical pharmacological characteristics of medications, which influence lipid metabolism. Clinical pharmacology of antiarrhythmic, antianginal, antiischemic and inotropic drugs. Clinical pharmacological characteristics of antihypertensive drugs. Clinical pharmacological characteristics of drugs influencing bronchial patency. Antiinflammatory drugs. Clinical pharmacological characteristics of hormone drugs. Clinical pharmacological characteristics of antibacterial drugs. Clinical pharmacological characteristics of drugs influencing digestive canal functions. Clinical pharmacological characteristics of drugs influencing hepatobiliary system and pancreas.	2.Level 1 testing	Oral questions, Level 1 testing	
II The main stage				

	<ol style="list-style-type: none"> 1. To learn the modern classification of medications relevant to the topic 2. To learn the clinical pharmacological characteristics of the relevant drugs 3. To study the modern usage principles of the outlined medications. 4. To know how according to the clinical and laboratory data and additional methods of examination to assess the patient's condition and to assign the adequate therapy, as well as to evaluate the therapy efficiency criteria relevant to the topic. 6. To learn the rules of writing prescriptions for medications for the treatment of the illnesses relevant to the topic. 	<p>Practical training for solving typical and non typical professional tasks.</p>	<ol style="list-style-type: none"> 1. Medical histories 2. Tables, slides, instructions and prospectuses for medications 	60%
III The final stage				
	<ol style="list-style-type: none"> 1. Assesment and correction of the professional skills and knowledge level 2. Summing up the class 3. Home task: the topic of the next lesson 	<p>Individual control of the practical skills and their results</p>	<p>Phonendoscopes, tonometers, medical histories</p>	<p>30%</p> <p>2-3min. 1-3min.</p>

Theme #1. Introduction in clinical pharmacology. Main principles of clinical pharmacology: pharmacokinetics, pharmacodynamics.

Clinical pharmacology of hypolipidemic drugs.

Clinical pharmacology of antianginal and antiischemic drugs.

Subject: clinical pharmacology

Year of study: 5

Faculty: medical

Number of hours: 4

1. Topicality. Clinical pharmacology is the science of drugs and their clinical use. It is based on the science of pharmacology and focuses on the application of pharmacological principles and methods in the real world. Clinical pharmacology fills the gap between laboratory science and medical practice. Its main objective is to enhance the safety of use, maximise the drug efficiency and minimise the side effects or toxic effects.

The main branches of clinical pharmacology are:

- Pharmacokinetics – studies what happens to the drug in the body, namely: absorption, distribution, metabolism, excretion.
- Pharmacodynamics – studies what effect drugs have on the body and how it happens. This includes not just the cellular and molecular aspects, but also the relevant clinical laboratory or instrumental parameters.
- Correct prescribing – includes using the right medication, at the right dose, with the right way and frequency of administration and stopping the drug use at the right time.
- Adverse drug effects – studies the drugs effects, which are not connected with the therapeutic effect, which can be unwanted or harmful.
- Toxicology of drugs – is the study of symptoms, mechanisms, detection and treatment of poisoning with the help of medications.
- Drug interactions – the increase or decrease of drug action, or emergence of a new nontypical effect of a medication, caused by the simultaneous administration of another drug.
- Drug implementation – in case of clinical pharmacology it means mainly clinical trial of drugs with the aim of studying their safety and efficiency, having enough information about the quality of the new drug and proved preclinical safety.

Starting from the mid 1950s the spread of circulatory system diseases in most countries worldwide became an epidemic. They are the most common cause in the death rate of Ukrainian citizens (around 62,5%), which is far more common than death caused by malignant tumors. The rate of circulatory system diseases occurrence is rising annually. Economic losses due to temporal disability and premature death caused by the cardiovascular pathology reach more than several billion hryvnias yearly. Moreover, extensive costs are given by the government for treatment and rehabilitation of this category of patients.

Atherosclerosis is the essence of ischemic heart disease and its effective treatment, especially the primary and the secondary prevention, are among the central priorities of the modern pharmacotherapy and clinical pharmacology. One of the main causes of atherosclerosis development are dyslipidemias, thus their correction with the lipid lowering drugs is an important clinical task for the doctor. Furthermore, the wide use of drugs for lipid metabolism correction and their long lasting (often lifelong) administration today calls on the doctors of any specialization to be well familiar with this group of drugs.

2. Educational aim. To acquaint the students with the content, subject matter and the main parts of clinical pharmacology, as well as clinical pharmacological characteristics and principles of choosing the medications that influence lipid metabolism.

3. Pedagogical aim. To teach students to understand correctly the necessity of the primary and secondary prevention of ischemic heart disease and of timely dyslipidemias treatment. To draw the doctor's-to-be attention to the economic losses at the state and world scale caused by IHD related disabilities and death, and to the real effectiveness of the modern lipid lowering drugs. To teach the rational use of the drugs influencing lipid metabolism. To focus the student's attention at the dosage, intake and prescription rules. To highlight the importance of the Ukrainian scientist's contribution into the development and introduction of the new medications.

4. Interdisciplinary integration:

Subjects	Knowledge	Skills
1. Preceding : normal anatomy	cardiovascular system structure	
normal physiology	cardiovascular system physiology	
pathological physiology	etiology and pathogenesis of cardiovascular system diseases	
pathological anatomy	morphological changes during cardiovascular system diseases	
pharmacology	classification, pharmacodynamics and pharmacokinetics of lipid lowering drugs	to write the relevant prescriptions
2. Following: internal diseases	main clinical manifestations of ischemic heart disease: stenocardia, myocardial infarction, arterial hypertension, collapse and other emergency states	to perform clinical examinations of the patients, to prescribe the relevant additional examinations.
Interdisciplinary integration: clinical pharmacology of drugs used for cardiovascular failure treatment	effect peculiarities of statines, fibrates, niacins, bile acid sequestrants, omega-3 polyunsaturated fatty acids	to write the relevant prescriptions

5. Theme content:

- Definition of clinical pharmacology as a subject.
- The main parts of clinical pharmacology.
- Pharmacodynamics: definition, content, main principles, practical value.
- Pharmacokinetics: definition, content, main principles, practical value.
- Ways of administration of the medications into the body.
- Distribution, biotransformation, accumulation and excretion of medications.
- Mechanism of action of medications.

- The notion of side effects and toxic effects of medications.
- Drugs interaction, polypragmasia.
- The notion of clinical research and its stages. The levels of evidence in medicine. The importance in the daily practice of doctors.
- Clinical classification of dyslipidemias, the notion of the optimum level of lipids and lipoproteins in blood.
- General clinical pharmacological characteristics of lipid lowering drugs.
- Classification of lipid lowering drugs.
- Clinical pharmacological characteristics of inhibitors of 3-hydroxy-3-methylglutaryl-coenzyme α -reductase (HMG-CoA-reductase) – statines.
- Clinical pharmacological characteristics of bile acid sequestrants.
- Clinical pharmacological characteristics of nicotinic acid as a lipid lowering drug.
- Clinical pharmacological characteristics of Fibric acid derivatives (fibrates).
- Clinical pharmacological characteristics of omega-3 polyunsaturated fatty acids.
- Goal levels of lipidogram parameters during the treatment with lipid lowering drugs.
- Principles of drugs used for dyslipidemia treatment choice.

6. Class plan and structure (see introduction).

7. Methodological materials for the class.

7.1 *Materials for the preparatory stage of class – assessment questions:*

- Define the terms:
 - ✓ Clinical pharmacology
 - ✓ Pharmacokinetics
 - ✓ Pharmacodynamics
 - ✓ Side effects of drugs
 - ✓ Toxic effects of drugs
 - ✓ Drugs interaction
 - ✓ Therapeutic effect.
- What is pharmacokinetics? What and why does it study?
- What is pharmacodynamics? What and why does it study?
- Why is clinical research conducted? What is its aim and how to assess its results?
- Modern classification of lipid lowering drugs.
- Name the possible side effects of statines.
- What changes in lipid profile may occur as a result of using statines?
- What are the modern approaches to statines dosage?
- Name the main side effects and contraindications for use of nicotinic acid.
- Which conditions complicate the wide use of nicotinic acid for treatment and primary or secondary prevention of IHD?
- Name the indications for use of fibrates.
- Side effects and contraindications for use of fibrates.
- Name the factors and peculiarities of fibrates, which limit their wide use in pharmacotherapy.
- Indications for use of bile acid sequestrants.
- Name the main groups and dosage of lipid lowering drugs, which are used in complex treatment of patients with 2 type diabetes.
- What is the role of omega-3 polyunsaturated fatty acids for modern treatment and primary or secondary prevention of IHD?

7.2. Methodological materials for the main stage of the class:

To analyze basing on the real clinical examples the indications and contraindications for use of drugs influencing lipid metabolism, their compatibility and possible side effects as well as the possibilities of use in various clinical situations.

7.3. Materials for assessment at the final stage of the class – situational tasks:

1. Mechanism of drug action is explored by:

- A) pharmacokinetics
- B) pharmacogenetics
- C) pharmacoeconomics
- D) pharmacodynamics
- E) pharmacognosy

2. Therapeutic window is the dosages of a medication (therapeutic serum concentrations) between:

- A) TD_{50} curve and ED_{50}
- B) ED_{50} and $T_{1/2}$
- C) the amount that gives an effect (effective dose) and the amount that gives more adverse effects than desired effects
- D) the amount that gives minimal adverse effects and the amount that gives more adverse effects
- E) the amount that gives minimal effect and the amount that gives full therapeutic effect

3. Therapeutic index is the ratio of:

- A) LD_{50} over the ED_{50}
- B) ED_{50} over the LD_{50}
- C) bioavailability over drug dose
- D) apparent volume of distribution over elimination rate constant
- E) total clearance over nonrenal (extrarenal) clearance

4. Therapeutic drug monitoring means:

- A) trough concentration under steady-state condition
- B) measurement of medication concentrations in blood
- C) the process of chemical alteration of drugs in the body
- D) amount of untoward effects following treatment
- E) development of expected desired effects

5. Therapeutic dose is not related to:

- A) patient's age
- B) rout of administration
- C) desired therapeutic effect
- D) organs of elimination
- E) treatment costs

6. Mean therapeutic doses mentioned in manuals is obtained by the following way:

- A) calculation of pharmacokinetic features
- B) clinical investigations
- C) experimental investigations
- D) experimental data adopted for human body

E) calculation of pharmacodynamic features

8. THE LIST OF DRUGS TO BE STUDIED FOR THE FINAL TEST

Name in English	Name in Latin	Drug forms
Atorvastatin	Atorvastatinum	tab. 10 mg
Nicotinic acid	Acidum Nicotinicum	flac. 1%; tab. 50 mg
Rosuvastatin	Rozuvastatinum	tab. 10, 20 mg
Simvastatin	Simvastatinum	tab. 10, 20 mg
Fenofibrate	Fenofibratum	cap. 0,1 g

9. RECOMMENDED LITERATURE (see at the end of methodological instructions).

Clinical pharmacology of antianginal and antiischemic drugs.

1. Topicality. Treatment and prevention of cardiovascular diseases (CVD) is one of the main tasks of the medical practice. Often help is needed for the patients with ischemic heart disease (IHD) and arrhythmia. Acute myocardial infarction is a serious IHD complication, which can lead to death or disability. The heart rhythm disorders cause deterioration of geodynamics and development of heart failure. Apart from knowing the etiological and pathogenic peculiarities of the illness, as well as the accompanying conditions, their seriousness and other points, it is also necessary to possess the deep understanding of medications action for their proper use. The proper medical practice requires comprehensive awareness of indications and contraindications of drugs, which is based on the knowledge of their pharmacodynamics and pharmacokinetics. In the everyday work a doctor should not only know how to diagnose various types of IHD and arrhythmia, but also to provide adequate and qualified medical treatment.

2. Educational aim. To acquaint the students with the clinical pharmacological characteristics of antianginal and antiarrhythmic drugs and the basics of their rational use.

3. Pedagogical aim. To draw the doctor's-to-be attention to the necessity of deep study of the main cardiovascular diseases taking into consideration the importance of antianginal and antiarrhythmic drugs in their treatment.

4. Interdisciplinary integration:

Subject	Knowledge	Skills
1. Preceding: normal anatomy	Cardiovascular system structure	
normal physiology	cardiovascular system physiology	
pathological physiology	etiology and pathogenesis of cardiovascular system diseases	
pathological anatomy	morphological changes during cardiovascular system diseases, especially during arrhythmias	

pharmacology	drugs for cardiovascular diseases treatment, namely drugs for ischemic heart disease and arrhythmia treatment. Classification of antianginal and antiarrhythmic drugs	to write prescriptions for the relevant drugs
2. Following: internal diseases	main clinical manifestations of heart disorders	to perform clinical examinations of the patients, to prescribe the relevant additional examinations.
general surgery	main clinical manifestations of heart disorders	to perform clinical examinations of the patients, to prescribe the relevant additional examinations.
3. Interdisciplinary integration: clinical pharmacology of antianginal and antiarrhythmic drugs for treatment of cardiovascular pathology.		
Organic nitrates, β -adreno blockers, calcium antagonists. Membrane stabilizing potassium channels blockers.	peculiarities of action of antianginal and antiarrhythmic drugs for treatment of cardiovascular pathology, their compatibility and side effects.	to write prescriptions for the relevant drugs

5. Theme content:

- Modern classification of antianginal and antiarrhythmic drugs.
- Clinical symptoms and diagnostic criteria of stenocardia and myocardial infarction.
- Types of arrhythmia and conduction disorders, their differential diagnostic features.
- Clinical pharmacological characteristics of antianginal drugs
- Clinical pharmacological characteristics of membrane stabilizing drugs
- Clinical pharmacological characteristics of drugs used for the treatment of stable and unstable forms of stenocardia.
- Modern pharmacotherapy of acute myocardial infarction.
- Clinical pharmacological characteristics of antiarrhythmic drugs with the membrane stabilizing and local anesthesia effect.
- Clinical pharmacological characteristics of antiarrhythmic effect of class III drugs.
- Antiarrhythmic effect mechanism of β -adreno blockers and slow potassium channels blockers.
- Treatment of arrhythmias with potassium ions containing drugs.
- The main contraindications for use of antianginal and antiarrhythmic drugs.

6. Class plan and structure (see introduction).

7. Methodological materials for the class.

7.1 *Materials for the preparatory stage of class – assessment questions:*

- Modern classification of antianginal and antiarrhythmic drugs.
- Name the mechanism of action of antianginal and membrane stabilizing drugs.
- Which antiarrhythmic properties do β -adreno blockers possess?
- What is the action mechanism and pharmacokinetics of antiarrhythmic drugs of class III?
- Name the main pharmacodynamic effects of slow potassium channels blockers antiarrhythmic action.
- Name the main clinical pharmacological approaches to the treatment of unstable stenocardia.
- Name the main clinical pharmacological approaches to the first aid and principles of myocardial infarction treatment.
- Name the main clinical pharmacological approaches to arrhythmia treatment.
- Which are the side effects of antiarrhythmic drugs use?
- Indications and contraindications for use of antiarrhythmic drugs.

7.2. *Methodological materials for the main stage of the class:*

To analyze basing on the real clinical examples the indications and contraindications for use of antiarrhythmic drugs, their compatibility and possible side effects.

7.3. *Materials for assessment at the final stage of the class – situational tasks:*

1. Therapeutic doses of cardiac glycosides cause the following:

- A) negative chronotropic effect
- B) negative bathmotropic action
- C) negative inotropic effect
- D) positive dromotropic action
- E) negative diuretic effect

2. Negative chronotropic effect of cardiac glycosides ...

- A) causes increased oxygen consumption of myocardium
- B) causes incomplete relaxation of myocardium during diastole
- C) is most evident in digitalis drugs
- D) is determined by decreased effect of nervus vagus
- E) causes incomplete recovery of energy recourses of myocardium

3. Cardiac glycosides are able to:

- A) decrease daily diuresis
- B) improve cardiac blood supply
- C) decrease cardiac contractility and minute volume
- D) precipitate hypertension in lesser circuit
- E) xanthopsia

4. Choose the optimal rout of strophanthine administration:

- A) intramuscular
- B) rectal
- C) oral
- D) intravenous
- E) subcutaneous

5. Choose the optimal route of digitoxin administration:

- A) intramuscular
- B) subcutaneous
- C) inhalation
- D) intravenous
- E) oral

6. Negative chronotropic action of cardiac glycosides means:

- A) improvement of atrioventricular and sinoauricular conductivity
- B) inhibition of atrial and ventricular activation
- C) reduction of P-Q interval on ECG
- D) reduction of S-T interval on ECG
- E) reduction of heart rate

8. THE LIST OF DRUGS TO BE STUDIED FOR THE FINAL TEST

Name in English	Name in Latin	Drug forms
Isosorbide mononitrate	Isosorbidum mononitratum	cap., tab. 40; 60 mg
Isosorbide dinitrate	Isosorbidum dinitratum	tab. 20, 40 mg
Nitroglycerin	Nitroglycerinum	tab. 5 mg; flac. 1% –5 ml; ointment 1%
Molsidomine	Molsidominum	tab. 2 mg
Amlodipine	Amlodipinum	tab. 5; 10 mg
Verapamil	Verapamilum	tab. 40; 80 mg
Diltiazem	Diltiazem	tab. 30; 60 mg
Nifedipine	Nifedipinum	cap. 10; 20 mg
Ethacyzin	Aethacizinum	tab. 25; 50 mg
Amiodarone	Amiodaronum	tab. 200 mg
Lidocain	Lidocainum	amp. 0.5; 1; 2; 5; 10 %
Propafenone hydrochloride	Propafenonum hydrochloridum	tab. 150 mg
Sotalol	Sotalol	tab. 80; 160 mg
Procainamide	Procainamidum	tab. 0,25 g, 10 % - 5 ml
Digoxin	Digoxinum	tab. 0.125; 0,25 mg, amp. 0,025% - 1 ml
Dobutamine	Dobutaminum	flac. 5 %- 55 ml; flac. 0,1; 0,25
Dopamine	Dopaminum hydrochloridum	amp. 50; 200 mg №5
Strophanthin	Strophanthinum	amp. 0.025 % - 1 ml
Atenolol	Atenololum	tabl. 0,1; 0,05 g

Bisoprolol	Bisoprololum	tabl. 2.5; 5; 10 g
Doxazosin	Doxazosinum	tabl. 2; 4 mg
Carvedilol	Carvedilolum	tabl. 12,5; 25; 50 mg
Metoprolol	Metoprololum	tabl. 50 mg
Nebivolol	Nebivololum	tabl. 5 mg

9. RECOMMENDED LITERATURE (see at the end of methodological instructions).

Theme #2. Clinical pharmacology of antihypertensive medications.

Subject: clinical pharmacology

Year of study: 5

Faculty: medical

Number of hours: 4

1. Topicality. Cardiovascular diseases are a serious medical problem and the main cause of death in the most economically developed countries. They occur more often among the large city residents than among the people living in the rural area. According to WHO, arterial hypertension is found in 15-20% of adult citizens, and 30-40% among the senior citizens. More than one third of the working-age population of Ukraine suffers from arterial hypertension and it is one of the main causes of developing atherosclerosis and its clinical manifestations: ischemic heart disease, myocardial infarction, cerebrovascular pathology, brain strokes. At the same time the combination of arterial hypertension with ischemic heart disease, which happens in more than 60% of patients, increases highly the danger of developing myocardial infarction, stroke and heart failure, which in its turn endangers the life of the patients. The rational antihypertensive therapy largely improves the prognosis for the patients with arterial hypertension. The correct use of the modern antihypertensive drugs decreases the occurrence of myocardial infarction, brain stroke, diabetes, nephropathy and heart failure.

The modern medicine possesses a large arsenal of antihypertensive drugs, which has naturally complicated the choice of the most adequate ones for patients. The emergence of new antihypertensive drugs not only complicates the choice of the drug according to the clinical pathogenic variant and stage of the hypertonic disease, but also makes it harder to evaluate the efficiency of prescribing hypotensive drugs.

2. Educational aim. To acquaint the students with the clinical pharmacological characteristics and principles of choice of drugs influencing vascular tone.

3. Pedagogical aim. To teach the students to be ready for the adequate medical action in case of chronic process exacerbation or emergency in outpatient and inpatient care units. To draw the doctor's-to-be attention to the possibility of patients developing the symptoms of cardiovascular failure, hypertonic crisis, coma etc., and to teach them the rational use of drugs influencing vascular tone. To focus their attention on the dosage, rule of use and writing the correct prescriptions. To highlight the importance of the Ukrainian scientist's contribution into the development and introduction of the new medications.

4. Interdisciplinary integration:

Subjects	Knowledge	Skills
1.Preceding : normal anatomy	cardiovascular system structure	
normal physiology	cardiovascular system physiology	
pathological physiology	etiology and pathogenesis of cardiovascular system diseases	

pathological anatomy	morphological changes during cardiovascular system diseases	
pharmacology	classification, pharmacodynamics and pharmacokinetics of vasodilators and vasoconstrictors	to write the relevant prescriptions
2. Following: internal diseases	main clinical manifestations of ischemic heart disease: stenocardia, myocardial infarction, arterial hypertension, collapse and other emergency states	to perform clinical examinations of the patients, to prescribe the relevant additional examinations.
Interdisciplinary integration: clinical pharmacology of drugs used for cardiovascular failure treatment	effect peculiarities of cardiac glycosides and hypotensive drugs.	writing the relevant prescriptions

5. Theme content:

- Arterial hypertension classification.
- Modern classification of drugs lowering vascular tone.
- Clinical pharmacological characteristics of centrally-acting drugs: central α_2 -adrenoreceptors agonists.
- Clinical pharmacological characteristics of centrally-acting drugs: imidazoline-I1-receptor agonists.
- Clinical pharmacological characteristics of ganglionic blocker.
- Clinical pharmacological characteristics of sympatholytics.
- Clinical pharmacological characteristics of α -adreno blockers.
- Clinical pharmacological characteristics of β -adreno blockers.
- Clinical pharmacological characteristics of cardiononselective β -adrenoreceptor blockers without own sympathomymetic activity.
- Clinical pharmacological characteristics of cardiononselective β -adrenoreceptor blockers with own sympathomymetic activity.
- Clinical pharmacological characteristics of cardiononselective β_1 -adreno blockers without intrinsic sympathomymetic activity.
- Clinical pharmacological characteristics of cardiononselective β_1 -adreno blockers with intrinsic sympathomymetic activity.
- Clinical pharmacological characteristics of α - and β -adrenoreceptors blockers (α_1 -, β_1 and β_2 -adrenolytics) of mixed action.
- Clinical pharmacological characteristics of calcium antagonists (blockers of slow calcium channels).

- Clinical pharmacological characteristics of angiotensin converting enzyme inhibitors (ACEi).
- Clinical pharmacological characteristics of angiotensin II receptor blockers of the first type.
- Clinical pharmacological characteristics of arterial vasodilators.
- Clinical pharmacological characteristics of drugs with mostly myotropic action.
- The principles of choice of medications used for treatment of arterial hypertension.

6. Class plan and structure (see introduction).

7. Methodological materials for the class.

7.1 *Materials for the preparatory stage of class – assessment questions:*

- Name the main pharmacokinetic and pharmacodynamic effects of action of central α 2-adrenoreceptors and central imidazoline-I1-receptor agonists.
- Which side effects may occur during the use of α 2-adrenoreceptors agonists?
- Which side effects may occur during the use of imidazoline-I1-receptor agonists?
- Name the possible side effects and contraindications for use of ganglionic blockers.
- Name the possible side effects of sympatholytics (guanitidine and reserpine).
- Which extravascular effects are typical of α -adreno blockers (influence on metabolism, rheology, urodynamics and sexual function of men)?
- Modern classification of β -adreno blockers according to the selectivity of action.
- Name the main side effects and contraindications for use of β -adreno blockers.
- What groups of β -adreno blockers are defined?
- Name the indications for use of arterial vasodilators - minoxidine and hydralazine.
- Side effects and contraindications for use of angiotensin converting enzyme inhibitors (ACE-i).
- Indications for use of angiotensin II receptor antagonists.
- Name the main groups and dosage of drugs used in case of hypertonic crisis.

7.2. *Methodological materials for the main stage of the class:*

To analyze basing on the real clinical examples the indications and contraindications for use of drugs influencing vascular tone, their compatibility and possible side effects, as well as peculiarities of use in case of emergency.

7.3. *Materials for assessment at the final stage of the class – situational tasks:*

1. Angiotensin-converting-enzyme inhibitors (ACE inhibitors) are able to decrease:

- A) angiotensin I formation
- B) angiotensin II formation
- C) angiotensin III formation
- D) angiotensin IV formation
- E) bradykinin formation

2. Choose effect which is typical to ACE inhibitors.

- A) increase in arterial vessel tone
- B) increase in venomotor tone
- C) decline in diuresis
- D) decrease in cardiac hypertrophy
- E) decrease in vascular wall hypertrophy

3. One of the following ACE inhibitors may be prescribed intravenously.

- A) spirapril
- B) moexipril
- C) fosinopril
- D) perindopril
- E) lisinopril

4. Concomitant use with ACE inhibitors is contraindicated for:

- A) β -adrenolytics
- B) Ca channel blockers
- C) Potassium-containing medicines
- D) thiazide diuretics
- E) prazosin

5. One of the following signs is not typical to side effects of ACE inhibitors.

- A) allergic reactions
- B) micro- and macropsia
- C) cough
- D) hypotension
- E) hyperkalemia

6. ACE inhibitors should not be used in one of the following conditions.

- A) diabetic nephropathy
- B) hypertension
- C) congestive heart failure, systolic dysfunction (treatment aim)
- D) congestive heart failure, systolic dysfunction (aim of prophylaxis)
- E) postinfarction cardiosclerosis

8. THE LIST OF DRUGS TO BE STUDIED FOR THE FINAL TEST

Name in English	Name in Latin	Drug forms
Hydrochlorothiazide	Hydrochlorothiazidum	tab. 25 mg; 100 mg
Indapamide	Indapamidum	tab. 1,5; 2,5 mg
Spirolactone	Spirolactonum	tab. 25; 50; 100 mg
Torasemide	Torasemidum	amp. 10 mg, tab. 10 mg
Furosemide	Furosemidum	tab. 40 mg, amp. 20 mg
Ivabradine	Ivabradinum	tab. 5; 7,5 mg
Enalapril	Enalaprilum	tab. 5; 10; 20; 40 mg
Captopril	Captoprilum	tab. 12,5; 25; 50; 100 mg
Lisinopril	Lisinoprilum	tab. 10; 40 mg
Perindopril	Perindoprilum	tab. 4; 8 mg
Ramipril	Ramiprilum	tab. 12,5; 25; 5; 10 mg
Fosinopril	Fosinoprilum	tab. 10; 40 mg
Valsartan	Valsartanum	tab. 80 mg, 160 mg
Irbesartan	Irbesartanum	tab. 75; 150 mg

Candesartan	Candesartanum	tab. 4.8; 16 mg
Losartan	Losartanum	tab. 10; 40 mg
Telmisartan	Telmisartanum	tab. 80 mg
Methyldopa	Alpha methyldopa	tab. 250 mg
Clonidine	Clonidinum	tab. 0.075; 0,15 mg; amp. 0,01% -1 ml

9. RECOMMENDED LITERATURE (see at the end of methodological instructions).

Theme #3. Drugs that affect the respiratory system. Anti-inflammatory drugs

Subject: clinical pharmacology

Year of study: 5

Faculty: medical

Number of hours: 4

1. Topicality. In their everyday practice doctors often see patients suffering from acute and chronic broncho-obstructive diseases. The number of such patients is growing every year. The main danger in this case lies in the probability of developing asthma status. The study of pharmacotherapeutic action of drugs, which improve respiratory drainage patency, enables doctors to provide qualified medical help.

Inflammation is one of the pathological conditions, which is typical of most diseases. Antiinflammatory drugs are widely used with different somatic pathologies, which are characterized by inflammatory process, including bronchopulmonary disease.

2. Educational aim. To acquaint the students with the clinical pharmacological characteristics and principles of choice of drugs influencing bronchial patency, as well as of steroidal and nonsteroidal antiinflammatory drugs; basic long-acting immune modifying drugs.

3. Pedagogical aim. To draw the doctor's-to-be attention to the possibility of patients developing the symptoms of acute respiratory failure, which is accompanied by acute bronchial obstruction, to teach the rational use of bronchodilators and antiinflammatory drugs taking into consideration the dosage, possible side effects and prescription rules. To define the role of Ukrainian scientists in this sphere.

4. Interdisciplinary integration:

Subjects	Knowledge	Bmiru Skills
<p>1. Preceding :</p> <ul style="list-style-type: none"> • normal anatomy • normal physiology • pathological physiology • pathological anatomy • pharmacology 	<ul style="list-style-type: none"> • bronchopulmonary system structure • bronchopulmonary system physiology • etiology and pathogenesis of bronchopulmonary system diseases • the notions of inflammation, allergy, etiology and pathogenesis of inflammation and allergy processes • morphological changes during bronchopulmonary system diseases • classification and pharmacodynamics of bronchodilators and antiinflammatory drugs 	<ul style="list-style-type: none"> • to write the relevant prescriptions

<p>2. Following:</p> <ul style="list-style-type: none"> • internal diseases • general surgery 	<ul style="list-style-type: none"> • main clinical manifestations and use of broncholytics and antiinflammatory drugs in case of acute and chronic pulmonary diseases • main clinical manifestations of asthma status, acute respiratory failure in case of surgical pathology and peculiarities of prescribing broncholytics and antiinflammatory drugs 	<ul style="list-style-type: none"> • to perform clinical examinations of the patients, to prescribe the relevant additional examinations. • to perform clinical examinations of the patients, to prescribe the relevant additional examinations.
<p>3. Interdisciplinary integration:</p> <ul style="list-style-type: none"> • clinical pharmacology of α- and β-adrenostimulators, β-adrenostimulators, M-cholinomimetics, methylxanthines, expectorants, mucolytics and antiinflammatory drugs 	<ul style="list-style-type: none"> • peculiarities of action of α- and β-adrenostimulators, β-adrenostimulators, M-cholinomimetics, methylxanthines, expectorants, mucolytics and antiinflammatory drugs 	<ul style="list-style-type: none"> • to write the relevant prescriptions

5. Theme content:

- Modern classification of bronchodilators.
- Clinical pharmacological characteristics of α - and β -adrenostimulators.
- Clinical pharmacological characteristics of β -adrenostimulators.
- Clinical pharmacological characteristics of M-cholinomimetics.
- Clinical pharmacological characteristics of methylxanthines.
- Clinical pharmacological characteristics of expectorants.
- Clinical pharmacological characteristics of mucolytics.
- Principle of bronchodilators choice.
- Peculiarities of bronchodilators use.
- Methods of efficiency and safety evaluation of using drugs, which cause elevation of blood pressure.
- Modern classification of antiinflammatory drugs.
- Classification of nonsteroidal antiinflammatory drugs according to their chemical structure.
- Clinical pharmacological characteristics of nonsteroidal antiinflammatory drugs.
- Side effects of nonsteroidal antiinflammatory drugs.
- Clinical pharmacological characteristics of steroidal antiinflammatory drugs.

6. Class plan and structure (see introduction).

7. Methodological materials for the class.

7.1 Materials for the preparatory stage of class – assessment questions:

- Where are α - and β -receptors localized and which pharmacodynamic effects occur during their stimulation?
- Name the mechanism of α - and β -receptors stimulators action.
- Indications for use of β -adrenomimetics of short and long lasting action.
- Name the main pharmacodynamic effects of teofilin.
- Name the mechanism of action, side effects and contraindications for use of mucolytics.
- Mechanism of action and pharmacodynamics of M-cholinoblocker – troventol.
- Name the main schemes of asthma status pharmacotherapy.
- Side effects of nonsteroidal drugs.
- Peculiarities of prescribing, dosage, side effects of steroidal anti-inflammatory drugs.
- Clinical pharmacological characteristics of basic long-acting immune modifying anti-inflammatory drugs.
- Contraindications for use of anti-inflammatory drugs.

7.2. Methodological materials for the main stage of the class:

To analyze basing on the real clinical examples the indications and contraindications for use of various drugs with bronchodilatory action, and the peculiarities of anti-inflammatory drugs use; their compatibility and possible side effects, as well as peculiarities of use in medical practice.

7.3. Materials for assessment at the final stage of the class – situational tasks:

1. Choose the effect which is not caused by epinephrine.
 - A) bronchodilation
 - B) increase in mucociliary clearance
 - C) elevation of blood pressure
 - D) increase the strength of contraction of heart muscle
 - E) decrease in skeletal muscle tonus
2. Name the most common rout of administration of epinephrine in the case of bronchial obstruction.
 - A) intramuscularly
 - B) intravenously
 - C) intra-arterial
 - D) subcutaneously
 - E) inhalation
3. One of the adverse effects mentioned below is not common for epinephrine.
 - A) cardiac insufficiency
 - B) urinary retention
 - C) promotion of preterm delivery
 - D) aggravation of bronchial obstruction
 - E) silent lung disease
4. Choose the long-acting β_2 selective adrenomimetic.
 - A) ipratropium bromide
 - B) isoproterenol
 - C) formoterol
 - D) ketotifen

E) bamipine

5. Effect of inhaled β_2 selective adrenomimetics appears:

- A) immediately
- B) after 1-2 min
- C) after 3–5 min
- D) after 10 min
- E) after 20–30 min

6. Advantages of dry powder inhalers over pressurized metered-dose inhalers include all of the following, except:

- A) lower jetting velocity
- B) propellant is not required
- C) larger lung deposition
- D) shaking the inhaler before use is not needed
- E) lower bronchial resistance.....

8. THE LIST OF DRUGS TO BE STUDIED FOR THE FINAL TEST

Name in English	Name in Latin	Drug forms
Epinephrine	Epinephrinum	amp. 0,18 % 1 ml №10
Ambroxol	Ambroxolum	tab. 30 mg; amp. 0,75%
Acetylcysteine	Acetylcysteinum	tab. 100 mg; cap. 200; 400 mg
Euphyllin	Euphyllinum	tab. 150 mg; amp. 2,4%
Tiotropium bromide	Tiotropium bromidum	aerosol 18 μ g
Nedocromil sodium	Nedocromilum natricum	aerosol 1 dose - 2 mg
Salbutamol	Salbutamololum	aerosol 200 dose; tab. 2; 4 mg
Salmeterol	Salmeterolum	aerosol 25 μ g - 120/doses
Fenoterol	Fenoterolum	aerosol 0,1 mg
Beclometasone dipropionate	Beclometasonum dipropionatum	aerosol 50, 100, 250 μ g /dose flac. 200 doses
Montelukast	Montelukastum	tab. 10 mg
Hydrocortisone	Hydrocortisonum	amp. 100; 500 mg; ointment 0,1; 1; 5 %; cream 0,1%
Dexamethasone	Dexamethasonum	tab. 500 mg; amp. 4 mg – 1 ml
Diclofenac sodium	Natrium diclofenacum	tab. 25, 50 mg
Meloxicam	Meloxicamum	tab. 7,5; 15 mg; supp. 7,5; 15 mg
Methylprednisolone	Methylprednisolonum	tab. 4,8 mg; amp. 0,4 %
Nimesulide	Nimesulidum	tab. 100 mg; flac. 1%
Prednisolone	Prednisolonum	tab. 5 mg; amp. 25; 30 mg – 1ml
Rofecoxib	Rofecoxibum	tab. 25; 50 mg
Celecoxib	Celecoxibum	cap. 100; 200 mg
Paracetamol	Paracetamol	tab. 325, 500 mg, cap. 500 mg

9. RECOMMENDED LITERATURE (see at the end of methodological instructions).

Theme #4. Clinical pharmacology of antimicrobial drugs.

Subject: clinical pharmacology

Year of study: 5

Faculty: medical

Number of hours: 4

1. Topicality. The number of various antimicrobial drugs has risen recently, which enhances the treatment opportunities of different diseases of bacterial origin. However the choice of an effective and safe antibacterial drug remains a difficult task, which is caused first of all by the increase of bacterial flora resistance, and impossibility of defining, in some cases, the causative agent of the disease and its sensitivity to antibacterial drugs; another cause is the increase in number of patients with chronic pathologies and various immunodeficiencies. The growing number of medical manipulations for diagnosis and treatment also facilitates the occurrence and development of infections caused by the nontypical microflora and/or its nontypical location. The insufficient information about the indications, action mechanism and side effects of drugs of this group limits its prescription possibilities, while, on the other hand, we can see its uncontrolled careless use. Thus there is a need of deep comprehensive study of clinical pharmacology of antibacterial drugs.

2. Educational aim: To acquaint the students with the modern antibacterial therapy and its use in main infectious diseases. To define the principles of rational dosage, optimal administration mode, duration of use and principles of changing drugs in the course of treatment with antimicrobial drugs.

3. Educational aim: To use in medical practice the principles of ethics and deontology; to help the students form clinical thinking; to learn the achievements of Ukrainian scientists in antimicrobial therapy.

4. Interdisciplinary integration:

Subjects	Knowledge	Skills
1. Preceding : <ul style="list-style-type: none">• normal anatomy• normal physiology• pathological physiology• pathological anatomy• microbiology• pharmacology	<ul style="list-style-type: none">• anatomy of internal organs• physiology of internal organs• etiology and pathogenesis of bacterial diseases• morphological changes during bacterial diseases• characteristics of bacteria• pharmacology of antimicrobial drugs	<ul style="list-style-type: none">• to write the relevant prescriptions
2. Following: <ul style="list-style-type: none">• internal diseases	<ul style="list-style-type: none">• indications, contraindications	<ul style="list-style-type: none">• to perform clinical

<ul style="list-style-type: none"> • surgery <p>3. Interdisciplinary integration:</p> <ul style="list-style-type: none"> • clinical pharmacology of antiinflammatory and antihistamine drugs 	<p>and dosage of antimicrobial drugs in the internal diseases clinic</p> <ul style="list-style-type: none"> • indications, contraindications and dosage of antimicrobial drugs in surgical pathology • peculiarities of use of antiinflammatory and antihistamine drugs 	<p>examinations of the patients, to prescribe the relevant additional examinations.</p> <ul style="list-style-type: none"> • to perform clinical examinations of the patients, to prescribe the relevant additional examinations. • to prescribe a rational combination with the drugs of other groups • to write the relevant prescriptions
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5. Theme content:

- The main principles of the modern antibacterial therapy.
- Modern classification of antibiotics.
- The role of antibiotics during infectious and pyoinflammatory diseases.
- The choice of antiinflammatory drugs according to the sensitivity of microorganisms, process localization and seriousness of the disease.
- Side effects of antibacterial drugs.
- Contraindications for use of antibacterial therapy.
- Clinical pharmacological characteristics of antibiotics.
- The choice of antibacterial drugs depending on pharmacokinetics.
- Interaction of antimicrobial drugs.
- Dosage mode of antimicrobial drugs.
- Antibacterial therapy efficiency evaluation criteria.
- Age peculiarities of antibacterial therapy.
- Antibiotic resistance and ways of fighting it.

6. Class plan and structure (see introduction).

7. Methodological materials for the class.

7.1 Materials for the preparatory stage of class – assessment questions:

- What does the notion of antimicrobial drugs include?
- Classification of antibacterial drugs (according to groups and mechanism of action).
- Classification of antibacterial drugs.
- Principles of antibiotics choice taking into consideration the nature of agent, character and location of pathological process.
- The meaning of allergological anamnesis.
- Defining sensitivity to an antibiotic. The meaning of antibiotics gram.
- Name the examples of antibiotics side effects and ways of their prevention.

7.2. Methodological materials for the main stage of the class:

To analyze basing on the real clinical examples the indications and contraindications for use of various drugs in case of endocrine system, pancreas, thyroid, pituitary, adrenals diseases; their compatibility and possible side effects.

7.3. Materials for assessment at the final stage of the class – situational tasks:

1. Bacteriostatic antibiotics are able to:
 - A) damage the function of cytoplasmic membrane of microorganisms
 - B) inhibit synthesis of cytoplasmic membrane of microorganisms
 - C) inhibit synthesis of proteins on ribosomes in a microorganism
 - D) inhibit DNA synthesis in microorganisms
 - E) inhibit synthesis of DNA-hydrolase in microorganisms

2. Broad spectrum bactericidal antibiotic is the most suitable in the following case:
 - A) as initial drug in an acute suppurative process
 - B) severe infectious diseases with doubtful etiology
 - C) treatment of infections caused by chlamydia
 - D) supportive treatment of infectious disease
 - E) treatment of an intercurrent infection

3. Point the data that is not used in the empirical choice of antibacterial drugs.
 - A) clinical appearance
 - B) epidemic situation
 - C) sensitivity of microorganisms to the antibacterial drug
 - D) patient's complains
 - E) drug's features

4. Choose the antibacterial drug effectiveness of which is higher in the acid environment (pH 5,0-6,5)
 - A) fosfomicin
 - B) erythromycin
 - C) gentamicin
 - D) lincomycin
 - E) azithromycin

5. The drug of choice in the treatment of gastric thrush, caused by *Candida albicans* is:
 - A) clotrimazole
 - B) fluconazole
 - C) levorinum
 - D) natamycin
 - E) amphotericin B

6. The drug of choice in the treatment of infections caused by *Bacillus aeruginosa* is:
 - A) ampicillin
 - B) amikacin
 - C) azithromycin
 - D) amoxicillin + clavulanate
 - E) cefuroxime

8. THE LIST OF DRUGS TO BE STUDIED FOR THE FINAL TEST

Name in English	Name in Latin	Drug forms
Azithromycin	Azithromycinum	tab. 125; 500 mg; cap. 250 mg
Amikacin	Amikacinum	amp. 50; 125; 250; 500 mg – 1 ml
Amoxicillin	Amoxicillinum	tab. 250; 500 mg
Acyclovir	Acyclovirum	tab. 200, 400, 800 mg
Benzylpenicillin	Benzylpenicillinum	flac. 25000; 50000; 1 mln. IU
Vancomycin	Vancomycinum	flac. 500; 1000 mg
Gentamicin	Gentamicinum	amp. 10; 20; 40 mg - 1 ml; ointment 0,1%; aerosol 0,1 %
Doxycycline	Doxycyclinum	cap., tab. 50; 100; 200 mg
Imipenem	Imipenemum	flac. 500 mg
Interferon alfa	Interferonum alfa	sol. 10, 18, 25, 30, 60 mln. IU
Clarithromycin	Clarithromycinum	tab. 250 mg; flac. 500 mg
Clindamycin	Clindamycinum	cap. 75; 150; 300 mg; amp. 2;4 ml
Levofloxacin	Levofloxacinum	tab. 250; 500 mg; flac. 5 mg/ml - 100 ml
Rifampicin	Rifampicinum	cap.150; 300 mg; amp. 125 mg – 1,5 ml; 250 mg –3 ml; 500 mg – 10 ml
Ribavirin	Ribavirinum	cap. 100, 200 mg
Streptomycin	Streptomycinum	flac. 500; 1000 mg
Sulfadimethoxine	Sulfadimethoxinum	tab. 200; 500 mg
Sulfasalazine	Sulfasalasinum	tab. 500 mg
Tetracycline	Tetracyclinum	cap. 250; 500 mg
Tobramycin	Tobramycinum	amp.10; 20; 40 mg –1 ml; ointment 0,3%
Fluconazole	Fluconazolium	cap. 50, 100, 150 mg
Cefalexin	Cephalexinum	tab. 50; 250; 1000 mg; cap. 250; 500 mg
Cefepime	Cefepimum	flac. 500 mg; 1; 2 g
Cefotaxime	Cefotaximum	flac. 250; 500 mg; 1; 2 g
Ceftriaxone	Ceftriaxonum	flac. 250; 500 mg; 1; 2 g
Cefuroxime	Cefuroximum	flac. 250; 750; 1500 mg; tab. 125; 250; 500 mg
Ceftazidime	Ceftazidimum	flac. 0,5, 1,2 g
Ciprofloxacin	Ciprofloxacinum	tab. 250; 500; 750 mg; amp. 10; 20 mg – 1 ml

9. RECOMMENDED LITERATURE (see at the end of methodological instructions).

Theme #5. Clinical pharmacology of hormones.

Clinical pharmacology of agents that effect on intestinal motility and secretion, on pancreatic diseases and liver diseases.

Subject: clinical pharmacology

Year of study: 5

Faculty:
medical

Number of hours: 4

1. Topicality. Endocrine organs diseases are a serious problem nowadays, since diabetes possesses the third place among the most spread diseases in the world and endocrine pathology is becoming more and more common. Some of the endocrine diseases are chronic life-long illnesses, so the doctors of all specializations will face such patients in their everyday practice. The therapeutic diagnostic approach to this group of patients is a priority in endocrinology, as it defines the course of the disease character and thus its qualified and timely treatment. Today thyroid pathologies increase can be seen not only in endemic regions, such as Prykarpattya, but all over the world. Special attention to this problem was drawn after Chernobyl disaster. Scientific observations prove thyroid cancer occurrence increase, reveal the tendency to younger age of patients and to the combinations of different forms of thyroid pathology in one patient. Adrenal hormones take active part in supporting the body's homeostasis, play an important role in extreme conditions and many pathological processes, influence enzyme activity and ensure the balance of chemical reactions, which are the basis of living process. The knowledge of clinical pharmacological peculiarities of these substances enables the rational choice in any clinical situation and thus their maximum effective and safe use.

2. Educational aim: To know clinical pharmacology of drugs used in endocrinology. To learn the modern principles of pharmacotherapy of the main digestive system organs. To know how to analyze, basing on a clinical example, the indications and contraindications for the use of drugs and their side effects and compatibility; to learn the methods of drugs choice and if needed to be able to interchange them.

3. Pedagogical aim: To draw the doctor's-to-be attention to the peculiarities of diagnosing and pharmacotherapy of endocrine system diseases. To highlight the importance of the Ukrainian scientist's contribution into the development and introduction of the new medications into endocrinologic practice.

4. Interdisciplinary integration:

Subjects	Knowledge	Skills
<i>1. Preceding :</i> <ul style="list-style-type: none">• normal anatomy• normal physiology• pathological anatomy• pathological physiology	<ul style="list-style-type: none">• structure and topography of endocrine organs and target organs• endocrine system physiology• morphological changes during endocrine system diseases• etiology and pathogenesis of endocrine system diseases	<ul style="list-style-type: none">• to model the development of some pathology on the cell level, organ level and

		body level
<ul style="list-style-type: none"> • pharmacology 	<ul style="list-style-type: none"> • classification, pharmacodynamics and pharmacokinetics of the relevant groups of drugs 	<ul style="list-style-type: none"> • to write the relevant prescriptions
<p><i>2. Following:</i></p> <ul style="list-style-type: none"> • faculty therapy • hospital therapy 	<ul style="list-style-type: none"> • the main clinical diagnostic criteria of endocrine organs diseases; endocrine diseases treatment principles <p>Preoperative preparation of a patient and postoperative period after removing pancreas, thyroid, pituitary adenoma and adrenal tumors</p>	<ul style="list-style-type: none"> • to perform clinical examinations of the patients, to prescribe the relevant additional examinations and therapy plan. • to perform clinical examinations of the patients, to prescribe the relevant additional examinations and therapy plan.
<p><i>3. Interdisciplinary integration:</i></p> <ul style="list-style-type: none"> • clinical pharmacology of antimicrobial drugs • interaction of drugs 	<ul style="list-style-type: none"> • clinical pharmacological peculiarities of the relevant drugs; • potential variants and consequences of drugs interaction in endocrinology 	<ul style="list-style-type: none"> • to write the relevant prescriptions

5. Theme content:

- Clinical pharmacological characteristics of steroidal drugs.
- Side effects of steroidal drugs.
- Peculiarities of prescribing, dosage, side effects of steroidal antiinflammatory drugs.
- Classification of drugs used for hormonal replacement therapy: estrogens, androgens. Antiestrogens, antiandrogens. Drugs for treatment of male and female menopause.
- Clinical pharmacological peculiarities and rational use of hormonal contraceptives.
- Clinical pharmacology of insulins.
- Peroral hypoglycemic drugs. Classification, mechanism of action, indications for use.
- Thyroid hormones drugs. Indications, contraindications, side effects, complications, modern possibilities of this type of therapy.
- Antithyroid drugs, peculiarities of use, side effects, complications.
- Clinical pharmacological approach to drug choice in case of major endocrine system diseases.

6. Class plan and structure (see introduction).

7. Methodological materials for the class.

7.1 Materials for the preparatory stage of class – assessment questions:

- Which side effects are characteristic of steroidal antiinflammatory drugs?
- Withdrawal syndrome and ways of fighting it.
- Classification of the main pituitary tropic hormones and the mechanism of their interaction.
- What does the clinical pharmacological approach to the choice of antidiabetic therapy of 2

type diabetes include?

- Name the modern schemes of insulin therapy according to the duration of insulin action.
- Clinical pharmacological approach to the correction of hypothyreosis caused by operative therapy.
- Which drugs are used for hypothyreosis treatment?
- Modern possibilities of hormonal replacement therapy of male and female menopause.
- Peculiarities of use of hormonal contraceptives.
- Which groups of drugs are the main in pangipopituitary syndrome treatment?
- What does the clinical pharmacological approach to the choice of drugs in endocrine obesity treatment include?
- Which groups of drugs are used in diabetic coma treatment?

7.2. Methodological materials for the main stage of the class:

To analyze basing on the real clinical examples the indications and contraindications for use of various drugs in case of endocrine system, pancreas, thyroid, pituitary, adrenals diseases; their compatibility and possible side effects.

7.3. Materials for assessment at the final stage of the class – situational tasks:

1.The major action of insulin is

- A. Conversion of glucose to glycogen
- B. Proteolysis
- C. Conversion of fatty acids to glucose
- D. Glycogenolysis
- E. Gluconeogenesis

2.One of the main causes of hypoglycaemia is

- A. Unaccustomed exercise
- B. Stress
- C. Weight loss
- D. Weight gain
- E. Diarrhoea

3.Which of the following is not correct for oral hypoglycaemic drugs?

- A. Stimulation of insulin synthesis
- B. Reduction of carbohydrate absorption
- C. Inhibition of gluconeogenesis
- D. Stimulation of insulin release
- E. Anorexigenic effect

4.Beta-blockers in the presence of hypoglycaemia may interact as follows

- A. Mask tachycardia
- B. Mask bradycardia
- C. Increase sweating
- D. Upset pulmonary circulation
- E. Formation of antibodies and immune complexes

5.Mechanism of sulphonylureas' action includes

- A. Beta cells' stimulation to secrete insulin
- B. Stimulating beta cells to synthesise insulin
- C. Inhibiting beta cell to secrete insulin

- D. Beyond pancreatic activity
- E. Inhibiting insulin resistance

6. Choose insulin without peak of action

- A. Glargine
- B. Actrapid
- C. Novorapid
- D. Protaphane
- E. NPH

8. THE LIST OF DRUGS TO BE STUDIED FOR THE FINAL TEST

Name in English	Name in Latin	Drug forms
Insulin glargine	Insulin glargine	flac. 10 ml, cart. 3 ml (1 ml–100 IU)
Insulin glulisine	Insulin glulisine	flac. 10 ml, cart. 3 ml (1 ml–100 IU)
Insulin actrapid	Insulin actrapid	flac. 10 ml, cart. 3 ml (1 ml–100 IU)
Insulin isophane	Insulin isophane	flac. 10 ml, cart. 3 ml (1 ml–100 IU)
Glibenclamide	Glibenclamidum	tab. 5 mg
Gliclazide	Gliclazidum	tab. 60 mg
Glimepiride	Glimepiridum	tab. 2, 3, 4, 6 mg
Metformin	Metforminum	tab. 500, 850, 1000 mg
Levothyroxine	Levothyroxinum	tab. 25, 50, 75, 100, 125 mg.
Methimazole	Methimazole	tab. 5 mg
Testosterone undecanoate	Testosteronum undecanoatum	amp. 4 ml-1000 mg
Oxytocin	Oxytocinum	amp. 5 IU 1 ml
Progesterone	Progesteronum	tab. 100 mg,
Estradiol	Estradiolum	tab. 50 mg
Diane 35	Diane 35	№21
Lindynette	Lindynette	№ 21
Novynette	Novynette	№ 21
Cyproterone	Cyproteronum	tab. 100 mg, amp. 300 mg

9. RECOMMENDED LITERATURE (see at the end of methodological instructions).

Agents that affect intestinal motility and secretion. Clinical pharmacology in liver and pancreatic diseases.

1. Topicality. Digestive organs diseases (chronic gastritis, ulcer, enterocolitis, cholecystitis, chronic hepatitis etc) are widely spread and thus are not only of medical but also of social significance. The modern idea of etiology, pathogenesis and clinical course of the mentioned

diseases enable the use of a range of various drugs and their combinations. Among them are medications belonging to different pharmacological classes but largely increasing the efficiency of treatment of different gastrointestinal diseases (antibacterial, psychotropic and hormone drugs, immunomodulators). For example, the conservative treatment of gall bladder and biliary tract pathology includes fighting infections (antimicrobial therapy), dyskinetic disorders correction and bile composition normalization (bile-expelling drugs of different action type), and sometimes – attempts of dissolution of bile concretions (lithotripsy with the help of medications). The main group includes the drugs directly influencing digestive system organs function. The possibilities of such treatment have risen recently due to the introduction into medical practice a range of modern pharmacological agents – proton-pump inhibitors, prokinetics, synthetic analogies of prostaglandines, a whole group of pro- and prebiotics, new antiemetic drugs etc. The knowledge of clinical pharmacological peculiarities of these substances enables the rational choice in any clinical situation and thus their maximum effective and safe use.

2. Educational aim: To know the clinical pharmacology of drugs used in gastroenterology. To learn the modern principles of pharmacotherapy of the main digestive organs diseases. To know how to analyze, basing on a clinical example, the indications and contraindications for use of drugs and their side effects and compatibility; to learn the methods of drugs choice and if needed to be able to interchange them.

3. Pedagogical aim: To draw the doctor’s-to-be attention to the peculiarities of diagnosing and pharmacotherapy of digestive system organs diseases. To highlight the importance of the Ukrainian scientist’s contribution into the development and introduction of the new medications into gastroenterologic practice.

5. Interdisciplinary integration:

Subjects	Knowledge	Skills
<p><i>1. Preceding:</i></p> <ul style="list-style-type: none"> • normal anatomy • topographic anatomy • normal physiology • pathological anatomy • pathological physiology • pharmacology <p><i>2. Following:</i></p>	<ul style="list-style-type: none"> • structure and topography of digestive organs • digestive system physiology • morphological changes during gastrointestinal, liver, bile excretory routes and pancreas diseases • etiology and pathogenesis of digestive system diseases • classification, pharmacodynamics and pharmacokinetics of relevant drugs 	<ul style="list-style-type: none"> • to model the development of some pathology on the cell level, organ level and body level • to write the relevant prescriptions

<ul style="list-style-type: none"> • faculty therapy • hospital therapy • faculty surgery • hospital surgery 	<ul style="list-style-type: none"> • main clinical diagnostic criteria of digestive organs diseases; • digestive organs treatment principles • preoperative preparation of a patient and postoperative period during gastrointestinal and hepatobiliary zone diseases 	<ul style="list-style-type: none"> • to perform clinical examinations of the patients, to prescribe the relevant additional examinations and therapy plan. • to perform clinical examinations of the patients, to prescribe the relevant additional examinations and therapy plan.
<p><i>3. Interdisciplinary integration:</i></p> <ul style="list-style-type: none"> • clinical pharmacology of antimicrobial drugs • interaction of drugs 	<ul style="list-style-type: none"> • clinical pharmacological peculiarities of relevant drugs; • potential variants and consequences of drugs interaction in gastroenterology 	<ul style="list-style-type: none"> • to write the relevant prescriptions

5. Theme content:

- Classification of drugs correcting secretory and motor function of digestive organs.
- Clinical pharmacology of antacids with neutralizing action.
- Drugs changing secretory function of stomach, modern possibilities of such therapy.
- Clinical pharmacological peculiarities and rational use of gastroprotectors.
- Clinical pharmacology of emetic and antiemetic drugs.
- Drugs influencing gastrointestinal motorics.
- Drugs regulating intestinal microflora, their rational use.
- Clinical pharmacology of bile-expelling drugs. Drugs enhancing dissolution of bile concretions.
- Clinical pharmacological peculiarities of hepatoprotectors.
- Clinical pharmacology of enzyme and antienzyme drugs.
- Clinical pharmacological approach to drug choice in case of main digestive organs diseases.
- Interaction of drugs influencing digestive organs function.
- Drugs causing digestive system damage. Prognosis and prevention of such influence.

6. Class plan and structure (see introduction).

7. Methodological materials for the class.

7.1 Materials for the preparatory stage of class – assessment questions:

- Pharmacokinetics of antacids with neutralizing action and their interaction with other drugs.
- Which side effects are characteristic of H₂-receptors blockers?
- What does the clinical pharmacological approach to the choice of drugs in type B chronic gastritis treatment include?
- Name the modern drugs with active prokinetic action and indications for their use.
- Clinical pharmacological approach to the correction of intestinal dysbacteriosis caused by antibiotic therapy.
- What drugs and with what aim are used in case of unspecified ulcerative colitis?
- Tell the difference in pharmacological action of cholagogues and choleretics. What are the

contraindications for use of bile-expelling drugs?

- Modern possibilities of gallstone disease conservative treatment.
- Peculiarities of hepatoprotectors use in clinical practice.
- Which group of drugs is the basis for treatment of chronic active hepatitis of viral etiology?
- What does the clinical pharmacological approach to the choice of drugs in chronic pancreatitis treatment include?
- What group of drugs is used in liver coma treatment?

7.2. Methodological materials for the main stage of the class:

To analyze basing on the real clinical examples the indications and contraindications for use of various drugs in case of gastrointestinal, liver, bile excretory routes and pancreas diseases; their compatibility and possible side effects.

7.3. Materials for assessment at the final stage of the class – situational tasks:

1. Drugs used in treating peptic ulcer include

- A. Histamine H₂-receptor antagonists
- B. Cytotoxic drugs
- C. Beta-blockers
- D. Antiplatelet drugs
- E. Sulphonamides

2. What group of drugs is not used in the treatment of peptic ulcer?

- A. Glucocorticoids
- B. Selective and non-selective M-cholinoceptor antagonists
- C. Histamine H₂-receptor antagonists
- D. Gastrin-receptor antagonists
- E. Proton pump inhibitors

3. Which drug is active against *Helicobacter pylori* and elevates gastrin level?

- A. Omeprazole
- B. Cimetidine
- C. Calcium carbonate
- D. Misoprostol
- E. Sucralfate

4. The onset of omeprazole action is

- A. 1 hour
- B. 2 hours
- C. 3 hours
- D. 15 min
- E. 30 min

5. The effects of omeprazole typically persist over

- A. 3 days
- B. 2 days
- C. 1 day
- D. 4 days
- E. 36 hours

6.Characterise esomeprazole and omeprazole in ulcer therapy

- A. Potency of esomeprazole against Helicobacter pylori is higher than that of omeprazole
- B. Potency of omeprazole against Helicobacter pylori is higher than that of esomeprazole
- C. Their action against Helicobacter pylori is equal
- D. Their action is synergistic, thus they may be used concurrently
- E. Their action over Helicobacter pylori is antagonistic

8. THE LIST OF DRUGS TO BE STUDIED FOR THE FINAL TEST

Name in English	Name in Latin	Drug forms
Atropine sulphate	Atropinum sulfuricum	amp. 0,1 %; tab. 0,5 mg
Bismuth subnitrate	Bismuthum subcitratum	tab. 0,12
Domperidone	Domperidonum	tab. 10 mg
Drotaverine hydrochloride	Drotaverinum hydrochloridum	tab. 40 mg; amp. 2% – 2 ml
Lactulose	Lactulosum	syrup 200 ml
Loperamide	Loperamidum	tab. 2 mg
Mebeverine hydrochloride	Mebeverinum hydrochloridum	tab. 200 mg
Metoclorpramide	Metoclorpramidum	tab. 10 mg; amp. 2 ml
Omeprazole	Omeprazolium	cap. 20 mg
Pirenzepine	Pirenzepinum	tab. 25; 50 mg; amp. 0,5%
Prifinium bromide	Prifinium bromidum	tab. 30 mg, syrup
Rabeprazole	Rabeprazolum	tab. 20 mg
Sucralfate	Sucralfatum	tab. 500; 1000 mg
Famotidine	Famotidine	tab. 20; 40 mg;flac. 0,02 g
Ademethyonine	Ademethyoninum	flac. 400 ml
Essentiale Forte N	Essential forte N	cap. 300 mg; amp. 250 mg –5 ml
Octreotide	Octreotide	amp. 100
Pancreatin	Pancreatinum	tab. 0.25
Silimarin	Silimarinum	tab. 0,04
Ursodesoxycholine acid	Acidum ursodeoxycholicum	cap. 250 mg
Cholagol	Cholagolum	flac. 10 ml
Citrarginine	Citrarginine	amp. 10 ml

9. RECOMMENDED LITERATURE (see at the end of methodological instructions).

CLINICAL PHARMACOLOGY
for the fifth year students of the medical faculty

LIST OF QUESTIONS

- Modern classification of lipid lowering drugs.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, contraindications of statins, side effects, doses.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, contraindications of fibrates, side effects, doses.
- Omega-3 polyunsaturated fatty acids. Mechanism of action, prescribing peculiarities.
- Classification of dyslipidemia. Differential approach to treat dyslipidemia.
- Modern classification of antianginal and antiischemic drugs.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, contraindications of nitrates, side effects, doses.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, contraindications of beta adrenergic blockers, side effects, doses.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of Ca channel blockers, side effects, doses.
- Classification of Ca channel blockers. Prescription drug information.
- Classification of beta adrenergic blockers. Prescription drug information.
- Antiplatelet drugs. Classification. Mechanism of action, side effects, doses.
- Thrombolytic agents. Indications, contraindications. Algorithm for use.
- Anticoagulant medicines. Classification. Mechanism of action, side effects, doses.
- Classification of antihypertensive drugs.
- Usage of antihypertensive drugs in different clinical settings (diabetes mellitus, bronchial asthma, pregnancy, old age, pheochromocytoma etc.)
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, contraindications of ACE-inhibitors, side effects, doses.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, contraindications of AT II type 1 receptor blockers, side effects, doses.
- Combined treatment of hypertension.
- Classification of antiarrhythmic drugs, prescribing peculiarities.
- Classification of cardiac glycosides, doses. Cardiac effects of glycosides, indications, side effects.
- Inotropic agents, indications, contraindications.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of diuretics, side effects, doses (loop, thiazides, thiazide-like, potassium sparing diuretics).
- Classification of diuretics.
- Usage of diuretics in different clinical settings (influence on lipid and carbohydrate metabolism).
- Classification of drugs influencing bronchial patency.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of β_2 agonists (short and long acting), side effects, doses.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of methylxanthines, side effects, doses.

- Inhaled corticosteroids, advantages, side effects, regimen, doses, guidelines for tapering or withdrawal of corticosteroids.
- Mechanism of action, regimen and doses of antitussives, drug-drug interaction, side effects.
- Classification of nonsteroidal antiinflammatory drugs.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of nonsteroidal antiinflammatory drugs, side effects, regimen, doses.
- The most common errors in antibiotic therapy.
- Allergic reactions following antibiotic therapy, clinical picture.
- Penicillins: classification, spectrum of activity, mechanism of action, treatment features, doses.
- Cephalosporins: classification, spectrum of activity, mechanism of action, treatment features, doses.
- Carbapenems: classification, spectrum of activity, mechanism of action, treatment features, doses.
- Aminoglycosides: classification, spectrum of activity, mechanism of action, treatment features, doses.
- Fluoroquinolones: classification, spectrum of activity, mechanism of action, treatment features, doses.
- Macrolides: classification, spectrum of activity, mechanism of action, treatment features, doses.
- Classification of drugs correcting secretory and motor function of digestive organs.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of selective dopamine receptor antagonists, side effects, doses.
- Classification of drugs influencing gastrointestinal motorics (Loperamide, doses)
- Spasmolytics: classification, spectrum of activity, mechanism of action, treatment features, doses.
- Drugs changing secretory function of stomach, modern possibilities of such therapy.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of proton-pump inhibitors, side effects, doses.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of histamine H₂ receptor antagonists, side effects, doses.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of antacids, side effects, doses.
- Clinical pharmacological peculiarities and rational use of gastroprotectors.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of hepatoprotectors, side effects, doses.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of pancreatic enzymes, side effects, doses.
- Mechanism of action, pharmacodynamics, pharmacokinetics, indications, and contraindications of anti-allergy medication, side effects, doses.
- Classification of insulins, indications, contraindications, side effects, doses.
- Oral hypoglycemic drugs. Classification, mechanism of action, indications for use.
- Classification of drugs used for hormonal replacement therapy: estrogens, androgens. Antiestrogens, antiandrogens. Drugs for treatment of male and female menopause.
- Clinical pharmacological peculiarities and rational use of hormonal contraceptives.
- Thyroid hormones drugs. Indications, contraindications, side effects, complications, modern possibilities of this type of therapy.
- Antithyroid drugs, peculiarities of use, side effects, complications.

List of methodological literature and textbooks

1. A Textbook of Clinical Pharmacology and Therapeutics / M. Ritter J., D. Lewis L., G.K. Mant T., Ferro A. : Amazon.co.uk., 2008. – 465 p.
2. Grahame-Smith D., Aronson J. Oxford Textbook of Clinical Pharmacology and Drug Therapy, Oxford: University Press, 2002. – 641 p.
3. Dinesh Badyal. Practical Manual of Pharmacology: Japee, 2008. – 300 p.
4. Tripathi K.D. Pharmacological classification of drugs: with doses and preparations, 3rd Edition: Japee, 2008. – 190 p.
5. Kikhtyak O.P., Zimenkovsky A.B. Conceptual pharmacotherapy in lecture notes. – Львів: Щедрик, 2006. – 152 с.