Edited by prof. Olesya P. Kikhtyak

PHARMACOLOGICAL ASPECTS IN GENERAL MEDICINE AND SURGERY FOR DENTAL STUDENTS

Primedia eLaunch

PHARMACOLOGICAL ASPECTS IN GENERAL MEDICINE AND SURGERY FOR DENTAL STUDENTS

Edited by prof. Olesya P.Kikhtyak

Third Edition Supplemented
Of Methodical principles in clinical pharmacology: Textbook stud. of higher med. institution

A textbook for students
of higher medical institutions with the 4th level
of accreditation with English
as the language of instruction

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The textbook “Pharmacological aspects in general medicine and surgery for dental students” has been written according to the educational qualification characteristics and educational programs of professional training, as well as according to the principles of the Credit Transfer System. For English speaking students of High Medical Institutions of IV accreditation level. Thus, while intended primary for medical students, we believe this handbook will also be of use for general practitioners and medical specialists who know English.

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Contents

Textbook

FOREWORD

The format of "Pharmacological aspects in general medicine and surgery for dental students" is originally designed and proposed for the first time.

Authors hope that structured approach to learning of clinical pharmacology given in the presented work will help with the basic understanding and will create the firm foundation to which additional information can be added in an easy and structured way.

Pharmacological aspects in general medicine and surgery for dental students is first of all advised for students of dentistry, but also to all those who try to organize or repeat their knowledge and thoughts. Original and concise teaching material may set up a base for processing of forthcoming information resources as well as may open possibilities for the expansion use of it by special-interest groups.

We have not attempted to be comprehensive or lay claim to ultimate authority concerning the exhausted list of drugs mentioned in given nosology since they appear as an example. Furthermore, the replenishment of the list of drugs may be a basic reason for students in self-study training, considering that every country possesses its own proper index as well as its own pharmaceutical market. This textbook has been written in the format of brief notes; hence it cannot cover more information than it is allotted to the class time. Nevertheless we hope you will find this small volume of value.

This work draws special attention to main groups of medicaments which are widely used in different pathologies, emphasizing basic drugs and their generic names. The handbook bears information concerning essential side effects, contraindications and interaction peculiarities.

Creating of such a textbook in clinical pharmacology has been dictated by the current reformation of High School and the integration into Bologna process.

Undoubtedly, all material given in this book is not a dogma since we deal with the rapidly developing field of knowledge. However, we ourselves accept the full responsibility for the contents of the volume which was synthesised and adapted from the compiled bibliography the list of which presents the final part of the given book.

Suggestions for improvements will be warmly welcomed and carefully considered.

Professor Olesya P. Kikhtyak

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 2 3	Organizing the class. Defining educational goals. Assessment of the initial knowledge level (relevant to the topic): 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.	1.Initial theoretical rapid survey 2.Level 1 testing	Tables, flow-charts Oral questions, Level 1 testing	1-3 min. 10%
II	**The main stage**			
	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.	Practical training for solving typical and non typical professional tasks.	1. Medical histories 2. Tables, slides, instructions and prospectu-ses for medications	60%
№	Main stages of the lesson, their functions and content	Methods of study and assessment	Methodological materials	Timing
III	**The final stage**			
	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	Individual control of the practical skills and their results	Phonendo-scopes, tonometers, medical histories	30% 2-3min. 1-3min.

Part 1

(faculty of dentistry, forth year of study in "Clinical pharmacology", class studies)

1.1 Introduction in clinical pharmacology. The main principles of pharmacology: pharmacokinetics and pharmacodynamics. Clinical pharmacology of hypolipidemic 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, maximize the drug efficiency and minimize 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 drug's 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 hryvnyas 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	
Subjects	**Knowledge**	**Skills**

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 lipoprodeides 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 nicotine 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
- ✓ Pharmacikinetics
- ✓ 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 nicotine acid.
- Which conditions complicate the wide use of nicotine 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
http://en.wikipedia.org/wiki/Therapeutic_window - cite_note-0
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 MODULAR 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).

1.2 Clinical pharmacology of antianginal and antiischemic drugs.

Subject: clinical pharmacology
Year of study: 5
Faculty: medical
Number of hours: 4

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: 2.		
normal anatomy normal physiology pathological physiology	Cardiovascular system structure cardiovascular system 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.

Subjects	Knowledge	Skills
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 antiarrhytmic 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 rout of digitoxin administration:
A) intramuscular
B) subcutaneous
C) inhalation
D) intravenous
E) oral

6. Negative dromotropic 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 MODULAR TEST

Name in English	Name in Latin	Drug forms
Isosorbide mononitrate	Isosorbidum mononitratum	cap., tab. 40; 60 mg
Isosorbide dinitrate	Isosorbidum dinintratum	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 мг, amp. 0,025% - 1 ml
Dobutamine	Dobutaminum	flac. 5 %- 55 ml; flac. 0,1; 0,25

Name in English	Name in Latin	Drug forms
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).

1.3 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 acuquaint 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 α2-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 β1-adreno blockers without intrinsic sympathomymetic activity.
- Clinical pharmacological characteristics of cardiononselective β1-adreno blockers with intrinsic sympathomymetic activity.
- Clinical pharmacological characteristics of α- and β-adrenoreceptors blockers (α1-, β1 and β2-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 α2-adrenoreceptors and central imidazoline-I1-receptor agonists.
- Which side effects may occur during the use of α2-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 MODULAR TEST

Name in English	**Name in Latin**	**Drug forms**
Hydrochlorothiazide	Hydrochlorothiazidum	tab. 25 mg; 100 mg
Indapamide	Indapamidum	tab.1,5; 2,5 mg
Spironolactone	Spironolactonum	tab.25; 50; 100 mg
Torasemide	Torasemidum	amp.10 мг, 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
Name in English	**Name in Latin**	**Drug forms**
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).

1.4 Drugs that affect the respiratory system. Antiinflammatory 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 sympthoms 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	Skills
1.Preceding : • normal anatomy • normal physiology • pathological physiology	• 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	
• pathological anatomy	• morphological changes during bronchopulmonary system diseases	
• pharmacology	• classification and pharmacodynamics of bronchodilators and antiinflammatory drugs	• to write the relevant prescriptions
3. Following: 4. • internal diseases	• main clinical manifestations and use of broncholytics and antiinflammatory drugs in case of acute and chronic pulmonary diseases	• to perform clinical examinations of the patients, to prescribe the relevant additional examinations.
• general surgery	• main clinical manifestations of asthma status, acute respiratory failure in case of surgical pathology and peculiarities of prescribing broncholytics and antiinflammatory drugs	• to perform clinical examinations of the patients, to prescribe the relevant additional examinations.
Subjects	**Knowledge**	**Skills**

3.Interdisciplinary integration: • clinical pharmacology of α- and β-adrenostimulators, β-adrenostimulators, M-cholinomimetics, methylxanthines, expectorants, mucolytics and antiinflammatory drugs	• peculiarities of action of α- and β-adrenostimulators, β-adrenostimulators, M-cholinomimetics, methylxanthines, expectorants, mucolytics and antiinflammatory drugs	• 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 MODULAR 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 мг; amp. 2,4%
Tiotropium bromide	Tiotropium bromidum	aerosol 18 μg
Nedocromil sodium	Nedocromilum natricum	aerosol 1 dose - 2 mg
Salbutamol	Salbutamolum	aerosol 200 dose; tab. 2;4 mg
Salmeterol	Salmeterolum	aerosol 25 μg -120/doses
Fenoterol	Fenoterolum	aerosol 0,1 mg
Beclometasone dipropionate	Beclometasonum dipropionatum	aerosol 50, 100, 250 μg /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
Name in English	**Name in Latin**	**Drug forms**
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).

1.5 Clinical pharmacology of hormone drugs.

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 Chornobyl 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
1. Preceding :		
• normal anatomy	• structure and topography of endocrine organs and target organs	
• normal physiology	• endocrine system physiology	
• pathological anatomy	• morphological changes during endocrine system diseases	
• pathological physiology	• etiology and pathogenesis of endocrine system diseases	• to model the development of some pathology on the cell level, organ level and body level
• pharmacology	• classification, pharmacodynamics and pharmacokinetics of the relevant groups of drugs	• to write the relevant prescriptions
2.Following:		
• faculty therapy • hospital therapy	• the main clinical diagnostic criteria of endocrine organs diseases; endocrine diseases treatment principles	• to perform clinical examinations of the patients, to prescribe the relevant additional examinations and therapy plan.
• faculty surgery • hospital surgery	Preoperative preparation of a patient and postoperative period after removing pancreas, thyriod, pituitary adenoma and adrenal tumors	• to perform clinical examinations of the patients, to prescribe the relevant additional examinations and therapy plan.
Subjects	**Knowledge**	**Skills**
3.Interdisciplinary integration:		

• clinical pharmacology of antimicrobal drugs • interaction of drugs	• clinical pharmacological peculiarities of the relevant drugs; • potential variants and consequences of drugs interaction in endocrinology	• 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 pharnmacological 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 MODULAR 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).

1.6 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 : • normal anatomy • normal physiology • pathological physiology	• anatomy of internal organs • physiology of internal organs • etiology and pathogenesis of bacterial diseases	
Subjects	**Knowledge**	**Skills**

• pathological anatomy • microbiology • pharmacology 2. Following:	• morphological changes during bacterial diseases • characteristics of bacteria • pharmacology of antimicrobal drugs	• to write the relevant prescriptions
• internal diseases	• indiactions, contraindications and dosage of antimicrobal drugs in the internal diseases clinic	• to perform clinical examinations of the patients, to prescribe the relevant additional examinations.
• surgery	• indiactions, contraindications and dosage of antimicrobal drugs in surgical pathology	• to perform clinical examinations of the patients, to prescribe the relevant additional examinations.
3.Interdisciplinary integration: • clinical pharmacology of antiinflammatory and antihistamine drugs	• peculiarities of use of antiinflammatory and antihistamine drugs	• to prescribe a rational combination with the drugs of other groups • to write the relevant prescriptions

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) fosfomycin
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 MODULAR 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
Name in English	**Name in Latin**	**Drug forms**

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%
Fluconanazole	Fluconanazolum	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 мл

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

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

Subject: clinical pharmacology
Year of study: 5
Faculty: medical
Number of hours: 4

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 concrements (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**
1. Preceding:		
• normal anatomy • topographic anatomy	• structure and topography of digestive organs	
• normal physiology	• digestive system physiology	
• pathological anatomy	• morphological changes during gastrointestinal, liver, bile excretory routes and pancreas diseases	
• pathological physiology	• etiology and pathogenesis of digestive system diseases	• to model the development of some pathology on the cell level, organ level and body level
• pharmacology	• classification, pharmacodynamics and pharmacokinetics of relevant drugs	• to write the relevant prescriptions
2.Following:		
• faculty therapy • hospital therapy	• main clinical diagnostic criteria of digestive organs diseases; • digestive organs treatment principles	• to perform clinical examinations of the patients, to prescribe the relevant additional examinations and therapy plan.
Subjects	**Knowledge**	**Skills**

• faculty surgery • hospital surgery *3.Interdisciplinary integration:* • clinical pharmacology of antimicrobial drugs • interaction of drugs	• preoperative preparation of a patient and postoperative period during gastrointestinal and hepatobiliary zone diseases • clinical pharmacological peculiarities of relevant drugs; • potential variants and consequences of drugs interaction in gastroenterology	• to perform clinical examinations of the patients, to prescribe the relevant additional examinations and therapy plan. • 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 concrements.
- 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 H_2-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 choleretics and cholekinetics. 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 H_2-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 H_2 –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 MODULAR 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
Name in English	**Name in Latin**	**Drug forms**

Metoclorpramide	Metoclorpramidum	tab. 10 mg; amp. 2 ml
Omeprazole	Omeprazolum	cap. 20 mg
Pirenzepine	Pirenzepinum	tab. 25; 50 mg; amp. 0,5%
Prifinium bromide	Prifinium bromidum	tab. 30 mg, syrup
Rabeprazole	Rabeprazolum	tab. 20 мг
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).

Part 2

(faculty of dentistry, fourth year of study in "Clinical pharmacology", self-education**)**

2.1 Clinical pharmacological of anticoagulants

Subject: clinical pharmacology
Year of study: 4
Faculty: dentistry
Number of hours: 1

1. Topicality. Under normal conditions blood clotting happens when blood vessels are damaged, it stops bleeding thus having a protective function. Intravascular coagulation is a pathological process and happens during hemostasis system regulation disorder. The structure of a clot is a network of fibers of insoluble enzyme fibrin and formed elements of blood immobilized in the fibrin fiber. Maintaining the liquid state of blood within vessels and resistance to intravascular coagulation is provided by the anticoagulant blood system. Fibrin clots, which are created in the vessels, are ruined by the enzymes of fibrinolytic system.

Thromboembolic complications mainly happen in case of cardiovascular diseases. To the drugs influencing adhesion, aggregation and fibrinolysis belong: anticoagulants, antiaggregants and fibrinolytics. There are preventive and therapeutic types of antithrombotic medical therapy. In case of acute thrombosis, emboly and myocardial infarction thrombolytic drugs are widely used. Heparin is commonly prescribed in subacute phase of thrombosis and for its prevention. Laboratory control of blood coagulation and fibrinolytic systems is compulsory.

2. Educational aim. To get acquainted with the drugs used for treatment of thromboemboly. To know how to differentiate typical and nontypical clinical manifestations of thromboemboly, to interpret the laboratory data results. To learn the methods of prevention and treatment of thrombosis, thromboemboly and complicated myocardial infarction with the help of medications influencing blood coagulation system.

3. Materials for independent preparation for classes.

3.1. Basic knowledge and skills necessary for learning the topic (interdisciplinary integration).

Subjects	Knowledge	Skills
1. Normal physiology 2. Pathological physiology 3. Pathological anatomy 4. Pharmacology	Blood physiology, etiology and pathogenesis of blood diseases Morphological changes during cardiovascular system diseases Parmacodynamics and pharmacokinetics of drugs influencing blood coagulation system	To write the relevant prescriptions
5. Internal diseases 6. Surgery 7. Endocrinology 8. Cardiology 9. Hematology	Clinical manifestations and treatment of diseases, which require prescribing drugs influencing blood coagulation system	To perform clinical examinations of the patients, to prescribe the relevant additional examinations. To write the relevant prescriptions

3.2. Theme content:

1. Classification of drugs influencing blood coagulation system.
2. Drugs influencing fibrinolysis.
3. Anticoagulants of direct and indirect action, their classification and clinical pharmacological action.
4. Antiaggregants (inhibitors of cyclooxygenase, adenylate cyclase, thromboxane synthase), their classification and clinical pharmacological action.
5. Angioprotectors, their classification and clinical pharmacological action.
6. Antithrombotic medications with hemorheologic properties (dextran, hemodes), their classification and clinical pharmacological action.
7. Procoagulants of local and complete action. Their clinical pharmacological action.
8. Drugs enhancing clot destruction.
9. Etiology, pathogenesis, clinics, diagnosing, prevention and treatment of thrombosis.
10. Preventive measures and treatment of patients with myocardial infarction, lung artery embolization and brain artery thrombosis.

3.3. Recommended literature (see at the end of methodological instructions).

3.5. Materials for self- assessment:

A. Questions for self-assessment:

1. Enumerate the main symptoms of thrombosis.

2. Where does thromboemboly most often occur?
3. What are the reasons for thromboemboly development?
4. Name the anticoagulants of direct action.
5. Name the anticoagulants of indirect action.
6. Name the fibrinolytic drugs.
7. Enumerate the drugs which improve rheologic properties of blood.
8. The mechanism of angioprotectors action.

Materials for independent work in class:

4.1. The list of tasks to be performed at the practical class:

- to learn the skills of collecting information for anamnesis for a motivated choice of the optimal treatment taking into consideration blood hemostasis disorder. To know how according to clinical and laboratory data to approve the rational type of pharmacotherapy.

- to learn the modern principles of thromboemboly pharmacotherapy. – to chose the appropriate group of drugs and the drug itself for treatment, taking into consideration the peculiarities of pharmacodynamics and pharmacokinetics.

4.2. Instructions for studying the topic:

№	Tasks	Instructions	Comments
1.	To carry out the patient's treatment with drugs which decrease clot formation and prevent blood coagulation.	To find out during the examination: the peculiarities of the patient's allergological anamnesis; recent or current unwanted side effects of drugs influencing blood coagulation.	
2.	To evaluate the possible interaction and side effects of medications. To define the treatment scheme for different side effects manifestations of drugs influencing blood coagulation	To evaluate: Clinical examination results. Results of additional examinations. The possibility of drugs interaction during the treatment. To write the relevant prescriptions.	To pay attention to: Clinical manifestations of antiaggregant drugs side effects in anamnesis. The rules of preventing interaction of anticoagulant drugs with other medications.

4.3. Tests and tasks for assessment:

1. Which of the list of drugs has the direct effect as anticoagulant?

A) Sincumar

B) Heparin

C) Dipiridamole
D) Urokinase
E) Acetylsalicylic asid

2. Which drug belongs to anticoagulants of indirect effect?
A) Heparin
B) Dipiridamole
C) Urokinase
D) Acetylsalicylic asid
E) Neodicumarin

3. Choose the drug with fibrinolitic effect.
A) Heparin
B) Pentoxifylline
C) Streptodecase
D) Acetylsalicylic asid
E) Neodicumarin

4. Choose the drug which does not belong to anticoagulants:
A) Acetylsalicylic asid
B) Fibrinolysin
C) Dipiridamole
D) Pentoxifylline
E) Ticlopidine

5. One of the drugs given bellow belongs to low molecular weight heparins:
A) Sulodexide
B) Streptokinase
C) Heparin
D) Ticlopidine
E) Indobufen

Task 1. Patient M., 56 years old, admitted to the vascular surgery department in hospital because of subacute thrombophlebitis of lower extremities after usage of low molecular weight heparin (fraxiparine) in the following dose 0,3 ml subcutaneously during 14 days. After treatment course dyspepsia in the form of heartburn, nausea, epigastric pain developed. What was thw the sause of such problems? How are you going to change the treatment approach?

Task 2. Patient N., 62 years old, complains on heardache, ringing in the ears, bad hearing, mental confusion, frequent nausea and vomiting. Because of ischemic heart

disease patient takes aspirin in the dose of 500 mg/day. What is the cause of recrudescence? Describ your new treatment tactics.

5. Materials for independent work:

- Clinical meaning of using the drugs which increase thrombosis.
- Use of drugs enhancing clot destruction in complex treatment of myocardial infarction.

2.2 Clinical pharmacological of antiarrhythmic drugs. Clinical pharmacology of hypolipidemic drugs

Subject: clinical pharmacology
Year of study: 4
Faculty: dentistry
Number of hours: 1

1. Topicality. Treatment and prevention of cardiovascular diseases (CVD) including ischemic heart disease (IHD) and heart disorders is one of the current tasks of cardiology. One of the most frequent causes of death and disability in our society is acute myocardial infarction. When arrhythmia occurs the hemodynamic conditions are disturbed and cardiovascular failure develops. Early diagnosing of any form of IHD and arrhythmia helps to prevent the development of different types of acute or chronic heart failure. For proper use of medications it is necessary to possess the right diagnosis, definite indications and adequately chosen drugs. The study of pharmacotherapeutic action of antiarrhythmic drugs enables the doctors to give patients proper and qualified help in emergencies.

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 clinical pharmacological characteristics of antianginal and antiarrhythmic drugs. To draw the doctor's-to-be attention to the cardiovascular system pathologies and teach them the rational use of antiarrhythmic drugs taking into consideration mode of dosage, preventive measures and rules of writing out prescriptions, as well as clinical

pharmacological characteristics and principles of choosing the medications that influence lipid metabolism.

3. Materials for independent preparation for classes.

3.1. Basic knowledge and skills necessary for learning the topic (interdisciplinary integration).

Subjects	Knowledge	Skills
1.Normal anatomy	The structure of cardiovascular, respiratory, urogenital systems.	
2.Normal physiology	Physiology of cardiovascular, respiratory, urogenital systems. Iatrogenic pathology of cardiovascular system organs. Cardiovascular system disorders caused by medications.	
3.Pathological anatomy		
4.Pathological physiology	Drugs for treatment of cardiovascular system diseases.	
5.Pharmacology	Main clinical manifestations of interaction and side effects of drugs in medical practice.	To write relevant prescriptions
6.Internal diseases	Surgical aspects of interaction and side effects of some drugs combinations	To perform clinical examinations of the patients, to prescribe the relevant additional examinations.
7.General surgery		To perform clinical examinations of the patients, to prescribe the relevant additional examinations.

3.2. Theme content:

1. Modern classification of antiarrhythmic drugs.
2. Clinical pharmacological characteristics of antianginal drugs.
3. Clinical pharmacological characteristics of β-blockers.
4. Clinical pharmacological characteristics of blockers of slow calcium channels.
5. Clinical pharmacological characteristics of membrane stabilizing drugs.
6. Clinical pharmacological characteristics of F-channel blockers.
7. Clinical pharmacological characteristics of antiarrhythmic drugs of different groups.

8. Classification of lipid lowering drugs.
9. Clinical pharmacological characteristics of inhibitors of 3-hydroxy-3-methylglutaryl-coenzyme α-reductase (HMG-CoA-reductase) – statines.
10. Clinical pharmacological characteristics of bile acid sequestrants.
11. Clinical pharmacological characteristics of nicotine acid as a lipid lowering drug.
12. Clinical pharmacological characteristics of Fibric acid derivatives (fibrates).
13. Clinical pharmacological characteristics of omega-3 polyunsaturated fatty acids.
14. Goal levels of lipidogram parameters during the treatment with lipid lowering drugs.
15. Principles of drugs used for dyslipidemia treatment choice.

3.3. Recommended literature (see at the end of methodological instructions).

3.5. Materials for self- assessment:

A. Questions for self-assessment:

1. What is the mechanism of action and pharmacokinetics of Ia class antiarrhythmic drugs?
2. What is the mechanism of action and pharmacokinetics of Ib class antiarrhythmic drugs?
3. What is the mechanism of action and pharmacokinetics of Ic class antiarrhythmic drugs?
4. What is the mechanism of action and pharmacokinetics of II class antiarrhythmic drugs?
5. What is the mechanism of action and pharmacokinetics of III class antiarrhythmic drugs?
6. What is the mechanism of action and pharmacokinetics of antiarrhythmic drugs of different groups?

Materials for independent work in class:

4.1. The list of tasks to be performed at the practical class:

- to carry out the treatment of the patient taking into consideration the main pharmacotherapy principles for antiarrhythmic drugs by choosing the safest and the most effective medications according to information about their pharmacodynamics, pharmacokinetics, possible side effects and interaction;
- to analyze the prescriptions in order to find out the incompatible administration and predict the possible drugs interaction taking into consideration the clinical condition of the patient.

4.2. Instructions for studying the topic:

№	Tasks	Instructions	Comments
1.	To carry out the patient's treatment from the pharmacological anamnesis and possible prescription of antiarrhythmic drugs	To find out during the examination: the peculiarities of the patient's pharmacological anamnesis.	
2.	To define the scheme of IHD treatment with antiarrhythmic drugs	To evaluate: Clinical examination results. Results of additional examinations. The possibility of antiarrhythmic drugs prescription. To write out the relevant prescriptions.	To pay attention to: Clinical manifestations antiarrhythmic drugs. The rules of preventing interaction of drugs.

4.3. Tests and tasks for assessment:

1. Which of the following β-adrenoblockators has both vasodilative and membrane stabilizing effects, and possesses internal adrenomimetic effect ?
A) Nebivolol
B) Atenolol
C) Bisoprolol
D) Labetalol
E) Bopindolol

2. Which of the following β-adrenoblockators is selective?
A) Bopindolol
B) Bisoprolol
C) Oxprenololum
D) Sotalol
E) Nadolol

3. Combined prescribing of β-adrenoblockators with verapamil or amiodaronum may cause
A) Severe dyspepsia, diarrhea
B) Decrease of blood coagulation, bleeding
C) Bradycardia, decrease of miocard contractions
D) Ricochet hypertension
E) Paroxysmal tachycardia

4. To antiarythmia medicine belong all except
A) Membrane stabilizing medicine
B) β-adrenoblockators

C) Inhibitors of repolarisation
D) Blockators of the slow calcium channels
E) Cardiac glycosides

5. Choose the medicine, which vividly prolong the potential of action
A) Chinidinum, procainamide, disopyramidum
B) Lidocaine, trimecaium, pyromecainum
C) Nebivolol, metoprolol, atenolol
D) Aethacizium, ajmalinum, propafenone
E) Amiodaronum, bretylium

Tas 1. After myocardial infarction patient developed ventricular arrhythmia Cardiac rhythm had been normalized after injection of antiarrythmic drug with local anaethtetic activity. What was this drug? (panangin, verapamil, lidocainum, propranolol, benzocaine)

Tas 2. Patient B., 58 years old, takes medication (digoxin 0,0005 mg/day) because of ischemic heart disease, atherosclerotic cardiosclerosis, chronic cardiac insufficiency II B stage. After 20 days of treatment course nausea, vomiting, irregular pulse, yellow vision. What is your diagnosis? How will you change the treatment?

5. Materials for independent work:

- Clinical meaning of F-channel blockers in modern arrhythmia treatment.
- The main pharmacokinetic and pharmacodynamic interactions of antiarrhythmic drugs.
- Prevention and predicting of antiarrhythmic drugs unwanted effects.

2.3 Clinical pharmacological of agents that affect intestinal motility and secretion

Subject: clinical pharmacology
Year of study: 4
Faculty: dentistry
Number of hours: 1

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 concrements (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. Materials for independent preparation for classes.

3.1. Basic knowledge and skills necessary for learning the topic (interdisciplinary integration).

Subject	Knowledge	Skills
1. Pathological physiology	Etiology and pathogenesis of allergic diseases	
2. Pathological anatomy	Morphological changes during allergic diseases	
3. Pharmacology	Classification and pharmacodynamics of antihistamine drugs	to write the relevant prescriptions
4. Internal diseases	Main clinical manifestations of immediate and delayed allergic reactions, bronchial asthma	to perform clinical examinations of the patients, to prescribe the relevant additional examinations.
5. General therapy	Main clinical manifestations of asthma status, acute respiratory failure, lung swelling	to perform clinical examinations of the patients, to prescribe the relevant additional examinations.
6. Clinical pharmacology of antihistamine drugs	Peculiarities of action of 1,2 and 3 generation antihistamine drugs	to write the relevant prescriptions

3.2. Theme content:

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

3.3. Recommended literature (see at the end of methodological instructions).

3.5. Materials for self- assessment:

A. Questions for self-assessment:

1. Pharmacokinetics of antacids with neutralizing action and their interaction with other drugs.
2. Which side effects are characteristic of H_2-receptors blockers?
3. What does the clinical pharmacological approach to the choice of drugs in type B chronic gastritis treatment include?
4. Name the modern drugs with active prokinetic action and indications for their use.
5. Clinical pharmacological approach to the correction of intestinal dysbacteriosis caused by antibiotic therapy.
6. What drugs and with what aim are used in case of unspecified ulcerative colitis?
7. Tell the difference in pharmacological action of choleretics and cholekinetics. What are the contraindications for use of bile-expelling drugs?
8. Modern possibilities of gallstone disease conservative treatment.
9. Peculiarities of hepatoprotectors use in clinical practice.
10. Which group of drugs is the basis for treatment of chronic active hepatitis of viral etiology?

11. What does the clinical pharmacological approach to the choice of drugs in chronic pancreatitis treatment include?
12. What group of drugs is used in liver coma treatment?

Materials for independent work in class:

4.1. The list of tasks to be performed at the practical 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;
- to analyze the prescriptions in order to find out the incompatible administration and predict the possible drugs interaction taking into consideration the clinical condition of the patient.

4.2. Instructions for studying the topic:

№	Tasks	Instructions	Comments
1.	To carry out the patient's treatment taking into consideration gastrointestinal diseases and possible interaction and side effects of drugs	To find out during the examination: the peculiarities of the patient's anamnesis. Recent or current unwanted side effects of drugs	
2.	To define the scheme of treatment of different side effects (nausea, vomiting, dizziness)	To evaluate: Clinical examination results. Results of additional examinations. The possibility of drugs interaction during the treatment. To prescribe the adequate treatment of drug interaction side effects.	To pay attention to: manifestations of side effects of drugs in anamnesis. The rules of preventing interaction of drugs with other medications. Writing the relevant prescriptions

4.3. Tests and tasks for assessment:

1. Drugs used in treating peptic ulcer include
A) Histamine H_2-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 H_2 –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

Task 1. Patient M., 45 years old, used aspirin, like to drink coffee (5 cups/day). Patient complains of pain in stomach, weakness. What is the mater? What are you going to do?

Task 2. Patient D., 62 years old, attended to hospital with black stool and fatigue. What is your diagnosis? How are you going to help this patient?

5. Materials for independent work:

- Characterise histamine H_2-receptor antagonists
- Classification of proton pump inhibitors
- Adverse effects of proton pump inhibitors and histamine H_2-receptor antagonists.
- Indications for antibiotics in gastrointestinal diseases.
- Role (importance) of cytoprotective agents

Appendix

Protocol of medication choice

Drugs use efficiency and safety evaluation form
(according to curation data)

Patient's full name_____
_____
Age_____
Date of application_____
Duration of hospital treatment previous to curation_____

Diagnosis:
Main:_____
_____
_____
_____
_____
_____
_____
Complications:_____
_____
_____
_____
_____
_____
Accompanying:_____
_____
_____
_____
_____
_____
_____

Curator: st._____**year**
_____**faculty**
_____
_____
Lecturer: _____

Evaluation of patients condition dynamics during the treatment.
Health history.

Life anamnesis_____
_____

Previous illnesses
_____
_____

Operations, trauma
_____
_____

Injuries _____
_____

Professional
risks_____
_____

Cardiovascular system
Patient's complaints

Complaints	At time of application	During curation
Heart pains: during a day (frequency)		
at night		
presence of permanent pains		
number of nitroglycerin pills per day		
Type of pain: sharp pains		
pressing pain		
Peculiarities of occurrence: during exercise		
other causes (specify)		
Complaints about heart rhythm disorders (frequency of occurrence)		
missing heartbeats		
atrial fibrillation attacks (tachy-, normo-, brady-, attack, constant form)		
constant form of atrial fibrillation (tachy-, normo-, brady-)		
Bradycardia (frequency of occurrence)		
Weakness		
Dyspnea: during exercise		
at rest		
Chocking attacks		

Swelling		
Blood pressure fluctuations		

Illness anamnesis

Beginning of symptoms manifestation, illness development dynamics_____
_____
_____

Complications:
acute myocardial infarction_____ acute cerebrovascular accident
Peculiarities of recent dynamics
_____
_____

Examination data

Blood pressure		
Heart rate		
Heart rhythm: correct		
extrasystole, rate per 1 minute		
atrial fibrillation (tachy-, normo-, brady)		
Hheart murmurs		
Swellings: absent		
location		
mucosa color: pink		
cianosis		

Extra examinations data

Echocardiogram (in dynamics)
_____
_____
_____
Blood coagulation _____
_____
_____
_____
Cholesterol _____β-lipoproteides _____HDL_____LDL _____
Echocardiogram _____
_____
_____

5. Consultations

Oculist

_____

Respiratory system

1. Patient's complaints

Complaints	At time of application	During curation
Cough: frequency of attacks		
phlegm in cough		
Type of phlegm: mucus		
purulent		
Complaints	At time of application	During curation
Time of occurrence: in the morning		
during the day		
at night		
Wheeze: absent		
dry		
Chest pains during breathing		
Weakness		
Dyspnea		
Choking attacks in case of broncho-obstructive syndrome: frequency during the day		
frequency at night		
number of broncholytics inhalations per day		

Anamnesis_____

_____

Previous illnesses _____

_____

_____

Operations, trauma _____

Injuries _____

Professional risks_____

_____

_____

Examination data

Respiratory rate		
Wheeze: absent		
dry		
moist		
single		
multiple		
crepitation		
Weak breathing (location)		
Percussion date: lung sound		
dull sound		

Extra examinations data

Radioscopy (radio- or fluoroscopy)

_____
_____
_____

Spirography _____
_____
_____

Gastrointestinal tract

1. Patient's complaints

Скарги	At time of application	During curation
Pains: absent		
in epigastrium		
in right hypochondrium		
in left hypochondrium		
in umbilical area		
around all the abdomen		
other		
Time and peculiarities of: before meal		
after meal		
irrespective of meal		
during the day		
at night		
Character of: acute		
dull		

cutting		
prickly		
Nausea		
Vomiting (times a day)		
Bitter taste in the mouth		
Character of stool constipation		
diarrhea		
Bloating		

Anamnesis

Beginning of symptoms manifestation, illness development dynamics

_____

_____

Complications:

_____

_____

_____

Peculiarities of recent dynamics _____

_____

_____

Examination data

Tenderness to palpation: absent		
in epigastrium		
in pyrrolo-duodenal zone		
in right hypochondrium		
in left hypochondrium		
in umbilical area		
in pubic area to the left, right		
around all the abdomen		
Positive symptom		

Extra examinations data

Complete blood count: Erythrocytes_____Hemoglobin _____ Leukocytes _____ Erythrocyte sedimentation rate (ESR)_____

_____

Hepatic complex

Ultrasound of liver, gall bladder, pancreas

Musculoskeletal system
Patient's complaints

Complaints	At time of application	During curation
Pains in joints: constantly		
during exercise		
Pains location: all large joints		
small joints		
separate joints (specify)		
spine (specify the segment)		
Severity of pain according to the 5(10) points scale		
Stiffness of joints in the morning (duration)		
Swelling of joints (specify which)		

Anamnesis
Beginning of symptoms manifestation, illness development dynamics

Complications:

Peculiarities of recent dynamics

Examination data

Joints deformation (specify which)		
Swelling of joints (specify which)		

Extra examination data
Radioscopy

_____
_____

Consultation of orthopedist-traumatologist

_____

Urinary system
Patient's complaints

Complaints	At time of application	During curation
Enuresis		
Urinating difficulty		
Complaints	At time of application	During curation
Frequent urinating: absent		
during the day		
at night (number of times)		
Pains in kidney area		

Anamnesis
Beginning of symptoms manifestation, illness development dynamics

_____
_____
Complications:

_____

Peculiarities of recent dynamics

_____
_____

Examination data

Pasternatsky's symptom: negative		
positive to the left, right		

Extra examination data
Complete urine analysis:

_____
_____

Hepatic complex

_____

_____

Ultrasound of kidneys, urinary bladder, prostate

_____

_____

Consultation of urologist

_____

_____

Cerebral blood flow and central nervous system condition Patient's complaints

Complaints	At time of application	During curation
Dizziness		
Complaints	At time of application	During curation
Headache: location		
time of occurence		
Sleepiness		
Insomnia		
Parkinsonism manifestation		
Unsteadiness of gait		

Anamnesis

Beginning of symptoms manifestation, illness development dynamics

_____

_____

Complications:_____

_____

Peculiarities of recent dynamics

_____

Extra examinations data

Radioscopy

_____

Ultrasound of brain vessels

_____

Neuropathologist's conclusion

_____
_____
_____

Peripheral blood circulation condition
Patient's complaints

Complaints	At time of application	During curation
Heavy feet		
Pain in the calf muscles: while walking		
at rest		
Distance covered before the muscle pain		
Болі у стопах		
Похолодання, мерзлякуватість ніг		
Судоми у литкових м'язах		

Anamnesis
Beginning of symptoms manifestation, illness development dynamics

_____
_____
Complications:
_____
_____

Peculiarities of recent dynamics
_____

Examination data

Varicose vascular lesion		
Feet skin color		
Trophic disorders		

Extra examinations data
Rheovasography of the lower extremities vessels

_____
_____
_____
Consultation of surgeon
_____
_____

Diagnosis:
Main**:**_____
_____
_____
Complications of the main illness
_____
_____
Accompanying:_____
_____
_____
TREATMENT PLAN
_____
_____
Characteristics of the drugs administered to the patient
_____
_____
_____
_____

A) Justification of administration.

Drug, dosage form, dosage and number of intake	Aim of administration
А) Influence on the main illness	
Б) Influence on the accompanying illnesses	

В)Administered drug safety evaluation

Drug	Main side effects	Safety criteria (methods of control)	Patient's possession
1	1. 2. 3. 4.		
2	1. 2. 3. 4.		

Side effects noticed in two or more drugs, which may increase during joint administration:

1._____
2._____
3._____

Interaction of drugs administered to the patient (Pharmacodynamics)

№	Drug	1	2	3	4	5	6	7	8	9	10
1		X									
2			X								
3				X							
4					X						
5						X					
6							X				
7								X			
8									X		
9										X	
10											X

«+» - the combination is effective and safe

«+/-» - therapeutic effect is enhanced during interaction, but side effects may increase (specify)

1._____
_____
2._____
_____
3

«-» - the combination is irrational (specify why, from your point of view)

_____
_____

Conclusion according to the results of drugs interaction in the treatment of the chosen patient.

Efficiency of administered drugs

Positive dynamics:

_____
_____

Negative dynamics (reasons):

_____
_____

Without changes (reasons):
_____
_____

Б) Justification
Administration_____
_____

В) Safety_____
_____

Г) Rationality of combination
_____

Outpatient treatment recommendations

Drug	Intake scheme+justification
Constant intake at home	
Duration of treatment started in hospital	

Report on side reactions/effects (sr/se) of drugs

National Classification Management Documentation code _ _ _ _ _ _ _
All-Ukrainian classification of enterprises and organizations code_ _ _ _ _ _ _

Ministry of Health of Ukraine		MEDICAL DOCUMENTATION FORM №_ _ _ _ _ _ _ _ _ _ _ _ Approved by order of the Ministry of Health of Ukraine_ _ _ _ _ _ _ _ _ _ _ _ №_ _ _ _ _ _ _ _ _ _

REPORT ON SIDE REACTIONS / EFFECTS (SR / SE) OF DRUGS (D)

I. INFORMATION ABOUT THE PATIENT AND SR/SE (number of medical history or outpatients record)

1. Full name	2. Place of birth	3. Age	4. Sex	Start of SR/SE			7. Start of SR/SE (underline the necessary)
				day	month	year	A-recovery without consequences B-recovery with consequences C-without change D- death as a result of drug administration E-death, probably due to drug F-cause of death unknown
6. Description of SR/SE							

II. INFORMATION ABOUT THE SUSPECTED DRUG (SD)

8.Suspected drug (name, manufacturer, country)				16. Was the withdrawal of the drug accompanied by the disappearing of SR/SE? Yes No Don't know
9. Single dose	10. Daily dose	11. Frequency of intake	12. Way of administration	17. Did the SR/SE repeat after second administration of the drug? Yes No Don't know

13. Indications for SD prescription						Clinical diagnosis
14. Date of administration from-to					15. Duration of therapy before the start of SR/SE	

III. ACCOMPANYING DRUGS AND ANAMNESIS

18. Accompanying drugs and dates of administration (except the drugs for SR/SE correction)

19. Other data from anamnesis (illnesses, allergy, pregnancy, harmful habits), chemical toxicants, ionizing radiation, adverse effects of Chornobyl tragedy

IV. MEANS OF SR / SE CORRECTION (underline the necessary)

Withdrawal of SD Without correction

Decrease of SD dose Withdrawal of accompanying drug (specify which)

Drug therapy of SR/SE
(which drugs were used)

V. ADDITIONAL DATA

Specific data of clinical, laboratory, radiological and autopsy studies, including determining the concentration of drug in the blood / tissues, if any, and related SR / SE (specify standards and dates)

_____

_____

VI. INFORMATION RELATED TO SD AND SR/SE

Has the patient used the SD before? Yes No Don't know

If yes, which SR/SE occurred – the same or different
Yes No Don't know

If different – specify which

Have other drugs caused similar SR/SE?
If yes – which drugs Yes No Don't know

Has the patient had similar clinical manifstations of SR/ SE not related to drug use? Yes No Don't know

Could other factors influence the development of SR/SE (systematical illnesses, drug addiction, environment, chemical toxicants, ionizing radiation, adverse effects of Chornobyl tragedy, allergy)?

Yes No Don't know

If yes, specify which

VII. DRUG STATUS (underline the necessary)

Clinical tests Use in medical practice

VIII. OTHER PECULIARITIES OF CLINICS, TREATMENT OF CONSEQUENCES

_____
_____
_____

Date_____ Signature_____

List of abbreviations: D-drug; SR – side reaction; SD – suspected drug

Note. Reports are sent to the State Pharmacological Center of the Ministry of Health of Ukraine at Kyiv, 03680. str. Narodnoho Opolchennya, 5. M.D. Strazhesko Institute of Cardiology Academy of Medical Sciences of Ukraine, Clinical Pharmacology department – Pharmacological Supervision department of State Pharmacological Center of the Ministry of Health of Ukraine tel/fax (044) 249 70 01.

Final modular test. List of tests for the final modular assessment

ANTIANGINAL DRUGS

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 route 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 dromotropic 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

7. Positive bathmotropic action of cardiac glycosides appears in the case of:
A) toxic concentration of glycosides in a patients' blood
B) increased heart rate and minute volume
C) inverted wave T on ECG
D) therapeutic concentration of glycosides in a patients' blood
E) connection with nervous vagus activity

8. In the case of renal insufficiency we should revise the dosage regimen of:
A) strophanthine
B) digoxin
C) digitoxin
D) all drugs above
E) none drugs above

9. Coefficient of elimination of strophanthine is equal to:
A) 2-5%
B) 7-10%
C) 20-35%
D) 40-50%
E) more than 60%

10. Choose the proper indication for cardiac glycosides use.
A) ventricular tachycardia
B) ventricular bradycardia
C) chronic systolic form of cardiac insufficiency
D) chronic diastolic form of cardiac insufficiency
E) cardiac insufficiency with high minute volume

11. The list of symptoms of intoxication with cardiac glycosides does not include:
A) abdominal pain
B) headache
C) hyperthermia
D) xanthopsia

E) gynecomastia

12. Choose short acting nitroglycerin ...
A) nitroglycerin (Sustac forte)
B) nitroglycerin (Sustonit)
C) nitroglycerin (Nitroglycerin)
D) nitroglycerin (Trinitrolong)
E) nitroglycerin (Nitroderm)

13. Name the short acting isosorbide mononitrate.
A) Cardix Mono
B) Mono Mack Depot
C) Iso Mack retard
D) sustac forte
E) Mono Mack

14. Choose the characteristic which is not appropriate for nitrates:
A) hydrodynamic cardiac unload
B) alleviation of cardiac wall tension
C) dilation of coronary vessels under myocardium
D) reduction in remodeling of heart and vessels
E) dilation of brain vessels and lesser circulation vessels'

15. One of the statements, given below, is considered to be nitrate like compound.
A) Nitroderm
B) Cardioguard SR
C) Molsidomine
D) Cardix Mono
E) Mono Mack

16. All of drugs given below are nonselective β-adrenergic blockers, except:
A) Bopindolol
B) Sotalol
C) Timolol
D) Acebutalol
E) Propranolol

17. Which drug is considered to be nonselective β-adrenergic blocker with vasodilative properties?
A) Pindolol
B) Sotalol

C) Bopindolol
D) Nadolol
E) Timolol

18. Which drug is considered to be nonselective β-adrenergic blocker with intrinsic adrenomimetic activity?
A) Atenolol
B) Sotalol
C) Timolol
D) Pindolol
E) Propranolol

19. All drugs given below are nonselective β-adrenergic blockers without intrinsic adrenomimetic activity, except:
A) Nadolol
B) Timolol
C) Sotalol
D) Propranolol
E) Bopindolol

20. All drugs, given below are cardioselective β-adrenergic blockers, except:
A) Atenolol
B) Bisoprolol
C) Nadolol
D) Carvedilol
E) Esmolol

21. Which drug is considered to be cardioselective β-adrenergic blocker with vasodilative properties?
A) Carvedilol
B) Acebutalol
C) Bisoprolol
D) Esmolol
E) Betaxolol

22. Bioavailability of Bisoprolol is equal to:
A) 85%
B) 20%
C) 15%
D) 30%
E) 50%

23. Bioavailability of Carvedilol is equal to:
A) 5%
B) 25%
C) 30%
D) 50%
E) 100%

24. Which of the following assertions is not correct regarding main indications for use of β-adrenergic blockers?
A) exertional angina pectoris
B) arterial hypertension
C) prevention of recurrent myocardial infarction
D) atrioventricular block
E) chronic cardiac insufficiency

25. All adverse effects given below are those of cardiovascular system, except:
A) sinus bradycardia
B) sinus tachycardia
C) arterial hypotension
D) impairment of sinoatrial conduction
E) aggravation of chronic cardiac insufficiency

26. Which feature develops following treatment with cardiac glycosides in nearly toxic doses?
A) positive chronotropic effect
B) negative dromotropic action
C) negative chronotropic effect
D) positive bathmotropic action
E) negative bathmotropic action

27. Cardiac glycosides are characterized by:
A) high therapeutic index
B) low therapeutic index
C) low cumulation
D) fast elimination by dialysis
E) inability to protein binding

28. Which of the β-adrenergic blockers, given below, is considered to be membrane stabilizer?
A) Betaxolol

B) Carvedilol
C) Sotalol
D) Metoprolol
E) Celiprolol

29. Which of the β-adrenergic blockers, given below, is considered to be lipophilic?
A) Atenolol
B) Sotalol
C) Nadolol
D) Carvedilol
E) Bisoprolol

30. Which of the following drugs is not inotropic.
A) cardiac glycosides
B) β_1 - adrenergic agonists
C) phosphodiesterase inhibitors
D) β - adrenergic blockers
E) basophil stabilizers

31. Polar cardiac glycosides include the following:
A) strophanthine, digoxin
B) izolanide, digoxin
C) methyldigoxin, acetyldigitoxin
D) strophanthine, corglucone
E) digitoxin, digoxin

32. Nonpolar cardiac glycosides are:
A) hydrophobic compounds
B) hydrophilic compounds
C) lipophilic compounds
D) amphiphilic compounds
E) liposoluble compounds

33. Treatment with cardiac glycosides includes the following periods:
A) exhaustion time and saturation time
B) digitalization and maintenance
C) acute and chronic digitalizing periods
D) saturation time and adaptive period
E) digitalis cumulation period and elimination period

34. Which drug is considered to be selective β-adrenergic blocker?
A) Atenolol
B) Sotalol
C) Propranolol
D) Metoprolol
E) Labetalol

35. Chronic use of amiodarone may cause:
A) iatrogenic thyroiditis
B) iodine-induced thyrotoxicosis
C) secondary hypothyroidism
D) De Quervain thyroiditis
E) thyroid autonomy

36. Which drug of the β-adrenergic blockers, given below, does not affect cardiac rhythm?
A) Carvedilol
B) Metoprolol
C) Atenolol
D) Pindolol
E) Bopindolol

37. Cardiac glycosides are characterized by:
A) positive inotropic, negative dromotropic and chronotropic actions
B) negative inotropic, positive dromotropic and chronotropic actions
C) positive inotropic, dromotropic and chronotropic actions
D) negative inotropic, dromotropic and chronotropic actions
E) positive inotropic, dromotropic and negative chronotropic actions

38. Polar cardiac glycosides are:
A) hydrophobic compounds
B) hydrophilic compounds
C) lipophilic compounds
D) amphiphilic compounds
E) liposoluble compounds

39. Which statement is not correct relating to β-adrenergic blockers?
A) diminishing of insulin secretion from β-cells in islets of Langerhans
B) inhibition of gluconeogenesis in the liver
C) lowering of lipolysis

D) precipitation of hypoglycemia on the base of insulin treatment
E) activation of glycogenolysis in the liver

40. Which β-adrenergic blocker is allowed in the treatment of pheochromocytoma?
A) Metoprolol
B) Propranolol
C) Labetalol
D) Bisoprolol
E) Nebivolol

41. Onset of action of isosorbide dinitrate following sublingual route of administration is equal to:
A) 2,5-10 minutes
B) 10-15 minutes
C) 15-20 minutes
D) 20-25 minutes
E) 25-30 minutes

42. Peak of action of isosorbide dinitrate following sublingual route of administration is achieved after:
A) 10-20 minutes
B) 20-40 minutes
C) 40-60 minutes
D) 2 hours
E) 6 hours

43. Adverse effects of venous vasodilators include all of the following, except:
A) methemoglobinemia
B) withdrawal syndrome
C) reflex tachycardia
D) headache
E) tremor of hands

44. One of the following reduces nitroglycerine absorption.
A) alcohol
B) tricyclic antidepressant
C) atropine
D) potassium supplement
E) antihistaminic drug

45. One of the statements, given below, is not contraindicated in the treatment with venous vasodilators.
A) angle-closure glaucoma
B) severe anemia
C) hypovolemia
D) Prinzmetal's angina
E) increased intracranial pressure

46. Half time (in hours) for strophanthine is equal to:
A) 12-20
B) 20-24
C) 24-28
D) 28-32
E) 32-36

47. Absolute contraindication for cardiac glycoside use is:
A) cardiac fibrillation
B) sick sinus syndrome
C) glycoside intoxication
D) sinus bradycardia
E) ventricular rhythm disturbances

48. Toxic effects of digitalis treatment does not include:
A) insomnia disorder
B) headache
C) dizziness
D) depression
E) radiculitis

49. Which group of drugs, given below is allowed to be used in case of glycoside intoxication ?
A) sorbates
B) antiaggregants
C) fibrinolytic agents
D) antidepressants
E) antiarrhythmic drugs

50. Cardiac glycosides do not include:
A) strophanthine
B) digoxin

C) lanatoside C
D) corglucone
E) lansoprazole

ANTIBACTERIALS

51. 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

52. 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

53. 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

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

55. The drug of choice for the treatment of gastric thrush, caused by Candida albicans is:
A) clotrimazole
B) fluconazole
C) levorinum

D) natamycin
E) amphotericin B

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

57. The drug of choice for the treatment of infections caused by chlamydia is:
A) benzylpenicillinum
B) amoxicillin + clavulanate
C) clarithromycin
D) vancomycin
E). cefepime

58. The drug of choice for the treatment of diseases caused by methicillin resistant staphylococcus is:
A) amoxicillin + clavulanate
B) imipenem + cilastatine
C) cefotaxime
D) azithromycin
E) teicoplanin

59. The drug of choice for the treatment of diseases caused by mycoplasma is:
A) sparfloxacin
B) tetracycline
C) tobramycin
D) spiramycin
E) chloramphenicol

60. Which group or drugs does not act toward enterococcus.
A) cephalosporins
B) penicillins
C) aminoglycosides
d) rifampicin
E) glycopeptides

61. Revision of drug prescription is needed in the case of liver insufficiency if a patient takes:
A) amoxicillin
B) oxacillin
C) carbenicillin
D) ampicillin
E) phenoxymethylpenicillin

62. Carbapenems affect:
A) chlamydia
B) mycoplasm
C) listeria
D) methicillin resistant staphylococcus
E) clostridium

63. For empirical treatment of suppurative osteomyelitis it is necessary to take
A) ampicillin
B) aztreonam
C) ceftibuten
D) chloramphenicol
E) lincomycin

64. One of the following drugs in high dose is eliminated with bile.
A) tobramycin
B) erythromycin
C) vancomycin
D) chloramphenicol
E) clindamycin

65. This group of drugs is not used for the treatment of dento-alveolar abscess.
A) macrolides
B) cephalosporins
C) lincosamides
D) tetracyclines
E) polyene antibiotics

66. Choose the broad spectrum antibiotic or group of antibiotics.
A) second generation cephalosporins
B) third generation macrolides
C) aminopenicillins
D) ketolides

E) fosfomycin

67. Choose the antibiotic with restricted dosage regimen.
A) third generation cephalosporins
B) chloramphenicol
C) lincosamides
D) tetracyclines
E) ristomycin

68. Choose the antibiotic with strict dosage regimen.
A) fosfomycin
B) azithromycin
C) piperacillin
D) ceftriaxone
E) amoxicillin + clavulanate

69. Choose the nephrotoxic antibiotic.
A) roxithromycin
B) vancomycin
C) fosfomycin
D) fusidin
E) rifampicin

70. Choose the ototoxic antibiotic.
A) meropenem
B) aztreonam
C) gentamicin
D) ceftazidime
E) spectinomycin

71. Point the antibiotic with hematotoxic effect.
A) mupirocin
B) cefalotin
C) fusafungine
D) amoxicillin
E) chloramphenicol

72. Choose antibiotic with hepatotoxicity.
A) benzylpenicillin
B) bacitracin
C) telithromycin

D) tetracycline
E) fosfomycin

73. Which antibiotic or group of antibiotics causes allergic reactions more than others?
A) macrolides
B) penicillins
C) aminoglycosides
D) ketolides
E) fusidin

74. Which of the following antibiotics does not produce photosensitization.
A) tetracycline
B) oxytetracycline
C) metacycline
D) doxycycline
E) minocycline

75. Choose the antibiotic which may be only used by inhalation.
A) gramicidin
B) bacitracin
C) spectinomycin
D) mupirocin
E) fusafungine

76. Chloramphenicol affects:
A) staphylococcus
B) coryneformic bacteria
C) enterococcus
D) Haemophilus influenza type B
E) Bacillus aeruginosa

77. Doxycycline acts toward:
A) staphylococcus
B) chlamydia
C) enterococcus
D) Haemophilus influenza type B
E) coryneformic bacteria

78. Mupirocin has an influence on:
A) chlamydia, mycoplasm

B) staphylococcus, streptococcus
C) Escherichia coli, proteus
D) gonococcus, Neisseria meningitidis
E) Clostridium, bacteroides

79. One of the drugs given below is combined sulfanilamide:
A) Co-trimoxazol
B) salazosulfapyridine
C) salazopyridazinum
D) sulfapyridazinum
E) sulfalenum

80. Sulfanilamide are sensitive to the following:
A) enterococcus, Gardnerella
B) mycoplasm, chlamydia
C) Bacillus aeruginosa, Treponema pallidum
D) staphylococcus, streptococcus
E) Clostridium, bacteroides

81. Choose sulfanilamide which in high concentration in active form may be found in bile
A) sulfadimezin
B) sulfisoxazole
C) sulfalenum
D) sulfazinum
E) sulfamethoxazole

82.Which adverse effect is not common for sulfanilamide?
A) methemoglobinemia
B) allergic reactions
C) neutropenia, thrombocytopenia
D) neuritis, ataxy, vertigo
E) hearing loss

83. Which quinolone may cause iodism?
A) enteroseptol
B) intestopanum
C) nitroxoline
D) chlorquinaldol
E) cinoxacin

84. Which microorganisms are high sensitive to nalidixic acid and oxolinic acid?
A) gram-positive cocci
B) gram-negative cocci
C) gram-positive bacilli
D) gram-negative bacilli
E) protozoa

85. Which adverse effect may appear following use of the second generation quinolones?
A) hepatotoxicity
B) nephrotoxicity
C) hematologic toxicity
D) ototoxicity
E) cardiotoxicity

86. The mechanism of action of fluoroquinolones is:
A) impairment of microbial wall synthesis
B) damage of microbial wall function
C) inhibition of protein synthesis on ribosomes
D) formation of complexes with nucleic acids, precipitating block of their activity
E) inhibition of DNA gyrase of microorganisms

87. Which microorganisms are high sensitive to fluoroquinolones?
A) Neisseria
B) Treponema pallidum
C) Methicillin-resistant Staphylococcus aureus MRSA (
D) Enterococcus faecium
E) Pseudomonas mallei

88. Name the drug which is able to enhance ability of an individual to fight off the detrimental effects of microorganisms and their toxic products.
A) sulfadimethoxine
B) amoxicillin + clavulanate
C) ciprofloxacin
D) sulperason
E) furazidin

89. This microorganism is not sensitive to nitrofurans.
A) proteus
B) Escherichia coli

C) shigella
D) salmonella
E) meningococci

90. Nitroimidazoles are not effective toward:
A) protozoa
B) anaerobes
C) campylobacter
D) mycoplasm
E) Gardnerella

91. Half-life of short-acting sulfonamides is:
A) nearly 2 hours
B) 2–4 hours
C) nearly 8 hours
D) 10–20 hours
E) more than 24 hours

92. Half-life of intermediate-acting sulfonamides is:
A) 2–5 hours
B) 5–7 hours
C) 8–16 hours
D) 24–48 hours
E) more than 48 hours

93. Half-life of long-acting sulfonamides is:
A) 10-12 hours
B) 12-24 hours
C) 24-48 hours
D) 48-60 hours
E) more than 60 hours

94. Half-life of ultra-long-acting sulfonamides is:
A) 10-12 hours
B) 12-24 hours
C) 24-48 hours
D) 40-48 hours
E) more than 48 hours

95. Frequency of administration of short-acting sulfonamides is:
A) 1-2 times a day

B) 2-3 times a day
C) 3-4 times a day
D) 4-6 times a day
E) 6-8 times a day

96. Which adverse effect regarding gastrointestinal tract is not common for sulfonamides?
A) anorexia nervosa
B) pseudomembranous colitis
C) diarrhea
D) abdomen pain
E) erosive gastritis

97. With which drug could sulfonamides be combined?
A) indirect anticoagulant
B) anticonvulsant
C) oral hypoglycemic drug
D) methotrexate
E) penicillins

98. Which untoward effect is not common for nitroimidazoles?
A) taste impairment
B) stomatitis
C) gingivitis
D) candida infection in the oral cavity
E) enamel hypoplasia

99. Contraindications to polyene antibiotics include all except:
A) compromised liver function
B) gastric ulcer
C) pregnancy
D) pancreatitis
E) gastritis

100. The dose of hydrocortisone for adult equals to:
A) 5-10 mg/day
B) 15-20 mg/day
C) 20-30 mg/day
Д) 40-50 mg/day
E) 100-200 mg/day

101. 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

102. Choose the effect which is typical of 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

103. One of the following ACE inhibitors may be prescribed intravenously.
A) spirapril
B) moexipril
C) fosinopril
D) perindopril
E) lisinopril

104. Concomitant use with ACE inhibitors is contraindicated for:
A) β-adrenolytics
B) Ca channel blockers
C) Potassium-containing medicines
D) thiazide diuretics
E) prazosin

105. One of the following signs is not typical of side effects of ACE inhibitors.
A) allergic reactions
B) micro- and macropsia
C) cough
D) hypotension
E) hyperkalemia

106. ACE inhibitors should not be used under 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

107. Usage of angiotensin II type 1 receptor blockers is contraindicated under one of the following condition.
A) acute myocardial infarction
B) renovascular hypertension
C) essential hypertension
D) chronic heart failure (treatment aim)
E) chronic heart failure (aim of prophylaxis)

108. β-Adrenoblockers may be combined with:
A) clonidine
B) reserpine
C) pilocarpine
D) losartan
E) verapamil

109. One sign of the given below is not typical of β-adrenoblockers.
A) bradycardia
B) bronchial spasm
C) impotence
D) claudication
E) decrease in intra-uterine tone in pregnant women

110. Point indication to use β-adrenoblockers.
A) hypertension
B) effort angina pectoris
C) acute heart failure
D) hypothyroidism
E) premature delivery

111. Name the pharmacological effect which is typical of calcium channel blockers
A) decline in automaticity in pacemaker cells
B) increase in platelet aggregation
C) increase in smooth muscle tone in brain vessels
D) increase in myocardial contractility
E) promotion of oxyhemoglobin dissociation

112. One of the following side effects occurs more often than others regarding use of calcium channel blockers.
A) cardiac failure
B) parkinsonism
C) headache
D) constipation
E) bigeminy or trigeminy

113. One of the following condition does not require usage of calcium channel blockers.
A) essential hypertension
B) hypertensive crisis with paroxysmal supraventricular tachycardia
C) Prinzmetal's angina
D) alleviation of stuttering
E) ventricular tachyarrhythmia

114. One pair of drugs from given below is appropriate in the case of hypokinetic crises.
A) perindopril, amiodarone
B) nifedipine, captopril
C) hydralazine, lovastatin
D) hydrochlorothiazide, doxazosin
E) propranolol, clonidine

115. When transient ischemic attack may occur one of the given below may be the drug of choice.
A) isradipine
B) amlodipine
C) felodipine
D) nimodipine
E) nitrendipine

116. In which case should glucagon not be used?
A) congestive heart failure with severe bradycardia
B) heart failure, atrioventricular heart block, ventricular fibrillation
C) intoxication following taking β-adrenolytics or calcium channel blockers
D) severe hyperglycemia
E) postoperative and perioperative rise in cardiac output

117.Choose the rate of dopamine infusion
A) less than 1 μ/kg/min

B) 1-2 μ/kg/min
C) 3-5 μ/kg/min
D) 8-10 μ/kg/min
E) more than 10 μ/kg/min

118. Administration of dopamine should be tapered quickly if at the same time a patient uses:
A) Nitroprusside Sodium
B) dobutamine
C) nialamide
D) nitroglycerine
E) almagel A (algeldrate + benzocaine + magnesium hydroxide)

119. Dopamine should not be used in the case when a patient has:
A) lung edema
B) cardiogenic shock and hypovolemic shock
C) lesser circuit hypertension in newborn
D) traumatic shock, septic shock
E) aortic stenosis, cardiac tamponade

120. Which statement is not correct regarding dopamine mimetics?
A) dobutamine stimulates β_1-adrenergic receptors and dopamine receptors
B) dobutamine is available only for parenteral administration 1-2 μ/kg/min
C) dobutamine is a sympathomimetic drug used in the treatment of heart failure and cardiogenic shock
D) ibopamine is a sympathomimetic used in ophthalmology (it induces mydriasis) and sometimes in the treatment of congestive heart failure
E) dopexamine, a dopamine analog developed for IV use in the treatment of heart failure and low cardiac output states

121. Which statement is not correct regarding α-adrenoblockers?
A) proroxan has been used as an antihypertensive and in the treatment of Meniere's disease, motion sickness, and allergic dermatitis
B) side effects of prazosin do not include orthostatic hypotension, syncope, and nasal congestion
C) the primary application for phentolamine is for the control of hypertensive emergencies, most notably due to pheochromocytoma
D) labetalol and carvedilol block α and β adrenergic receptors
E) cadralazine is an antihypertensive of the hydrazinophthalazine chemical class

122. Which drug is not included in the group of K+ATP channel agonists?
A) minoxidil
B) nicorandil
C) pinacidil
D) ribomunyl
E) cromakalim

123. Choose the incorrect effect of clonidine.
A) smooth muscle relaxation
B) sedative
C) increase in cardiac output and heart rate
D) somniferous
E) pain relieving

124. Reserpine may be combined with:
A) cardiac glycosides
B) tricyclic antidepressants
C) β-adrenolytics
D) diuretics
E) clonidine-like compounds

125. Choose the side effect for reserpine.
A) extrapyramidal disorder
B) tachycardia
C) inhibition of unconditioned reflexes (sucking, swallowing) and breathing in newborn
D) decreased libido
E) hyperacid gastritis

126. Angiotensinamide should not be used in one of the following states.
A) cardiogenic shock and hypovolemic shock with rhythm disturbance
B) circulatory collapse
C) traumatic shock, postoperative shock
D) refractory hypotension after cardiopulmonary bypass
E) myocardial infarction

127. Note the uncommon side effect for HMG-CoA reductase inhibitors (statins).
A) hepatotoxicity
B) nephrotoxicity
C) rhabdomyolysis
D) thrombocytopenia

E) photosensitization

128. Maximum daily dose of epinephrine is equal to:
A) 5 mg
B) 10 mg
C) 15 mg
D) 20 mg
E) 25 mg

129. Single IV dose of ephedrine is equal to:
A) 2 mg
B) 5 mg
C) 7 mg
D) 25 mg
E) 50 mg

130. Available dose in tablet of telmisartan is equal to:
A) 1 mg
B) 2 mg
C) 80 mg
D) 100 mg
E) 300 mg

131. In which case may epinephrine be prescribed?
A) hyperthyroidism
B) hypothyroidism
C) hypertension
D) prostatic hyperplasia
E) cerebral atherosclerosis

132. Adverse effects of epinephrine include all of the given below, except:
A) trembling
B) dyspnea
C) redness of face
D) sweating
E) hypotension

133. Single IV dose of phenylephrine hydrochloride is equal to:
A) 1-5 mg
B) 5-10 mg
C) 15-20 mg

D) 20-25 mg
E) 50-100 mg

134. Single intramuscularly dose of etafedrine is equal to:
A) 1-2 mg
B) 2-5 mg
C) 7-10 mg
D) 10-12 mg
E) 15-20 mg

135. Maximum dose of midodrine is equal to:
A) 5 mg
B) 10 mg
C) 12 mg
D) 30 mg
E) 100 g

136. Absolute contraindications for the use of norepinephrine include all of the given below, except:
A) complete heart block (third-degree AV block)
B) senility (old age)
C) halothane anesthesia
D) hypotension from blood volume deficits
E) mesenteric or peripheral vascular thrombosis

137. Relative contraindications for the use of norepinephrine include all of the given below, except:
A) advanced atherosclerosis
B) hypertension
C) thyrotoxicosis
D) sleeplessness
E) prostatic hyperplasia with urinary retention

38. Side effects of norepinephrine include all of the given below, except:
A) bradycardia
B) arrhythmia
C) skin necrosis
D) tachycardia
E) urinary difficulty

139. Side effects of dopamine include all of the given below, except:
A) trembling
B) headache
C) heavy breathing
D) palpitation
E) sluggishness

140. Which drug following its concomitant use with dopamine may provoke ventricular arrhythmias?
A) calcium-containing drug
B) somnifacient drug
C) sedative
D) general anesthetic
E) antiemetic

141. Bioavailability of guanfacine is equal to:
A) 10-15 %
B) 20-30 %
C) 50-60 %
D) 70-80 %
E) 80-100 %

142. High bioavailability is typical of:
A) clonidine
B) guanfacine
C) moxonidine
D) rilmenidine
E) methyldopa

143. Onset of action of rilmenidine is equal to:
A) 1-2
B) 5-6
C) 10 min
D) 30 min
E) 60 min

144. Which drug has the longest duration of action?
A) methyldopa
B) guanfacine
C) moxonidine
D) clonidine

E) imechinum

145. Which duration of action of azamethonium bromide follows IV administration?
A) 20-30 min
B) 1-2 hours
C) 2-4 hours
D) 5-6 hours
E) 10-12 hours

146. Single dose of hexamethonium benzosulfonate in mg is equal to:
A) 1-2
B) 6-75
C) 8-40
D) 15-90
E) 100-200

147. Choose the absolute contraindication for ganglioblockers.
A) glaucoma
B) pheochromocytoma
C) hypotension
D) advanced liver failure
E) thrombosis

148. Choose the relative contraindication for ganglioblockers.
A) glaucoma
B) sleeplessness
C) advanced liver failure
D) Severe cerebral atherosclerosis with coronary
E) subarachnoid hemorrhage

149. Duration of action of reserpine is equal to:
A) 1-2 hours
B) 2-4 days
C) 2-4 weeks
D) 5-6 weeks
E) more than 6 weeks

150. All drugs, given below are α-adrenoblockers, except:
A) teratozin
B) tamsulosin

C) phentolaminum
D) reserpine
E) alfuzosin

ANTI-INFLAMMATORY DRUGS

151. Which drug has no antiinflammatory effect?
A) acidum acetylsalicylicum
B) indometacin
C) metamizole
D) diclofenac
E) ibuprofen

152. Choose selective inhibitor of cyclooxygenase-2:
A) piroxicam
B) meloxicam
C) tenoxicam
D) tiaprofenic acid
E) sulindac

153. Choose the main effect for NSAIDs:
A) hypothermic
B) hypotensive
C) anticoagulant
D) cancerogenous
E) analgesic

154. When do NSAIDs reveal their antiinflammatory effect ?
A) 10-15 seconds
B) 10-15 minutes
C) 10-15 houres
D) 10-15 days
E) 10-15 weeks

155. Choose second generation NSAID which may be used in children.
B) paracetamol
C) ibuprofen
A) celecoxib
D) nimesulide
E) rofecoxib

156. NSAIDs are not effective in the treatment of fever in the case of:
A) meningococcal meningitis
B) hyperthyroidism
C) influenza
D) herpetic eczema
E) none is above

157. Choose NSAID from the 2 generation with antipyretic abilities:
A) meloxicam
B) celecoxib
C) nimesulide
D) metamizole
E) Acidum acetylsalicylicum

158. Choose the pharmacological effect of NSAIDs which in one case may be desirable but in another – harmful.
A) antiatheriosclerotic
B) antipyretic
C) weakening of smooth muscle contractility of nonpregnant uterus
D) antisensitazation
E) smooth muscle contractility of patent ductus arteriosus

159. Renal excretion of NSAIDs may be enhanced if a patient:
A) prefers vegetarian diets and mineral water
B) eats food of animal origin
C) takes calcium chloride
D) ingests in large doses ascorbinic acid
E) takes dietary supplements which contain arginine hydrochloride and sulfur-containing amino acids (cysteine and methionine)

160. First generation NSAIDs could not be combined with one of the following drugs:
A) dexamethasone
B) hydrochlorothiazide
C) furosemide
D) prednisolone
E) promedol

161. Choose typical untoward effect for NSAIDs of pyrazolone derivatives.
A) Reye's syndrome
B) retinopathy

C) edema
D) methemoglobinemia
E) leucopenia, anemia

162. Which drug should be used in paracetamol overdosing?
A) acetylcysteine
B) Hepabene® (phytocomposition includes Silybum marianum and Fumaria officialis)
C) Chophytol (includes Cynara scolymus)
D) Simepar™ (composition of vitamins and Silybum marianum)
E) Essentiale (a preparation of essential phospholipids)

163. Which effect is caused by fenspiride?
A) antipyretic
B) antiinflammatory
C) pain relief
D) hypothermic
E) bronchial obstruction

164. Choose the natural glucocorticoid.
A) prednisolone
B) hydrocortisone
C) dexamethasone
D) betamethasone
E) fluticasone

165. Antiinflammatory effect of glucocorticoids is based on the following:
A) inhibition of cyclooxygenase-1 (COX-1)
B) inhibition of cyclooxygenase-1 (COX-2)
C) inhibition of lipoxygenase
D) inhibition of phospholipase A2 by regulation of cellular calcium input
E) inhibition of phospholipase A2 following regulation of lipocortine synthesis

166. Choose the pharmacological effect which is not induced by glucocorticoids.
A) immunosuppression
B) permissive effect
C) antiinflammatory
D) hypothermic
E) metabolic

167. What kind of hematologic effect is caused by flucocorticoids?
A) lymphocytosis
B) leukocytosis
C) monocytosis
D) thrombocytopenia
E) erythrocytopenia

168. The most valuable blood changes are seen after the following period of treatment with glucocorticoids:
A) 1-2 hours
B) 4-6 hours
C) 1-2 days
D) 4-6 days
E) 2 weeks

169. After completion of long-term glucocorticoid treatment course changes in patient's serum may persist during:
A) 6-12 hours
B) 20-24 hours
C) 2-3 days
D) 4-6 days
E) 1-4 weeks

170. Glucocorticods do not favor synthesis of:
A) liver enzymes
B) permease
C) collagenase
D) fibrinogen
E) surfactant

171. Choose the glucocorticoid which has the minimal effect on fetus.
A) betamethasone
B) hydrocortisone
C) triamcinolone
D) dexamethasone
E) fludrocortisone

172. Synthetic glucocorticoids differ from natural ones by the following:
A) reduced elimination half-life
B) higher frequency of administration
C) weaker effect on hypothalamus–pituitary-adrenal axis

D) higher risk to develop exogenic Itsenko-Cushing syndrome
E) lower antiinflammatory activity

173. Which statement is correct regarding interaction between glucocorticoids and another drug?
A) reduction of barbiturate metabolism in the liver
B) acceleration of digitoxin metabolism in the liver
C) decreased risk of cardiac glycoside toxicity
D) intensified effect of simultaneously prescribed antihypertensive drugs
E) enhanced insulin action

174. Choose one of the following positions which is crucial in the development of adverse effects when a patient takes natural glucocorticoids.
A) hyponatremia
B) usage of glucocorticoids in physiological doses
C) simultaneous usage with antihypertensive drugs
D) simultaneous usage with histamine H2 receptor blockers
E) taking glucocorticoids in the morning

175. Damping of immune answer on infection following glucocorticoid treatment may occur after:
A) 1 day
B) 7 days
C) 14 days
D) 30 days
E) 2 months

176. Name the irreversible complication which occurs following glucocorticoid treatment.
A) hypertension
B) inclination to thrombosis
C) glaucoma
D) growth retardation
E) “dumb ulcers” of GIT

177. Untoward effects of indomethacin do not include one of the below.
A) headache
B) nausea and vomiting
C) impairment of carbohydrate metabolism
D) visual disturbance
E) gastralgia

178. The main mechanism of NSAIDs is based on the affect toward:
A) releasing factors
B) antigen-antibody complex
C) growth and propagation of microorganisms
D) replication of DNA viruses
E) prostaglandins

179. Which steroidal antiinflammatory drug mostly predisposes to myopathy development following long-term treatment?
A) dexamethasone
B) triamcinolone
C) betamethasone
D) methylprednisolone
E) prednisolone

180. Which glucocorticoid is much safer for adrenals?
A) hydrocortisone
B) betamethasone
C) fludrocortisone
D) beclometasone
E) dexamethasone

181. All of the given below represent diclofenac except:
A) inhibition of platelet aggregation
B) lower analgesic activity than it is for indomethacin
C) the same antiinflammatory effect as for indomethacin
D) in comparison with indomethacin adverse effects of CNS for diclofenac are rare
E) the same incidence of side effects in GIT as for indomethacin

182. Which drug possesses more potent nephrotoxic feature?
A) rofecoxibe
B) celecoxib
C) ibuprofen
D) naproxen
E) nimesulide

183. Name glucocorticoid with the mildest ulcerogenic properties.
A) methylprednisolone
B) betamethasone

C) triamcinolone
D) fluticasone
E) dexamethasone

184. In what pair with salicylates their toxic properties may appear?
A) glucocorticoids
B) barbiturates
C) antacids
D) sodium hydrogencarbonate
E) vitamin – B1

185. Pulse therapy with glucocorticoids usually involves:
A) prednisolone
B) triamcinolone
C) dexamethasone
D) betamethasone
E) methylprednisolone

186. Hepatotoxic effects are common for all NSAIDs, except:
A) indomethacin
B) nimesulide
C) diclofenac
D) phenylbutazone
E) ibuprofen

187. Find early side effect of glucocorticoids.
A) chronic pancreatitis
B) peptic ulcer
C) osteoporosis
D) Itsenko-Cushing syndrome
E) glaucoma

188. Which NSAID more often causes cytopenia?
A) Acidum tiaprofenicum
B) diclofenac
C) celecoxib
D) phenylbutazone
E) meloxicam

189. Which statement is correct regarding glucocorticoids?
A) glucocorticoids do not affect carbohydrate metabolism

B) glucocorticoids are insulin antagonists
C) glucocorticoids amplify insulin action
D) glucocorticoids enhance hypoglycemic effects of sulfonylureas
E) glucocorticoids increase biguanides activity

190. Choose one side effect regarding musculoskeletal system following long-term treatment with glucocorticoids.
A) myopathy
B) pathological fractures
C) osteosclerosis
D) muscle cramp syndrome
E) osteoporosis of fingers

191. Which sign is not common for glucocorticoids?
A) antiinflammatory
B) antiallergic
C) antishock
D) analgesic
E) immunosuppression

192. One of the following drugs produces more evident antiinflammatory effect.
A) phenylbutazone
B) metamizole
C) piroxicam
D) ketoprofen
E) diclofenac

193. One of the following drugs produces more evident analgesic properties.
A) acetylsalicylic acid
B) indomethacin
C) phenylbutazone
D) naproxen
E) ketoprofen

194. Glucocorticoids inhibit one of the following:
A) phenobarbital
B) cimetidine
C) acetylsalicylic acid
D) diclofenac
E) amiodarone

195. Glucocorticoids assist toxicity of:
A) cardiac glycosides
B) theophyllin
C) spironolactone
D) verapamil
E) oxicams

196. The most evident mineralocorticoid activity is present in:
A) triamcinolone
B) prednisolone
C) hydrocortisone
D) betamethasone
E) dexamethasone

197. Acetic acid derivatives from NSAID include all, except:
D) sulindac
E) ketorolac
A) etodolac
B) nimesulide
C) indomethacin

198. Choose selective COX-2 inhibitor from given below.
A) meloxicam
B) flurbiprofen
C) piroxicam
D) indomethacin
E) methimazole

199. Choose non-selective COX-2 inhibitor from given below:
A) rofecoxib
B) diclofenac
C) meloxicam
D) celecoxib
E) nimesulide

200. Choose correct bioavailability of indomethacin.
A) 30%
B) 45%
C) 50-65%
D) 96-98%
E) 99-100%

201. Choose the effect which is not caused by epinephrine.
A) bronchodilation
B) increase in mucociliary clearance
C) elevation of blood pressure
D) increase in strength of contraction of heart muscle
E) decrease in skeletal muscle tonus

202. 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

203. 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

204. Choose the long-acting β_2 selective adrenomimetic.
A) ipratropium bromide
B) isoproterenol
C) formoterol
D) ketotifen
E) bamipine

205. 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

206. 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

207. Choose the feature of muscarinic antagonist which differs from β_2 adrenoceptor agonist:
A) enhanced relaxation of smooth muscles in bronchi
B) influence on distal bronchial regions
C) effect of bronchodilation appears by 20-40 minutes
D) diminution of response to a stimulus after prolonged exposure (drug tolerance)
E) action results in a decrease of the parasympathetic tonus

208. Adverse effects of muscarinic antagonist are the following, except:
A) dry mouth, burning sensation in the mouth
B) bradycardia, decreased body temperature
C) ocular hypertension
D) reduction in gastric secretion and gastric motility
E) mydriasis, blurred vision, paralysis of accommodation

209. Xanthine compounds embrace the following pharmachological effects, except:
A) diaphragm loses its normal tonicity
B) bronchial spasmolytic
C) antiinflammatory
D) increase in mucociliary clearance
E) diuretic

210. Biotransformation of xanthine compounds in the liver becomes slower in the following case:
A) from 1 to 10 years of age
B) simultaneous use of glucocorticoids or barbiturates or rifampicin
C) при гіпертермії….
D) when smoking
E) excess of carbohydrates in diet

211. Biotransformation of xanthine compounds increases in the following case:

A) in newborn and old patients
B) along with erythromycin or cimetidine or anaprilin use
C) chronic hypoxia
D) excess of proteins in diet
E) when smoking

212. The first sign of theophylline overdose is:
A) hyperpyrexia
B) cardioacceleration
C) hematomesis
D) diarrhea
E) sleeplessness

213. Combination of bronchodilators with other drugs is not needed if after 10–20 minutes of their use the forced expiratory volume 1 (FEV_1) increases:
A) less than by 10%
B) by 20-30%
C) by 40-50%
D) by 30-40%
E) more than by 50%

214. Mast cell stabilizers should be used in the following case:
A) aspirin-exacerbated asthma
B) bronchospasm with parasympathotonia
C) in aged patients with nonallergic asthma
D) prevention of allergic (atopic) asthma
E) status asthmaticus

215. Advantages of nedocromil sodium over cromoglicic acid include all of the following, except:
A) useful in allergic rhinitis
B) more potent antiinflammatory activity
C) higher effectiveness in the treatment of nonallergic asthma
D) pronounced pharmacological activity
E) better prevention of bronchospasm

216. Choose long-acting glucocorticoid for aerosol inhalation.
A) beclometasone
B) flunisolide ……
C) triamcinolone
D) budesonide

E) betamethasone

217. Which adverse effect is not common for cromoglicic acid?
A) bronchospasm
B) decreased gastric acid secretion
C) oral candidiasis……
D) hoarseness
E) dry mouse

218. Which order must not be fulfilled regarding expectorants?
A) drink additionally 15–20 % of water
B) restrict use of diuretics
C) avoid drugs that inhibit cough reflex
D) be cautious with histamine H_1-receptor antagonists
E) decrease dose of antibiotics

219. Mucolytics do not include:
A) Althaea officinalis …..
B) ambroxol
C) bromhexine
D) acetylcysteine
E) trypsin crystalline

220. When adhesive and viscous properties of mucus become more pronounced one of the following drugs is preferable.
A) acetylcysteine
B) bromhexine
C) carbocisteine
D) ribonuclease
E) trypsin crystalline

221. Second generation of antihistamines include:
A) promethazine
B) chloropyramine
C) clemastin
D) loratadine
E) quifenadine

222. The third generation of antihistamines includes:
A) loratadine
B) astemizole

C) mebhydrolin
D) diphenhydramine
E) fexofenadine

223. Choose the drug which affects the late phase of allergic reaction.
A) mebhydrolin
B) desloratadine
C) cetirizine
D) quifenadine
E) astemizole

224. Which antihistaminic drug may be used subcutaneously?
A) clemastin
B) diphenhydramine
C) promethazine
D) ebastine
E) cetirizine

225 Choose the trade name of the drug which includes active metabolite of loratadine – desloratadine
A) Zyrtec
B) Clarityn
C) Telfast
D) NeoClarityn
E) Tavegyl

226. Which antihistaminic drug should not be prescribed with hepatotoxic medication?
A) cetirizine
B) loratadine
C) promethazine
D) quifenadine
E) diphenhydramine

227. One of antihistaminic drugs should not be prescribed with medication which may precipitate cardiotoxicity.
A) acrivastine
B) astemizole
C) chloropyramine
D) promethazine
E) cetirizine

228. The second generation of antihistaminic drugs differs from the first one by the following.
A) causes dry mouth
B) develops ataxia
C) can not be used parenterally
D) is manufactured as active metabolites
E) affects the late phase of allergic reaction

229. When does the first generation of antihistaminic drugs develop tolerance to the treatment?
A) after 24 hours
B) on the 3 day
C) on the 5–7 day….
D) after 2 weeks
E) after 1 month

230. Name the drug which is used in the case of vertigo.
A) terfenadine
B) clemastin
C) acrivastine
D) betahistine
E) levocabastine

231. Which of the drugs reveals both sedative and antihistaminic effects?
A) betahistine
B) cromoglicic acid
C) nedocromil sodium
D) chloropyramine ……
E) fexofenadine

232. Find nonnarcotic antitussive medication.
A) codeine
B) acetylcysteine
C) butamirate
d) dextromethorphan
e) aethylmorphini hydrochloridum

233. Which of the following drugs may aggravate bronchial obstruction?
A) bromhexine
B) trypsin

C) Thermopsis containing medications
D) ambroxol
E) acetylcysteine

234. All of the drugs, given below increase theophylline concentration in blood, except:
A) histamine H_2 receptor blockers
B) barbituric acid derivatives
C) macrolides
D) fluoroquinolones
E) β-adrenergic blockers

235. This drug is indicated in the case of pulmonary hypertension and bronchial asthma.
A) verapamil
B) nifedipine
C) digoxin
D) cromoglicic acid
E) beclometasone

236. Which of the drugs is not expectorant?
A) Glaucium flavum
B) potassium iodide
C) Althaea officinalis
D) Ipecacuanhae radix
E) acetylcysteine

237. Long-term treatment with inhaled glucocorticoids may cause the following adverse effects, except:
A) impaired glucose tolerance
B) inhibition of the hypothalamic-pituitary-adrenal axis
C) gynecomastia
D) osteoporosis
E) growth retardation

238. One of the following medications possesses drug incompatibility with phosphodiesterase inhibitors.
A) fluoroquinolone
B) calcium compounds
C) diuretics
D) histamine H_2 receptor blockers

E) Thiamine hydrochloride

239. All of the statements mentioned below are inherent to narcotic antitussive medication, except:
A) depression of cough center in the medulla oblongata
B) analgesic effect
C) depression of respiratory center in the medulla oblongata
D) mucous membranes in the respiratory tract become dry
E) development of physical dependence

240. Which dose of theophylline in blood may precipitate development of coma?
A) 10 mg/l
B) 20 mg/l
C) 30 mg/l
D) 40 mg/l
E) 50 mg/l

241. Choose the onset of action for inhaled salbutamol.
A) 1 minute
B) 2 minutes
C) 3 minutes
D) 4-5 minutes
E) 10 minutes

242. Which medication should be used when status asthmaticus develops?
A) atropine
B) cromoglicic acid
C) prednisolone
D) salbutamol
E) theophylline

243. Which assertion is correct regarding prescription of glucocorticoids orally?
A) quick action, foods decreases the absorption by 70 %
B) quick action, foods decreases the absorption by 50%
C) effect develops gradually, absorption takes place in the small intestine, bioavailability is equivalent to 70 %
D) effect develops gradually over 2-3 hours
E) quick action, absorption takes place in the small intestine, bioavailability is equivalent to almost 90%.

244. Sudden trouble in swallowing or breathing, tightness in throat may be overcome by the following medication:
A) salbutamol
B) fenoterol
C) metformin
D) theophylline
E) epinephrine

245. Bioavailability of ipratropium bromide following inhalation is equivalent to:
A) 10%.....
B) 20%
C) 30%
D) 80%
E) 100%

246. Broncholotic effect of theophylline is based on the following except:
A) increased airway smooth muscle contractility
B) enhanced histamine release from lung mast cells
C) suppression of catecholamine release from nerve endings
D) blockage of adenosine receptors located on cell membranes
E) inhibition of release of inflammatory mediators

247. What is the feature of theophylline oxidation in the neonate?
A) enzymatic reduction of oxidation
B) slow elimination
C) enzymatic oxidative activation
D) accelerated elimination
E) decreased enzymatic oxidation and elimination

248. Which of the following drugs is suggested to be selective adrenomimetic?
A) salbutamol
B) fenoterol
C) orciprenaline
D) terbutaline
E) formoterol

249. In which case elimination of theophylline will be slow?
A) hyperthyroidism
B) early morning medication intake
C) pulmonary heart
D) liver cirrhosis

E) smoking

250. Which antitussive drug is contraindicated in patients with glaucoma or bronchopulmonary pathology?
A) codeine
B) noscapine
C) carbetapentane
D) sodium benzoate
E) Glaucium flavum

LOCAL ANAESTHETICS

251. All groups given below are suggested to be antiseptics except:
A) weak acids
B) halogen-releasing agents
C) lyases
D) cationic detergents
E) heavy metal compounds

252. The mechanism of antiseptics is the following:
A) protein denaturation
B) damage to the permeability of cytosolic membrane
C) inhibition of enzymes essential to vital activity of microorganisms
D) shift of the ration between cyclic guanosine monophosphate (cGMP) and cyclic adenosine monophosphate (cAMP)……
E) disappearance of cell membrane barrier

253. All of given below are ester-type anesthetics, except:
A) chloroprocaine
B) mepivacaine
C) benzocaine
D) tetracaine
E) proparacaine

254. Which anesthetic does not belong to the amides?
A) prilocaine
B) articaine
C) dibucaine
D) procaine
E) bupivacaine

255. Which anesthetic possesses vasoconstrictive properties?
A) mepivacaine
B) lidocaine
C) articaine
D) etidocaine
E) prilocaine

256. Low systemic toxicity of articaine and bupivacaine is based on the following:
A) low distribution coefficient
B) drug activity
C) relative potency of action
D) high protein binding in plasma
E) low dose per kg of the body weight

257. Which is a short acting local anesthetic?
A) lidocaine
B) prilocaine
C) etidocaine
D) procaine
E) articaine

258. Which local anesthetic has the longest half-time of elimination ($T_{1/2}$)?
A) mepivacaine
B) etidocaine
C) prilocaine
D) bupivacaine
E) procaine

259. The list of fast-acting anesthetics includes all of the following, except:
A) prilocaine
B) lidocaine
C) mepivacaine
D) etidocaine
E) procaine

260. Vasoconstrictors are used in anesthesia:
A) to improve anesthetic sensitivity
B) for faster elimination
C) to prevent bleeding
D) for total anesthesia of all types of sensitivity (tactile, temperature, etc)
E) to enhance their potency and prolong their duration of action

261. Which drug does not have the vasoconstrictive effect?
A) phenylephrine
B) etafedrine
C) epinephrine
D) felipresin
E) phentolamine

262. Which drug should not be combined with epinephrine?
A) monoamine oxidase inhibitors
B) loop diuretics
C) iron-containing products
D) M-cholinergic blockers
E) antiaggregants

263. Lack of which compound in anesthetic solution decreases its allergic abilities?
A) vasoconstrictor
B) lipid analytes
C) amino acid residues
D) parabens
E) salt

264. Which dilution of anesthetic is preferable for improving medication safety at the point of care?
A) 1:300 000
B) 1:250 000
C) 1:400 000
D) 1:100 000
E) 1:200 000

265. In the case of long-lasting and traumatic manipulations which of the following mix is the best choice?
A) 4% articaine with epinephrine 1:100 000
B) 2% articaine with epinephrine 1:100 000
C) 2% procaine with epinephrine 1:200 000
D) 4% procaine with epinephrine 1:200 000
E) 1% articaine with epinephrine 1:100 000

266. In the case of pregnancy the most convenient from the point of view of toxicity is the following:
A) 4% articaine with epinephrine 1:200 000

B) 2% articaine with epinephrine 1:200 000
C) 2% procaine with epinephrine 1:200 000
D) 4% procaine with epinephrine 1:200 000
E) 1% articaine with epinephrine 1: 100 000

267. If a patient suffers from cardiovascular pathology, the doctor prefers:
A) prilocaine
B) lidocaine
C) mepivacaine
D) etidocaine
E) procaine

268. The patient with psychiatric disorder who uses tranquilizers should take anesthetic with vasoconstrictor in a following way:
A) 1:300 000
B) 1:250 000
C) 1:400 000
D) 1:100 000
E) 1:200 000

269. Overdose of ethyl chloride (mild topical anesthetic) may cause:
A) skin damage, frostbite
B) bleeding
C) facial numbness
D) atrioventricular block
E) taste changers

270. Topical anesthetics include all of the following, except:
A) benzocaine
B) dicain
C) pyromecaine
D) mepivacaine
E) lidocaine

271. Contraindications for the use of lidocaine include one of the following:
A) erosive gastritis
B) aphthous stomatitis
C) pyelonephritis
D) bronchial asthma.
E) migraine

272. Duration of action of bupivacaine without vasoconstrictor:
A) 240-360 minutes
B) 120-150 minutes
C) 120-240 minutes
D) 60-90 minutes
E) 90-120 minutes

273. Duration of action of bupivacaine with vasoconstrictor:
A) 240-360 minutes
B) 180-750 minutes
C) 120-360 minutes
D) 180-360 minutes
E) 90-120 minutes

274. Duration of action of prilocaine without vasoconstrictor:
A) 30-90 minutes
B) 120-150 minutes
C) 15-30 minutes
D) 60-90 minutes
E) 90-120 minutes

275. Duration of action of prilocaine with vasoconstrictor:
A) 240-360 minutes
B) 180-750 minutes
C) 120-360 minutes
D) 180-360 minutes
E) 90-120 minutes

276. Duration of action of articaine without vasoconstrictor:
A) 30-90 minutes
B) 120-150 minutes
C) 15-30 minutes
D) 60-90 minutes
E) 90-120 minutes

277. Duration of action of articaine with vasoconstrictor:
A) 240-360 minutes
B) 180-750 minutes
C) 120-360 minutes
D) 180-360 minutes
E) 90-120 minutes

278. Duration of action of lidocaine without vasoconstrictor:
A) 30-90 minutes
B) 30-60 minutes.
C) 15-30 minutes
D) 60-90 minutes
E) 90-120 minutes

279. Duration of action of lidocaine with vasoconstrictor:
A) 120-150 minutes
B) 120-360 minutes
C) 180-360 minutes
D) 60-90 minutes
E) 90-120 minutes

280. Protein binding is most typical of one of the drugs, given below:
A) lidocaine
B) prilocaine
C) etidocaine
D) procaine
E) articaine

281. The smallest extend to protein binding is typical of one of the drugs, given below:
A) prilocaine
B) lidocaine
C) mepivacaine
D) etidocaine
E) procaine

282. The highest recorded level of toxicity may appear for the following two drugs:
A) prilocaine, mepivacaine
B) lidocaine, prilocaine
C) mepivacaine, articaine
D) etidocaine, bupivacaine
E) procaine, lidocaine

283. The lowest level of toxicity is typical of the following two drugs:
A) prilocaine, mepivacaine
B) lidocaine, prilocaine
C) mepivacaine, articaine

D) etidocaine, bupivacaine
E) procaine, articaine

284. The apparent volume of distribution is larger in the following drug:
A) prilocaine
B) lidocaine
C) articaine
D) etidocaine
E) procaine

285. The small volume of distribution is characteristic of the following drug:
A) prilocaine.
B) lidocaine
C) articaine
D) etidocaine
E) procaine

286. Long-acting anesthetics are the following:
A) prilocaine, mepivacaine
B) lidocaine, prilocaine
C) mepivacaine, articaine
D) etidocaine, bupivacaine
E) procaine, articaine

287. Choose the short-acting anesthetic.
A) bupivacaine
B) lidocaine
C) dicain
D) etidocaine
E) procaine

288. Severe procaine intoxication is characterized by the following signs:
A) febrile chill, paleness, drowsiness
B) cramps, hypertension, tachycardia
C) hypotension, cramps, respiratory failure
D) dyspnea, hypotension, redness of the skin
E) hypertension, headache, nausea and vomiting

289. Toxic reaction following lidocaine use declares itself by all given below, except:
A) cyanosis

B) drowsiness
C) cramps
D) nausea and vomiting
E) hyperglycemia

290. Choose the reaction following the use of local anesthetics.
A) loss of consciousness
B) hematoma
C) painful contracture
D) paresis
E) paresthesia

291. Local anesthetics may develop toxicity in the following case:
A) hypothyroidism
B) diabetes insipidus
C) turn out into systemic circulation
D) psychic lability
E) leucopenia

292. The most common adverse effect following the overdose of local anesthetic is:
A) trismus (lockjaw)
B) motor anxiety
C) cramps
D) collapse
E) drowsiness

293. The mechanism of action of local anesthetics is related with influence on the following ion transport:
A) P
B) Ca
C) Na
D) K
E) Cl

294. Biotransformation of amide anesthetics takes place mainly in:
A) lumen of large intestine
B) kidneys
C) small intestine
D) salivary glands
E) liver

295. Local antiseptic chlorhexidine should not be used with the following:
A) local anesthetics
B) iodine-containing drugs
C) vitamins A and D
D) ethyl green
E) methylxanthines

296. Chlorhexidine increases sensitivity of bacteria to the following drugs:
A) fluoroquinolones
B) penicillins
C) cefalosporins
D) lincosamides
E) macrolides

297. Antiseptic sanguiritrin should not be used in the following case:
A) mycosis with eczematization
B) epilepsy
C) hyperkinesia
D) erosive gastritis
E) liver and renal diseases

298. Which antiseptic agent is the safest for the human body?
A) acids
B) quaternary ammonium compounds (cationic detergents)
C) antiseptics made from petroleum resins
D) chlorine-releasing agents
E) drugs obtained from plants and animals

MAIN PRINCIPLES OF CLINICAL PHARMACOLOGY

299. Mechanism of drug action is explored by:
A) pharmacokinetics
B) pharmacogenetics
C) pharmacoeconomics
D) pharmacodynamics
E) pharmacognosy

300. 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

301. 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

302. Therapeutic drug monitoring means:
A) through 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

303. Therapeutic dose is does not depend on:
A) patient's age
B) rout of administration
C) desired therapeutic effect
D) organs of elimination
E) treatment costs

304. Mean therapeutic doses mentioned in manuals are obtained 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

305. Find the correct definition to presystemic metabolism (first pass metabolism).
A) drug inactivation in the systemic circulation
B) drug inactivation in kidneys
C) drug inactivation in the liver after systemic circulation

D) enzymatic cleavage in the gastrointestinal lumen, gut wall, by bacterial enzymes, and in the liver
E) enzymatic cleavage in the gastrointestinal lumen

306. Advantages of parenteral rout of administration does not include one of the following:
A) rapid onset of action
B) low risk of overdosing
C) precise dosing
D) absence of influence on gastrointestinal tract
E) 100% bioavailability

307. Acetylsalicylic acid absorption is much faster when pH is:
A) 2,0
B) 3,0
C) 3,5
D) 4,5
E) 1,5

308. Atropine absorption is much faster when pH is:
A) 2,0
B) 3,0
C) 3,5
D) 4,5
E) 1,5

309. Choose the statement which should not be followed in the case of endolymphatic administration of the drugs
A) endolymphatic administration is contraindicated in trophic lesions of the legs
B) high concentrated solutions should be avoided
C) solution should be cooled prior to administration
D) repeated endolymphatic administration of the drug should be carried out on different sites
E) endolymphatic administration is contraindicated on sites where skin is damaged

310. Bioavailability means:
A) high dose in blood
B) good penetration of active drug form into the target organs from systemic circulation
C) amount of inactive form of drug after liver metabolism

D) the certain proportion of administered drug that gains systemic circulation in unchanged form or as an active metabolite
E) sufficient penetration of active form of drug into the target organs from portal circulation

311. If bioavailability after oral drug administration is less than 30%, one of the given below is correct:
A) high probability of adverse effects resulted in drug interaction
B) low probability of adverse effects resulted in drug interaction
C) better to prescribe drug intramuscularly or intravenously if it is possible
D) doctor should increase the dose of such drug and continue its administration
E) doctor should increase frequency of drug administration

312. Protein binding is not related with the following:
A) therapeutic window
B) liver disease
C) renal insufficiency
D) bilirubin level in blood
E) pregnancy

313. One of the assertions given below is correct if ability of drug to bind proteins in blood exceeds 80 %:
A) the drug does not leave systemic circulation
B) it should be taken into account when choosing the dose of such drug
C) effect of this drug is lower in hypoproteinemia
D) toxic effect of such drug may be treated by dialysis
E) fast penetration into tissues is characteristic for such drug

314. Aparrent volume of distribution determines:
A) ratio between drug dose and plasma drug concentration
B) ratio between drug absorption and bioavailability
C) drug distribution between systemic circulation and muscles
D) the amount of drug that reaches the systemic circulation
E) relationship between bioavailability and excretion

315. What does it mean if apparent volume of distribution is less than 0,15 l/kg?
A) drug is found in extracellular fluids
B) drug is found in blood
C) drug is found in tissues
D) drug is almost all eliminated
E) drug is found in fat

316. Biotransformation of drugs usually generates:
A) more lipophilic compounds
B) more hydrophilic metabolites
C) more active substances
D) pure compounds
E) inert matter

317. Choose one of the drugs which does not inhibit biotransformation of others.
A) clarithromycin
B) indomethacin
C) tetracycline
D) diphenyl
E) fluconazole

318. Choose one of the drugs which does not accelerate biotransformation of others.
A) phenobarbital
B) diltiazem
C) rifampicin
D) diphenhydramine
E) prednisolone

319. Weak acid drugs are excreted easily in the:
A) neutral urine
B) alkaline urine
C) acid urine
D) hydrophilic urine
E) hydrophobic urine

320. It is necessary to measure the clearance of creatinine in the following case:
A) hepatic insufficiency
B) renal failure……
C) bronchial insufficiency
D) heart failure
E) adrenal insufficiency

321. In the case of renal failure drug adjustment is carried out taking into account the following:
A) biochemical laboratory
B) measurement of diuresis

C) clearance of creatinine
D) drug elimination
E) renal excretion of drug

322. In the case of hepatic insufficiency drug adjustment is carried out taking into account the following:
A) enterohepatic cycle
B) total clearance
C) apparent volume of distribution
D) evaluation of clinical, paraclinical and laboratory data
E) extrarenal clearance

323. Frequency of drug administration is based on the following knowledge:
A) half-life of the drug
B) maximum drug concentration in blood
C) fluctuation in the amount of drug in the body
D) elimination rate constant
E) glomerular filtration rate

324. After which half-lives the steady-state concentration of drug is achieved?
A) 1-2 $T_{1/2}$
B) 3-5 T ½
C) 6-8 T ½
D) 9-11 T ½
E) 12-24 T ½

325. How do you understand elimination rate constant?
A) amount of drug, disposed in urine per day
B) amount of drug, disposed in feces per day
C) it is equivalent to the fraction of a substance that is removed per unit time measured at any particular instant
D) twofold reduction in drug concentration per day
E) twofold reduction in drug concentration during 12 hours

326. Risk of adverse effects is low in the following cases:
A) long-term of drug use
B) impairment of organs where biotransformation takes place
C) elderly patients
D) simultaneous use of less than 4 drugs
E) simultaneous use of drugs with the same adverse reactions

327. Pharmacokinetic interactions include one of the following:
A) drug action on receptors
B) enhancement of pharmacologic effect
C) attenuation of pharmacological effects
D) alteration of drug concentration of one drug by the prior or concurrent administration of another
E) influence of drug on another one following the same rout of administration

328. Name the methods used to evaluate drug safety and effectiveness:
A) laboratory studies
b) imaging technology
C) physical examination
D) recording patient symptoms
E) all of the above

329. One of the following drugs inhibits tetracycline absorption.
A) sodium bicarbonate
B) calcium-containing drugs
C) potassium-containing medicines
D) phosphorus-containing compounds
E) magnesium-containing drugs

330. Which drug induces cytochrome P450 in the liver?
A) probenecid
B) epinephrine
C) norepinephrine
D) phenobarbital
E) dopamine

331. Which drug induces bilirubin biotransformation?
A) serotonin
B) epinephrine
C) norepinephrine
D) phenobarbital
E) dopamine

332. Name the stage of drug-drug interaction
A) interaction between drugs along with elimination
B) ionic interaction
C) chemical interaction
D) atomic interaction

E) molecular interaction

333. Enzyme activity may be induced by one of the following drugs.
A) serotonin
B) epinephrine
C) norepinephrine
D) griseofulvin
E) dopamine

334. Which group of drug may decrease synthesis of vitamin K?
A) antimicrobial drugs
B) antacids
C) potassium-containing medicines
D) sodium-containing medicines
E) cimetidine

335. Cholestyramine decreases absorption of:
A) clindamycin
B) potassium-containing medicines
C) sodium bicarbonate
D) magnesium-containing drugs
E) phosphorus-containing compounds

336. One of the following drug delays absorption of local anesthetics.
A) phenobarbital
B) antacids
C) acetylsalicylic acid
D) norepinephrine
E) cimetidine

337. Anticoagulant activity of warfarin is altered by one of the following drug:
A) probenecid
B) epinephrine
C) norepinephrine
D) phenobarbital
E) dopamine

338. One of the following drugs increases in myocardial sensitivity to epinephrine.
A) serotonin
B) potassium-containing medicines
C) magnesium-containing drugs

D) diuretics
E) dopamine

339. Tetracyclines are not absorbed well when forming an insoluble complex with:
A) calcium
B) sodium
C) potassium
D) phosphorus
E) oxygen

340. One of the following drug increases permeability of penicillins into cerebrospinal fluid.
A) euphyllin
B) epinephrine
C) norepinephrine
D) phenobarbital
E) dopamine

341. Give the definition of drug absorption.
A) the process of drug movement from the site of application toward the systemic circulation
B) the process of drug movement from gastrointestinal tract toward the systemic circulation
C) the process of chemical modification of the drug
D) qualitative analysis of the serum concentration-time curve
E) area under the concentration curve

342. Choose the valid type of drug interaction.
A) pharmacological interaction
B) ionic interaction
C) chemical interaction
D) atomic interaction
E) molecular interaction

443. One of the following drug enhances biotransformation of vitamin D.
A) serotonin
B) epinephrine
C) norepinephrine
D) phenobarbital
E) dopamine

344. In emergency states we should take into account one of the following:
A) changes in drug absorption time
B) changes in drug absorption amount
C) blood pH
D) gastric pH
E) urine pH

345. Prednisolone binds with one of the following proteins:
A) globulin
B) albumin
C) fibrinogen
D) prealbumin
E) prothrombin

346. One of the given below enhances glucocorticoid metabolism.
A) serotonin
B) epinephrine
C) norepinephrine
D) diphenin
E) dopamine

347. One of the given below enhances thyroxine metabolism.
A) serotonin
B) epinephrine
C) norepinephrine
D) diphenin ……
E) dopamine

348. One of the given below increases blood concentration of acetylcholine.
A) serotonin
B) epinephrine
C) norepinephrine
D) proserin
E) dopamine

Final modular test. List of questions for the final modular test

- 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.
- Antiplatelety 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. Cardial effectss 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 H_2 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. Basic and Clinical Pharmacology 15e. McGraw-Hill Education, 2020.
2. Bespalov, Anton, та ін., редактори. Good Research Practice in Non-Clinical Pharmacology and Biomedicine. Springer International Publishing, 2020, https://doi.org/10.1007/978-3-030-33656-1.
3. Cannello, Pedro J., та ін. Clinical Pharmacology. DI Press, 2022.
4. Catala, Angel, та Usama Ahmad, редактори. Molecular Pharmacology. IntechOpen, 2020, https://doi.org/10.5772/intechopen.89926.
5. Ferro, Albert, та Kerry Layne. 100 Cases in Clinical Pharmacology, Therapeutics and Prescribing, First Edition. Taylor & Francis Group, 2020.
6. Francisco Rodríguez-Landa, Juan, та Jonathan Cueto-Escobedo, редактори. Behavioral Pharmacology - From Basic to Clinical Research. IntechOpen, 2020, https://doi.org/10.5772/intechopen.77701.
7. Hock, Franz J., та Michael R. Gralinski, редактори. Drug Discovery and Evaluation: Methods in Clinical Pharmacology. Springer International Publishing, 2020, https://doi.org/10.1007/978-3-319-56637-5.
8. Huang, S.-M., Lertora, J. J. L., Vicini, P. та J, A. J. A., (2021). Principles of clinical pharmacology. Elsevier Science & Technology Books.
9. Kikhtyak O.P., Zimenkovsky A.B. Conceptual pharmacotherapy in lecture notes. – Львів: Щедрик, 2006. – 152 с.
10. Layne, Kerry, та Albert Ferro. 100 Cases in Clinical Pharmacology, Therapeutics and Prescribing. Редактор Janice Rymer, CRC Press, 2020, https://doi.org/10.1201/9780429030093.
11. McCuistion, Linda E., та ін. Pharmacology Online for Pharmacology: A Nursing Process Approach. Elsevier - Health Sciences Division, 2020.
12. McKay, Gerard A., та ін. Lecture Notes - Clinical Pharmacology and Therapeutics. Wiley & Sons, Incorporated, John, 2020.
13. Medical Pharmacology. Independently Published, 2020.
14. Panigrahi, Ghanshyam. Experimental Pharmacology -- II. Nirali Prakashan, 2020.
15. Pharmacology. Creative Media Partners, LLC, 2022.

16. Prabhakar, Hemanshu, та ін., редактори. Pharmacology in Clinical Neurosciences. Springer Singapore, 2020, https://doi.org/10.1007/978-981-15-3591-8.
17. Simmons, Mark. Pharmacology: An Essential Textbook. Thieme Medical Publishers, Incorporated, 2020.
18. Vikhe, D. M., Koray, M. та Tosun, T., (2022). Clinical dentistry. DI Press.

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