STATE ESTABLISHMENT

«DNIPROPETROVSK MEDICAL ACADEMY

OF HEALTH MINISTRY OF UKRAINE»

V.I. MAMCHUR, V.I. OPRYSHKO, A.A. NEFEDOV,
A.E. LIEVYKH, E.V.KHOMIAK

PHARMACOLOGY

WORKBOOK

FOR PRACTICAL CLASSES

FOR FOREIGN STUDENTS

STOMATOLOGY DEPARTMENT

DNEPROPETROVSK - 2016

UDC: 378.180.6:61:615(075.5)

Pharmacology. Workbook for practical classes for foreign stomatology students / V.Y. Mamchur, V.I. Opryshko, A.A. Nefedov. - Dnepropetrovsk, 2016. – 186 p.

Reviewed by:
N.I. Voloshchuk - MD, Professor of Pharmacology "Vinnitsa N.I. Pirogov National Medical University."
L.V. Savchenkova – Doctor of Medicine, Professor, Head of the Department of Clinical Pharmacology, State Establishment "Lugansk state medical university"
E.A. Podpletnyaya – Doctor of Pharmacy, Professor, Head of the Department of General and Clinical Pharmacy, State Establishment "Dnipropetrovsk medical academy of Health Ministry of Ukraine"

Approved and recommended for publication by the CMC of State Establishment "Dnipropetrovsk medical academy of Health Ministry of Ukraine" (protocol №3 from 25.12.2012).

The educational tutorial contains materials for practical classes and final module control on Pharmacology.

The tutorial was prepared to improve self-learning of Pharmacology and optimization of practical classes. It contains questions for self-study for practical classes and final module control, prescription tasks, pharmacological terms that students must know in a particular topic, medical forms of main drugs, multiple choice questions (tests) for self-control, basic and additional references. This tutorial is also a student workbook that provides the entire scope of student's work during Pharmacology course according to the credit-modular system.

The tutorial was drawn up in accordance with the working program on Pharmacology approved by CMC of SE "Dnipropetrovsk medical academy of Health Ministry of Ukraine" on the basis of the standard program on Pharmacology for stomatology students of III - IV levels of accreditation in the specialties Stomatology – 7.110105, Kiev 2011.

The tutorial was developed by composite authors of the Department of Pharmacology, Clinical Pharmacology and Pharmacoeconomics of State Establishment "Dnipropetrovsk medical academy of Health Ministry of Ukraine".

V.I. MAMCHUR, V.I. OPRYSHKO, A.A. NEFEDOV

PHARMACOLOGY

WORKBOOK

FOR PRACTICAL CLASSES

FOR FOREIGN STUDENTS

STOMATOLOGY DEPARTMENT

Student_____

Course_____Group_____Decade_____

Faculty_____

Teacher _____

Academic year_____ / _____

№ topics	***Module 1*** ***General prescription. General pharmacology. Drugs affecting the synapses. Drugs affecting the peripheral and central nervous system***	Maximal grade
	Semantic unit № 1 **General prescription**	
1.	Ukrainian law «About medical drugs». Introduction into general prescription. The solid dosage forms.	6
2.	The soft dosage forms.	6
3.	Liquid dosage forms. Solutions for intrernal and external use and for injection, aerosoles.	6
4.	Potions, decoctions, and solutions that dosed in drops and spoons.	6
5.	**The final lesson on general prescription.**	6
	Semantic unit № 2 **History of Pharmacology and Pharmacy** **Common pharmacology**	
6.	Introduction into pharmacology. Pharmacology and pharmacy development. ***The final lesson on common pharmacology.***	6
	Semantic unit № 3 **Agents acting on the peripheral afferent and efferent nervous system**	
7.	Local anesthetics, astringent, absorbent, irritating drugs. Mucos membrane protectors.	6
8.	M, N cholinomimetics, anticholinesterase agents. M-cholinoblockers. N-cholinoblockers (ganglionic blockers, neuromuscular blocking drugs)	6
9.	Agents affecting on adrenoreceptors. Adrenomimetics drugs, sympathomimetics.	6
10.	Antiadrenergic drugs: adrenoblockers and, sympatholytics.	6
11.	Dopaminergic, serotoninergic drugs. ***The final lesson on agents acting on the peripheral afferent and efferent nervous system.***	6
	Semantic unit №4 **Drugs acting on the central nervouse system**	
12.	Psychotropic drugs. Sedative drugs, neuroleptics, tranquilizers (Anxiolytics drugs), mood stabilizers.	6
13.	Hypnotics drugs, antiepileptic and antiparkinsonic drugs.	6
14.	General anaesthetics. Pharmacology and toxicology of ethyl alcohol.	6
15.	Narcotic (Opioid) analgesics	6
16.	Non-narcotic (non-opioid) analgesics. Nonsteroidal anti-inflammatory drugs	6
17.	Psychomotor stimulants. Analeptics. Antidepressants. Nootropic drugs. Adaptogenes. Actoprotectors.	6
18.	***The final lesson on drugs acting on the central nervouse system.***	6

№ topics	***Module 2*** ***Pharmacology of medications that affect on function of the executive body's systems, metabolism, blood and immune system. Pharmacology of antimicrobial, antiviral, antiparasitic and antifungal medications***	*Maximal grade*
	Semantic unit №5 **Pharmacology of metabolism**	
1.	*Theme 16.* Pharmacology of the endocrine system. Hormonal agents, their synthetic substitutes and antagonists.	6
2.	*Theme 17.* Pharmacology of vitamins. Enzyme preparations and their inhibitors.	6
3.	*Theme 18.* Pharmacology of a blood system. Pharmacology of substances affecting hematopoiesis. Medications affecting blood coagulation, platelet aggregation, and fibrinolysis.	6
4.	*Theme 19.* Allergy and immunotropic medications. ***The final lesson «Pharmacology of metabolism».***	6
	Semantic unit №6 **Pharmacology of Medications which affect the function of organs and physiological systems**	
5.	*Theme 20.* Pharmacology of the respiratory system.	6
6.	*Theme 21.* Pharmacology of the digestive system	6
7.	*Theme 22.* Pharmacology circulation. Hypo-and hypertensive agents. Antihyperlipidemic agents. Angioprotectors.	6
8.	*Theme 23*. Pharmacology of the coronary and cerebral blood flow. Antianginal and cerebrovascular medications	6
9.	*Theme 24.* Cardiotonic medications.Antiarrhythmic medications	6
10.	*Theme 25.* Pharmacology of agents affecting water and electrolyte balance. Arthrifuge.	6
11.	*Theme 26.* Uterine medications and contraceptives. *Test control «Pharmacology of medications which affect the function of organs and physiological systems».*	6
12.	***The final lesson «Pharmacology of medications which affect the function of organs and physiological systems».***	6
	Semantic unit 7 **Pharmacology of antimicrobial, antiviral, antiparasitic, antifungal Medications**	
13.	*Theme 27.* Antiseptics and disinfectants. Sulfonamides. Fluoroquinolones.	6
14.	*Theme 28.* Antibiotics I (β - lactams, macrolides, aminoglycosides).	6
15.	*Theme 29.* Antibiotics II (tetracyclines, chloramphenicol). Anti-fungal, anti-viral, antitubercular medications.	6
16.	*Theme 30.* Antiparasitic, anti-cancer medications. ***The final lesson «Pharmacology of antimicrobial, antiviral, antiparasitic, antifungal medications».***	6
17.	Drugs affecting the mucous membranes of the mouth and tooth tissue.	
18.	Pharmacology of acute poisoning. Pharmacovigilance for side effects of medications.***The final test control Module-2.***	
19.	***The final control Module-2. «Pharmacology of medications which affect the function of the executive bodies, metabolism, blood system and immune system.Pharmacology of antimicrobial, antiviral, antiparasitic and antifungal Medications»***	80
Together semantic units		112
Student individual self-study (ISS)		8
Total		200

Note: After getting the traditional marks the student receives the following points.

Practical classes:

«5» – 6
«4» – 4
«3» – 3
«2» – 0

Final classes:

«5» – 6
«4» – 4
«3» – 3
«2» – 0

Requirements for admittance to the final module control:

- routine academic performance with a minimal sum of grades **51 points** in every semester
- passing the final test control with a result **more than 75%**

PLAN OF LECTURES
(First semester)

№№	***LECTURE'S TOPICS***
1.	History of the pharmocology development. Modern pharmacology condition. Ukrainian law «About medical drugs». General pharmacology.
2.	Agents acting on the peripheral efferent nervous system. M, N cholinomimetics, anticholinesterase agents. M-cholinoblockers. N-cholinoblockers (ganglionic blockers, neuromuscular blocking drugs) Agents affecting on adrenoreceptors. Adrenomimetics drugs, sympathomimetics. Antiadrenergic drugs: adrenoblockers and, sympatholytics.
3.	Psychotropic drugs. Sedative drugs, neuroleptics, tranquilizers (Anxiolytics drugs), mood stabilizers, salts of lithium. Hypnotics drugs, antiepileptic and antiparkinsonic drugs. Clinical use.
4.	Pharmacology of paid and anesthetics. General anesthetcs. Classification of analgesics. Narcotic analgesics. Non-narcotic (non-opioid) analgesics. Nonsteroidal anti-inflammatory drugs.
5.	Pharmacology of drugs affecting the respiratory and digestive system.

PLAN OF LECTURES
(Second semester)

№№	***LECTURE'S TOPICS***
1	Pharmacology of the respiratory system: decongestants, expectorant, antitussive and bronchodilators. Pharmacology of the digestive system. Medications affecting motor and secretory activity of the stomach and intestines. Hepatotropic and pankreatotropnye medications.
2	Pharmacology of systemic, coronary and cerebral circulation. Antihypertensive, antianginal and cerebro-vesselactive medications. Pharmacology of heart failure. Cardiac medications of glycoside and aglycoside nature. Antiarrhythmic medications.
3	Pharmacology of antimicrobial agents (AA). Antiseptics and disinfectants. Synthetic AA: sulfonamides, derivatives nitroimidazole quinoxaline. General principles of rational antibiotic therapy. Pharmacology of β-lactam antibiotics.
4	Aminoglycosides. Macrolides. Chloramphenicol and tetracycline. Fluoroquinolones.Principles of combination antibiotic. Antituberculosis and antimycosis medications.
5	Pharmacology of acute poisoning and emergency conditions pharmacovigilance. Monitoring of adverse drug reactions in Ukraine.

UNIT №1. GENERAL PRESCRIPTION

Learning objectives:

- Look through the content of the Law of Ukraine "About drugs" and the order of Health Ministry of Ukraine "About the drugs prescribing rules and dispensing of drugs procedure".
- Evaluate significance of correctly written out signature.
- Summarize and analyze the characteristics of solid and soft dosage forms, peculiarities of their manufacturing, routes of administration and prescribing.
- Summarize and analyze the characteristics of liquid dosage forms, peculiarities of their manufacturing, routes of administration and prescribing.
- Summarize and analyze the characteristics of new dosage forms (pastilles, caramels), peculiarities of their manufacturing, routes of administration and prescribing.

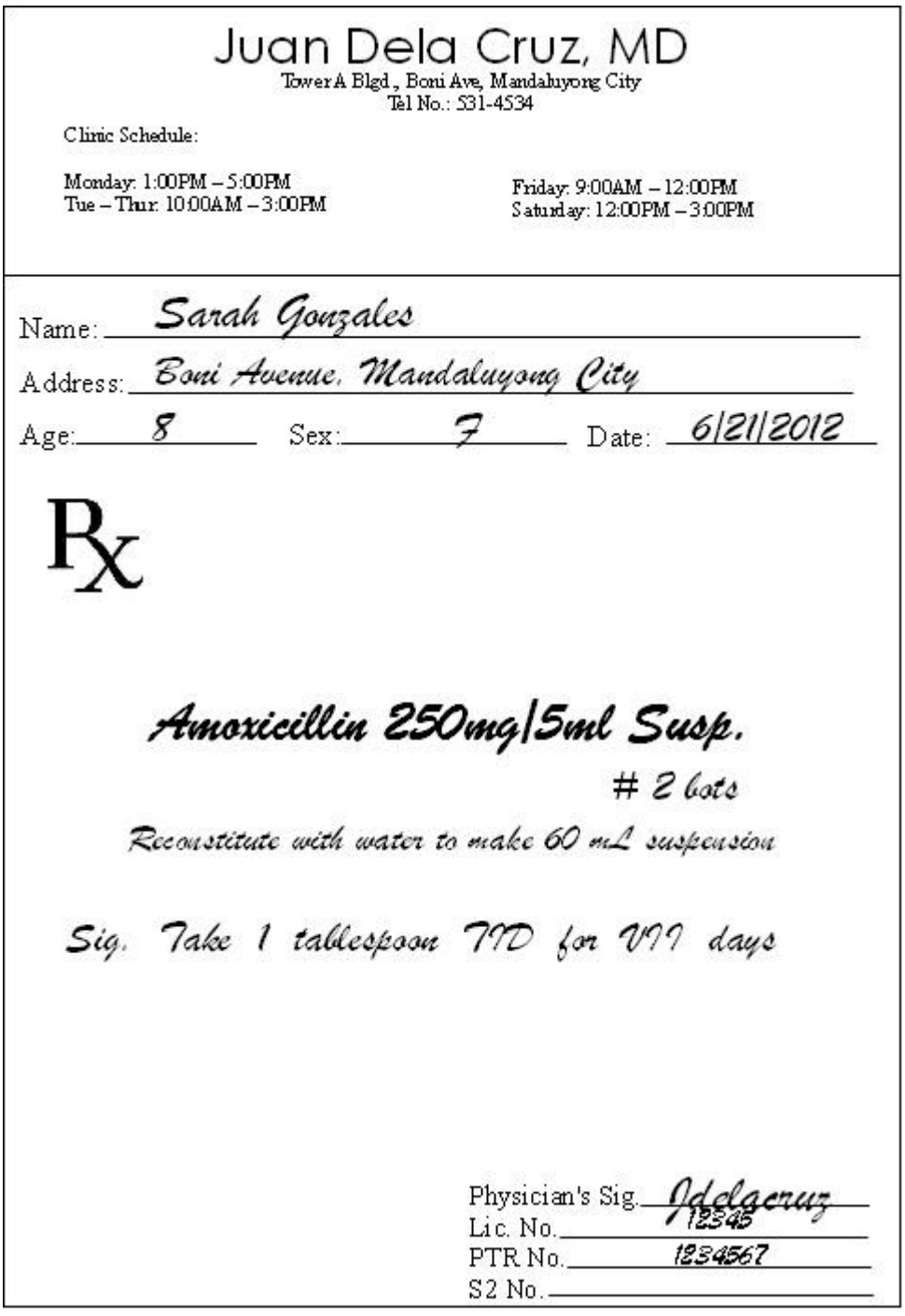
To know:

- Types of dosage forms, peculiarities of their use.
- The prescription structure and prescribing rules for different dosage forms.

To be able to:

- Write prescriptions (using full and short ways) for various dosage forms.

Prescription form (sample)



Juan Dela Cruz, MD
Tower A Bldg., Boni Ave, Mandaluyong City
Tel No.: 531-4534

Clinic Schedule:

Monday: 1:00PM – 5:00PM
Tue – Thur: 10:00AM – 3:00PM
Friday: 9:00AM – 12:00PM
Saturday: 12:00PM – 3:00PM

Name: Sarah Gonzales
Address: Boni Avenue, Mandaluyong City
Age: 8 Sex: F Date: 6/21/2012

Rx

Amoxicillin 250mg/5ml Susp.
2 bots
Reconstitute with water to make 60 mL suspension

Sig. Take 1 tablespoon TID for VII days

Physician's Sig. Jdelacruz
Lic. No. 12345
PTR No. 1234567
S2 No.

DATE		Module 1
Unit №1. General prescription		

Introduction into general prescription. Solid dosage forms

The list of basic terms in the topic

Term	Definition
Dosage form	Means by which drug molecules are delivered to sites of action within the body.
Prescription	Written doctor's request to a pharmacist about manufacturing and supplying a drug to a patient with instructions how to use this drug.
Pharmacopoeia	Collection of mandatory medical and pharmaceutical national standards and regulations concerning quality of drugs.
Main solid dosage forms	Powders, tablets, pills, capsules, pastilles, caramels.
Powder (Pulvis)	Solid, loose, dry particles of varying degrees of fineness.
Capsule (Capsula)	Solid dosage form in a gelatin container.
Tablet (Tabuletta)	Hard, compressed solid dosage form in round, oval or square shape.

Individual work

Theoretical questions:

1. The Law of Ukraine "About drugs", the order of Health Ministry of Ukraine "About the drugs prescribing rules and dispensing of drugs procedure". The concept of medical prescription, dosage forms, medicinal raw materials, substances, drugs.
2. Sources of drugs. Dosage forms and their classification.
3. Prescription: the structure and rules of prescribing drugs for adults and children. Types of prescription forms (1 and 3). Prescription as medical, legal, financial document. Prescribing rules for narcotic, poisonous and strong-acting drugs. Full and short ways of prescribing. Officinal and magistral prescriptions.
4. Dosing of drugs for adults and children. Pharmacy (chemist's).
5. Definition and types of Pharmacopeia. State Pharmacopoeia, its content and purpose.
6. Solid dosage forms.
7. Simple and complex powders, dosed and non-dosed, for external and internal use. Excipients for powders. Prescribing rules.
8. Capsules: types, characteristics, purpose, prescribing rules.
9. Tablets and dragee: characteristics, purpose, prescribing rules.
10. The concept of other solid dosage forms.
11. Advantages and disadvantages of solid dosage forms. Features of application.

Prescribe the drugs:

1) 25 g of anesthesin in a simple powder **(Anaesthesinum)**. For applying on the wound. Rp.:

2) 50 g of powder that contains 1% salicylic acid for treatment of atopic dermatitis **(Acidum salicylicum)**. Rp.:

3) 100 g of activated carbon **(Carbo activatus)** for internal use. Take 2 tablespoons mixed with a cup of water.

Rp.:

4) 12 powders of pancreatin **(Pancreatinum)** 0,5 g. Use orally 1 powder three times a day before meal with alkaline water.

Rp.:

5) 15 powders of nicotinic acid **(Acidum nicotinicum)** 0,03 g. Use orally 1 powder once a day.

Rp.:

6) 12 complex powders of papaverine **(Papaverini hydrochloridum)** 0,02 g with anestesin **(Anaesthesinum)** 0,3 g. Use orally 1 powder three times a day after meal.

Rp.:

7) 30 capsules containing 0,3 g of iron lactate **(Ferri lactas)**. Use orally 1 capsule 3 times a day after meal.

Rp.:

8) 40 tablets of nitroglycerin **(Nitroglycerinum)** 0,0005 g. Take 1 tablet sublingually during angina attack.

Rp.:

9) 20 diazolin dragees **(Diazolinum)** 0,05 g. Use 1 dragee 3 times a day for treatment of allergic rhinitis.

Rp.:

References:

1. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
2. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Unit №1. General prescription		
Soft dosage forms		

The list of basic terms in the topic

Term	Definition
Main soft dosage forms	Ointments, creams, pastes, liniments, suppositories, plasters.
Ointment (Unguentum)	Non-dosed, homogeneous, viscous, soft (semi-solid) dosage form that is intended for external application to the skin or mucous membranes. It consists of active substance (drug) and an ointment base. Ointments can be officinal (written out in short way) and magistral (written out in short and full ways).
Paste (Pasta)	Dense ointment that contains at least 25% (up to 65%) solid components.
Liniment (Linimentum)	Liquid ointment or jelatinous mass made on vegetable oils that is spread at body temperature.
Suppository (Suppositoria)	Dosed, small, cone-shaped solid (at room temperature) dosage form that is inserted either into the rectum *(rectal suppository)*, vagina *(vaginal suppository or pessaries)* where it dissolves or melts at body temperature.

Individual work

Theoretical questions:

1. Composition of ointment. Ointment bases (vaseline, lanolin, synthetic bases), their characteristics and significance for action of drugs. Eye ointments.
2. Paste and its differences from ointment.
3. Liniment and its variations.
4. Plasters and its use.
5. Other types of soft dosage forms: gel, cream.
6. Rectal and vaginal suppositories, their purpose.
7. Advantages and disadvantages of soft dosage forms. Prescribing rules for soft dosage forms.
8. Peculiarities of soft dosage forms use in pediatric practice.

Prescribe the drugs:

1) 30 g of 3% tetracycline ointment **(Tetracyclinum)**. Apply on the affected area of skin. Rp.:

2) 10 g of an eye ointment that contains 0,5% hydrocortisone **(Hydrocortisoni acetas)**. Put on the lower eyelids at night. Rp.:

3) 30 g of a complex ointment containing 1% salicylic acid **(Acidum salicylicum)** and 10% zinc oxide **(Zinci oxydum)**. Apply on the affected area of skin. Rp.:

4) 20 g of officinal zinc ointment **(Zincum)**. Apply on the wound. Rp.:

5) 30 g of a paste containing 0,2% furacilin **(Furacilinum)**. Apply on the affected area of skin. Rp.:

6) 30 g of officinal liniment containing synthomycin **(Synthomycinum)**. Apply on the wound. Rp.:

7) 100 g of Wishnevsky liniment containing 3% birch tar oil **(Pix liquida)**, 3% xeroform **(Xeroformium)** and the base castor oil **(Oleum Ricini)**. For bandaging of purulent wounds. Rp.:

8) 12 rectal suppositories that contain 0,1 g of levomycetin **(Laevomycetinum)**. Introduce into the rectum two times a day. Rp.:

9) 10 rectal suppositories containing 0,2 g of metacin **(Methacinum)** and 0,1 g of anestesin **(Anaesthesinum)**. Introduce into the rectum three times a day. Rp.:

10) 20 vaginal suppositories containing 0,001 g of sinestrol **(Synoestrolum)**. Introduce into the vagina in the morning and evening. Rp.:

References:

1. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
2. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Semantic unit №1. General recipe.		

Liquid dosage forms. Solutions for internal and external use, for injections, for aerosoles

The list of basic terms, parameters, characteristics, that must be learned by a student to prepare for lesson

Terms	Definition
Solutions (solutio) for enteral use	Introduced per os, in stomach and duodenum using a probe, per rectum. Dosed spoons, measuring cup.
Topical solution	Applied to the skin (baths, lotions, rinses, etc.). Solutions for external use can based on water, alcohol, oil, glycerine. Concentration of the solution is often expressed as a percentage.

I. Individual work

Theoretical questions:

1. The concept of the solution. Solutions for external use (eye drops, nasal drops, ear drops, irrigation, lotions, collodion), their use in medicine. Solvents: water, alcohol, oil, glycerine, etc., their characteristics. Ways of expressing the concentration of the solution. Methods prescribing solutions for external use.
2. Solutions for intake (mixtures, inside drops). Dosing of solutions for internal use (Soupspoon, dessertspoon, teaspoon, drops, etc.). Writing a prescriptions rules.
3. Dosage forms for injection. Demands placed upon them (sterility, purity, stability, apyrogenicity). Way of their introduction. Method of production of injection's drugs. Rules of prescribing medicines in ampoules, vials and pharmaceutical packaging.
4. The advantages and disadvantages of solutions for internal and injecting compared to solid dosage forms.
5. Aerosols and sprey, characteristics, application, rules of prescribing.
6. Value solutions as a dosage form in pediatrics.

Prescribe as a recipe:

1. 500 ml of 0.02% solution furacilinum **(Furacilinum).** Assign to wash wounds. Prescribe the long and short way.

   Rp:

2. 2% solution in alcohol of salicylic acid **(Acidum salicylicum)** 10 mL for the lubrication of abscesses.

   Rp:

3. 12 receptions in soupspoons of solution of calcium chloride **(Calcii chloridum)** at a dose of 1.0. Assign one soupspoon three times a day.

   Rp:

4. Dibasol on 10 receptions by dessert spoon **(Dibazolum)** for 6 years child.. Single dose for adults 0.04. Assign 1 soupspoon 3 times a day.

Rp:

5. Papaverine hydrochloride solution **(Papaverini hydrochloridum)** 30 reception as a internal drops for 7 years child. A single dose of papaverine - 0,005. Assign 10 drops 3 times a day.

Rp:

6. Solution for subcutaneous injection of papaverine hydrochloride **(Papaverini hydrochloridum)** in 1 ml ampoules. A single dose of papaverine - 0.02. Assign 1 ml 2 times a day.

Rp:

7. 10 ampoules 1 ml of 1% oil solution of progesterone **(Progoesteronum).** Assign 1 ml subcutaneously 1 time per day, preheat.

Rp:

8. 500 ml of 5% glucose solution **(Glucosum)** in pharmaceutical package for intravenous drip.

Rp:

9. 20 vials of streptomycin sulfate **(Streptomycini sulfas)** 0.5 for intramuscular injection, 2 times a day for teenager 14 years, previously dissolved in 3 ml of saline.

Rp:

10. 6 vials of corticotropin **(Corticotropinum)** about 10 OD intramuscular injections for 5 years child. Administered 2 times a day.

Rp:

11. Aerosol "Ingalipt" **(Ingaliptum).** Irrigate the nasopharynx 6 times a day.

Rp:

References:

1. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
2. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Semantic unit №1. General prescription.		
Potions, decoctions and solutions that are dosed by drops and spoons.		

The list of basic terms, parameters, characteristics, that must be learned by a student to prepare for lesson

Terms	Definition
infusions ***Infusum***	Aqueous extract of herbal raw materials. Made from friable medicinal plants, as well as raw materials contain volatile unstable substances (essential oils).
Decoctions ***Decoctum***	Aqueous extract of herbal raw materials. Made from dense plant material. For internal use prescription is based on a single dose of medicinal plants at the reception, when applied externally - on pharmacopeial breeding.
Tinctures ***Tinctura***	Clear colored liquids, obtained by alcohol, water-alcohol, and alcohol-essential extraction of active ingredients of medicinal plants.
Extracts ***Extractum***	Concentrated extracts of medicinal plants. Depending on the consistency, disting liquid, thick and dry.

I. Individual work

Theoretical questions:

1. Infusions and decoctions, their characteristics as multicomponent dosage forms. Method of their preparation. Pharmacopoeial ratio.
2. The concepts of fees their application.
3. Galenic products: tinctures, extracts. Their characteristics and applications.
4. Suspensions mucus. Sources and use.
5. Syrups, aromatic water, their use.
6. Potions based on decoctions and infusions.
7. The advantages and disadvantages of these medicines. Methods of dosing and prescribing rules in recipes.
8. Features of the use of these dosage forms in pediatrics.

Prescribe as a recipe:

1. 12 receptions of valerian tincture **(radix Valerianae)** with sodium bromide **(Natrii bromidum).** A single dose of valerian root - 0.5, sodium bromide - 0.25. Assign one soupspoon 3 times a day.

   Rp:

2. 10 receptions of potion marshmallow root **(radix Althaeae)** with sodium bicarbonate **(Natrii hydrocarbonas)** and syrup. A single dose of marshmallow root and sodium bicarbonate - 0.5. Assign 1 teaspoon 5 times a day.

   Rp:

3. Tincture of hawthorn **(Crataegus)** 20 drops per reception, 3 times a day. Rp:

4. Complicated tincture of motherwort **(Leonurum)**, a dose of 20 drops and strophanthus **(Strophanthum)**, dose of 5 drops. Take 2 times a day. Rp:

5. 20 receptions of potion of belladonna's dry extract **(Belladonna)** about 0,015, with sodium bicarbonate **(Natrii hydrocarbonas)** 0.3. Assign 1 teaspoon 2 times a day. Rp:

6. Long way recipe of codeine phosphate **(Sodeini phosphas)**, dose 0,015. Take 10 drops 2 times a day, 5 days. Rp:

References:

3. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
4. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Semantic unit №1. General recipe.		
The final lesson on general prescription.		

Prescribe as a recipe:

Written out in the form of recipes:

1. 45 g of powdered magnesium sulfate undivided (Magnesii sulfas) and sodium sulfate (Natrii sulfas) in a ratio of 2:1, respectively. Assign to 1 tablespoon, previously dissolved in 2/3 cup water.

Rp:

2. 12 comples powders with papaverine hydrochloride (Papaverini hydrochloridum), dose of 0.04 g, and platifillina gidrotartrat (Platyphyllini hydrotartras), and dose is 0.002 appoint on 1 powder twice a day.

Rp:

3. 20 capsules containing 0.05 g of hinidine sulfate (Chinidini sulfas). 1 capsule twice a day.

Rp:

4. In tablets, the drug contains 0.2 g of paracetamol (Paracetamolum) and acetylsalicylic acid (Acidum acetylsalicylicum), and 0.05 g of caffeine sodium benzoate (Soffeini-natrii benzoas). Appoint for headache treatment.

Rp:

5. 10 main rectal suppositories with Ichthyol (Ichthyolum) - 0,2 g, anestezin (Anaesthesinum) - 0,3 g and herb extracts (Extractum Belladonnae) - 0,015 g Apply for one candle on the night.

Rp:

6. 80 g lanolin ointment containing 2% salicylic acid (Acidum salicylicum) and 5% of the bismuth nitrate (Bismuthi subnitras). For the treatment of facial skin at night.

Rp:

7. 50 g of a paste containing 5% salicylic acid (Acidum salicylicum). Applied on the wound.

Rp:

8. For the treatment of bedsores 50 ml officinal compound methyl salicylate liniment (Linimentum Methylii salicylatis compositum).

Rp:

9. Eardrops containing 0.05% and 1% dimedrola

Rp:

ephedrine hydrochloride (Ephedrini hydrochloridum). 3 drops three times a day.

10. 15 ml aerosol of fenoterol (Fenoterolum). Breathe in a fit of asthma. **Rp:**

11. Aqueous extract of the herb wild thyme (Sepullum) - 1 g per reception with the addition of ammonium chloride (Ammonii chloridum) - 0,5 g reception, codeine fosfata (Codeini phosphas) a single dose of 0.01 g and cherry syrup (sirupus Cerasi). Appoint one tablespoon three times a day. **Rp:**

12. 120 ml medicine containing potassium iodide (Kalii iodidum) and sodium bicarbonate (Natrii hydrocarbonas) at the rate of respectively 0.2 g and 0.1 g per reception. Take into account the need for correction of taste. Assign 1 dessert spoon three times a day after meals. **Rp:**

13. 10 vials, each containing 1 ml of 0.06% solution korglikona (Corglyconum). Inject 0.5 ml of the vein slowly! Dissolved in 20 ml of 40% glucose solution. **Rp:**

14. 10 vials, each containing 1 ml of oil solution of progesterone (Progesteronum), 25 mg. 1 ml intramuscularly three times a week. **Rp:**

15. 20 vials, each containing 1 million units of benzylpenicillin sodium (Benzylpenicillinum Natrium). Contents of the vial to dissolve in 5 ml of 0.5% solution of novocaine. Injected intramuscularly. **Rp:**

References:

5. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
6. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Unit №2. General Pharmacology		

Introduction into pharmacology. History of pharmacology and pharmacy. Pharmacokinetics and pharmacodynamics. The final class «General pharmacology»

Learning objectives:

• summarize and analyze main pharmacological terms;
• evaluate significance of pharmacology as a fundamental subject for the development of other subjects in medicine;
• analyze main stages of development of pharmacology as a science and the contribution of scientists in each stage;
• study the general principles of human-drugs interaction, main types of pharmacological reactions.

Individual work

Theoretical questions:

1. Definition of pharmacology as a science. History of pharmacology and pharmacy.
2. Methods used in pharmacology. Drug development.
3. The main types of drug therapy.
4. General Pharmacology. Pharmacodynamics. Pharmacokinetics.
5. Routes of drug administration, their advantages and disadvantages. Comparative characteristics.
6. Types of drug action on the organism.
7. Therapeutic, toxic, main and adverse (side) effects of drugs.
8. Dependence of drug action on the chemical structure and other factors.
9. The action of drugs in their repeated introductions. Cumulation and its types. Tachyphylaxis. Tolerance.
10. Drug dependence. Prevention of drug addiction.
11. Types of synergism: summation and potentiation. Direct and indirect synergism. Its use in medicine.
12. Types of antagonism: direct and indirect. One-way and two-way antagonism. Its use in emergency treatment.
13. Pharmacokinetics and its stages.
14. The main mechanisms of drug transport through biological membranes.
15. Drug dose. Types of doses.
16. Metabolism of drugs. Reactions of drug biotransformation.
17. Elimination of drugs.
18. Toxicology. Drug disease.

ANSWER THE QUESTIONS:

1. DEFINITION OF PHARMACODYNAMICS AND PHARMACOKINETICS.

_____
_____
_____
_____
_____
_____

2. MAIN STAGES OF PHARMACOKINETICS.

_____
_____
_____
_____

3. TYPES OF DRUG THERAPY.

_____
_____
_____
_____
_____

4. DEFINITION OF SYNERGISM AND ANTAGONISM.

_____
_____
_____
_____
_____
_____

TESTS TO PREPARE FOR PRACTICAL CLASSES:

1. A 37 year old patient suffering from obliterating vascular endarteritis of lower limbs takes daily 60 microgram/kilogram of phenylin. Because of presentations of convulsive disorder (craniocerebral trauma in anamnesis) he was prescribed phenobarbital. Withholding this drug caused nasal hemorhage. What is this complication connected with?
A Induction of enzymes of microsomal oxidation in liver caused by phenobarbital
B Aliphatic hydroxylation of phenobarbital
C Conjugation of phenylin with glucuronic acid
D Oxidative deamination of phenylin
E Inhibition of microsomal oxidation in liver caused by phenobarbital

2. Proserin increases skeletal muscle tone when given systematically. Halothane induces relaxation of skeletal muscles and reduces proserin effects. What is the nature of proserin and halothane interaction?
A Indirect functional antagonism
B Direct functional antagonism
C Competitive antagonism
D Independent antagonism
E Noncompetitive antagonism

3. A patient taking clonidine for essential hypertension treatment was using alcohol that caused intense inhibition of central nervous system. What may it be connected with?
A Effect potentiating
B Effect summation
C Cumulation
D Intoxication
E Idiosyncrasy

4. Continuous taking of some drugs foregoing the pregnancy increase the risk of giving birth to a child with genetic defects. What is this effect called?
A Mutagenic effect
B Embryotoxic effect
C Teratogenic effect
D Fetotoxical effect
E Blastomogenic effect

5. A child suffers from drug idiosyncrasy. What is the cause of such reaction?
A Hereditary enzymopathy
B Exhaustion of substrate interacting with pharmaceutical substance
C Accumulation of pharmaceutical substance
D Inhibition of microsomal liver enzymes
E Associated disease of target organ

6. A patient suffering from initial hypertension has been taking an antihypertensive preparation for a long time. Suddenly he stopped taking this preparation. After this his condition grew worse, this led to development of hypertensive crisis. This by-effect can be classified as:
A Abstinence syndrome
B Cumulation
C Tolerance
D Sensibilization
E Dependence

7. A patient who has been suffering from cardiac insufficiency for several months has been taking digoxin on an outpatient basis. At a certain stage of treatment there appeared symptoms of drug overdose. What phenomenon underlies the development of this complication?
A Material cumulation
B Habituation
C Sensibilization
D Functional cumulation
E Tachyphylaxis

8. A patient ill with chronic cardiac insufficiency was prescribed an average therapeutic dose of digoxin. Two weeks after begin of its taking there appeared symptoms of drug intoxication (bradycardia, extrasystole, nausea). Name the phenomenon that caused accumulation of the drug in the organism?
A Material cumulation
B Functional cumulation
C Tolerance
D Tachyphylaxis
E Idiosyncrasy

9. A patient with chronic cardiac insufficiency has been taking foxglove (Digitalis) preparations for a long time. Due to the violation of intake schedule the woman got symptoms of intoxication. These symptoms result from:
A Material cumulation
B Tachyphylaxis
C Idiosyncrasy
D Antagonism
E Sensibilization

10. A man who has been taking a drug for a long time cannot withhold it because this causes impairment of psychic, somatic and vegetative functions. Name the syndrome of different disturbances caused by drug discontinuation:
A Abstinence
B Sensibilization
C Idiosyncrasy
D Tachyphylaxis
E Cumulation

11. A patient is being operated under inhalation narcosis with nitrous oxide. It is known that it has evident lipophilic properties. What mechanism is responsible for transporting this preparation through biological membranes?
A Passive diffusion
B Active transport

C Facilitated diffusion
D Filtration
E Pinocytosis

12. A patient was operated on account of abdominal injury with application of tubocurarin. At the end of operation, after the respiration had been restored, the patient got injection of gentamicin. It caused a sudden respiratory standstill and relaxation of skeletal muscles. What effect underlies this phenomenon?

A Potentiation
B Cumulation
C Antagonism
D Habituation
E Sensitization

13. A surgeon used novocaine as an anaesthetic during surgical manipulations. 10 minutes after it the patient became pale, he got dyspnea and hypotension. What type of allergic reaction is it?

A Anaphylactic
B Cytotoxic
C Immune complex
D Stimulating
E Cell-mediated

14. A 30 year old woman has been continuously using lipstick with a fluorescent substance thatled to development of a limited erythema on the prolabium, slight peeling, and later small transversal sulci and fissures. Microscopical examination of the affected zone revealed in the connective tissue sensibilized lymphocytes and macrophages, effects of cytolysis. What type of immunological hypersensitivity has developed on the lip?

A IV type (cellular cytotoxicity)
B I type (reagin type)
C II type (antibody cytotoxicity)
D III type (immune complex cytotoxicity)
E Granulomatosis

15. During anaesthetization of the oral cavity mucous tunic a patient developed anaphylactic shock (generalized vasodilatation, increase in vascular permeability along with escape of liquid to the tissues). What type of hypersensitivity has the patient developed?

A I type (anaphylactic)
B II type (antibody-dependent)
C III type (immune complex)
D IV type (cellular cytotoxicity)
E V type (granulomatosis)

16. Hemotransfusion stimulated development of intravascular erythrocyte hemolysis. The patient has the following type of hypersensitivity:

A II type hypersensitivity (antibody-dependent)
B I type hypersensitivity (anaphylactic)
C III type hypersensitivity (immune complex)
D IV type hypersensitivity (cellular cytotoxicity)
E V type hypersensitivity (granulomatosis)

17 Tetracycline taking in the first half of pregnancy causes abnormalities of fetus organs and systems, including tooth hypoplasia and alteration of their colour. What type of variability is the child's disease related to?

A. Recombinant
B. Combinative
C. Hereditary
D. Mutational
++*E. Modification

18. A surgeon used novocaine as an anesthetic during surgical manipulations. 10 minutes after it the patient became pale, he got dyspnea and hypotension. What type of allergic reaction is it?

++*A. Anaphylactic
B. Cell-mediated
C. Cytotoxic
D. Stimulating
E. Immune complex

19 A patient was prescribed a drug with apparent lipophilic properties. What is the main mechanism of its absorption?

A. Pinocytosis
B. Filtration
+C. Passive diffusion
D. Binding with transport proteins
E. Active transport

20 A patient noticed symptoms of approaching attack of bronchial asthma and took several tablets one by one at short intervals out of the doctor's control. Short-term improvement of his condition came only after taking the first two tablets. Next intakes of a drug didn't improve his condition. Reduction of the drug effectiveness was caused by:

A. Addiction
B. Dependence
+C. Tachyphylaxis
D. Cumulation
E. Idiosyncrasy

21 A patient who has been taking a certain drug for a long time cannot discontinue the use of it because this causes psychic and somatic disfunctions. The syndrome occuring at refraining from the use of a drug is called:

A. Sensitization
+B. Abstinence
C. Tachyphylaxis
D. Cumulation
E. Idiosyncrasy

22 A woman who had taken alcohols during her pregnancy had a child with cleft palate and upper lip. These presentations are indicative of some chromosomal anomalies. What process do they result from?

A. Ontogenesis
B. Carcinogenesis
+C. Teratogenesis
D. Mutagenesis
E. Phylogenesis

23 A patient with chronic heart failure has been taking digoxin for several months on an outpatient basis. At a certain stage of treatment, he got symptoms of drug overdose. What effect underlies the development of this complication?

A. Sensibilization
B. Functional cumulation
C. Adaptation
D. Tachyphylaxis
+E. Material accumulation

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Unit №3. Drugs affecting the afferent and efferent divisions of peripheral nervous system		
Local anesthetics, astringents, covering drugs, adsorbents, irritants		

The list of basic terms in the topic

Term	Definition
Local anesthetics	Drugs that cause reversible local anesthesia (absence of sensation), generally for the aim of having a local analgesic effect, that is, inducing absence of pain sensation, although other local senses are often affected as well. Also, when it is used on specific nerve pathways (nerve block), paralysis (loss of muscle power) can be achieved as well. Local anesthetics reduce sensitivity of afferent nerve endings and suppress conduction of excitation along the nerve.
Astringents, adsorbents, covering drugs	Drugs that protect endings of sensory nerves from the action of irritating substances.
Irritants	Drugs that irritate sensitive nerve endings in the skin or mucous membranes and produce local vascular reactions, reflexive actions and distractive effects.

Individual work

Theoretical questions:

1. Classification of drugs affecting afferent innervation (drugs that reduce and increase the sensitivity of afferent nerves).
2. Drugs for local anesthesia. Classification of local anesthetics by chemical structure and their use for different types of anesthesia. Requirements for local anesthetics.
3. Pharmacology of esters **(Procaine [Novocaine], Trimecaine, Benzocaine)** and replaced amides **(Lidocaine, Articaine, Bupivacaine)**.
4. Comparative characteristics of local anesthetics. Indications and clinical uses. The purpose of combination with adrenergic agonists.
5. Side effects of local anesthetics, prevention and treatment. Toxicology of cocaine.
6. Astringents. Organic and inorganic astringents. Mechanism of action, indications and clinical uses.
7. Pharmacological characteristics of **Tannin, Bismuth subnitrate, herb of St. John's wort (Hypericum), sage leaves, chamomile flowers**.
8. Covering drugs. General characteristics. Mechanism of action, indications and clinical uses **(starch mucus, flax seeds).**
9. Adsorbents. Classification. Mechanism of action. Indications and clinical uses **(Activated carbon, Enterosgel)**.
10. Drugs irritanting sensory nerves. Classification of irritants. Mechanism of action. Effects on the skin and mucous membranes. Indications and clinical uses.
11. Pharmacodynamics of **Ammonia solution, Menthol, mustard plaster, turpentine essence** and complex drugs on the basis of them.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. Tannin
2. **Vikalin***
3. Herb of St. John's wort (Hypericum)
4. Sage leaves
5. Chamomile flowers
6. **Novocaine [Procaine]***
7. Vicair
8. **Articaine***
9. Bupivacaine
10. **Lidocaine***
11. **Activated carbon***
12. **Ammonia solution***

Note: * – drugs for filling in the table

TASK FOR AN EXTRACURRICALAR WORK

Fill in the table:

The drug, dose and dosage form	*Mechanism of action*	*Main indications for use*	*Side effects and contraindications*

Prescribe as a recipe*:*

1. Vikalin

Rp:

2. Novocaine

Rp:

3. Activated carbon

Rp:

4. Lidocaine

Rp:

5. Ammonia solution

Rp:

6. Articaine

Rp:

TESTS TO PREPARE FOR PRACTICAL CLASSES:

1. A teenger had his tooth extracted under novocain anaesthesia. 10 minutes later he presented with skin pallor, dyspnea, hypotension. When this reaction is developed and the allergen achieves tissue basophils, it reacts with:

A IgE
B IgA
C IgD
D IgM
E T-lymphocytes

2. Removal of a foreign body from patient's eye involves local anesthesia with lidocaine. What is the action mechanism of this medication?

A It disturbs passing of Na^+ through the membrane
B It blocks passing of nitric oxide
C It inhibits cytochrome oxidase activity
D It reduces dehydrogenase activity
E It reduces passage of neuromediators

3. A driver felt sharp pain in the eye. He was delivered to the hospital. What local anesthetic may be applied for removal of a foreign body from the eye?

A.* Dicainum
B. Novocainum
C. Lidocainum
D. Trimecainum
E. Sovcainum

4. As a result of the influence of terminal anesthesia which part of the skin and mucus membranes are affected.

A. * Sensory nerve endings
B. Epiderm
C. Subcutaneous fatty tissue
D. Walls of capillaries
E. Dermis

5. Indicate the principle of action of covering drugs.

A. *Creation of protective layer on the mucous membranes.
B. Blockade of mucous membranes receptors.
C. Coagulation of proteins of superficial layer of mucous membrane.
D. Formation of complexes with toxic agents.
E. Stimulation of regenerative processes.

6. Indicate the mechanism of action of local anesthetics.

A. *Block sodium channels.
B. Create albuminates with plasma proteins
C. Block M-cholinoreceptors
D. Inhibit nonspecific activating systems of the CNS.
E. Block alpha adrenoreceptors.

7. Why not used Novocaine is terminal anesthesia?

A. *Is poorly absorbed through normal skin surface and mucous membrane
B. Doesn't cause covering action.
C. Is rapidly absorbed and inhibits the CNS.
D. Irritates mucous membrane.
E. Activates m-cholinoreceptors.

8. Indicate main effect of the local anesthetics.

A. *Eliminate all kinds of sensibility due to blockade of action potential creation
B. Selective relieve ot pain sensibility in local action.
C. Decrease of excitability of nerve endings
D. Decrease of excitability and conductivity of the afferent
E. Eliminates all kinds of sensibility due to paralysis of the CNS.

9. Indicate the mechanism of action of local anesthetics.

A. *Blockade of Na-channels
B. Formation of albuminates with tissue's proteins
C. Blockade of M-cholinoceptors
D. Inhibition of non-specific excitatory systems of CNS
E. Blockade ot alfa-adrenoceptors

10. What morphological elements of skin and mucous membranes are involved in interaction with the drug in terminal anesthesia?

A. *Sensitive nervous endings
B. Epidermis
C. Fatty tissue
D. Capillary wall
E. Derma

11. The patient needs an operation on soft palate. What method of anesthesia is the most appropriate?

A. *Infiltrative anesthesia
B. Local cooling
C. Conductive anesthesia
D. General anesthesia
E. Psychotherapy

12. The patient needs Vishnevsky paranephric blockade. What concentration of novocainum (procaine) solution should to be used?
A. *0,25-0,5%
B. 1-2%
C. 2-4%
D. 4-5%
E. 0.5-1%

13. What drugs from the group of local anesthetics are not used together with sulfonamides?
A. *Novocainum (procaine)
B. Sovcainum
C. Lidocaine
D. Trimecaine
E. Ultracaine

14. Determine the drug which is used for all type of anesthesia.
A. *Lidocaine
B. Anesthesinum (benzocaine)
C. Novocainum (procaine)
D. Trimecaine
E. Dicainum (tetracaine)

15. Injection of a local anesthetic has to be given to a patient for tooth extraction. What drug from listed below is to be chosen?
A. *Lidocaine
B. Dicainum (tetracaine)
C. Anesthezinum (benzocaine)
D. Cocaine
E. Ketamine

16. This agent is poorly soluble in water, so it is used for superficial anesthesia only in the form of ointment, paste and powder. What is this drug?
A. *Anesthezinum (benzocaine)
B. Novocainum (procaine)
C. Pyromecaine
D. Trimecaine
E Sovcainum

17. What drug has to be added to lidocaine solution to prolong its action?
A. *Adrenaline
B. Coffeinum
C. Analginum (methamizole)
D. Atropine
E. Anaprilinum (propranolol)

18. What is the mechanism of anti-inflammatory action of astringent drugs?
A. *They form albumin film which decreases irritation of receptors
B. They inhibit excitability of membrane of the nerve fibers
C. They are able to form colloid solutions
D. They block prostaglandine synthase
E. They inhibit phosphorylase

19. What is the mechanism of action of covering drugs?
A. Blockade of receptors of mucous membrane
B. Coagulation of proteins of superficial layer of mucous membrane
C. Binding to toxic substances with complexes formation
D. *Formation of protective layer on mucous membranes
E. Stimulation of regenrative processes

20. What is the main indication for adsorbing drugs use?
A. *Intoxication
B. Hvpoacidic gastritis
C. Decrease in trypsin activity
D. Decrease in bile secretion
E. Diarrhea

21. A nurse used mustard plaster with water of more than 60oC temperature and applied it on patient's back. In 30 minutes she found that patient's skin under the (sinapism, mustard poultice) mustard plaster did not get red. What is the reason for absence of (sinapism, mustard poultice) mustard plaster effect?
A. *Inactivation of mirosine
B. Inactivation of choline estherase
C. Activation of mirosine
D. Inactivation of monoaminooxydase
E. Activation of methyltranspherase

22. Dentists widely apply local anaesthesia adding adrenalin to an anaesthetic solution. What is the purpose of this method?
A. Local reduction of vascular resistance
++*B. Local vasoconstriction
C. Microcirculation improvement
D. Local vasodilatation
E. Lowering of arterial pressure

23 Introduction of a local anesthetic to a patient resulted in the development of anaphylactic shock. What is the leading mechanism of blood circulation disturbance?
A. Reduction of contractile myocardium function
B. Hypervolemia
+C. Decrease of vascular tone
D. Pain
E. Activation of sympathoadrenal system

24. In a surgical department of a stomatological polyclinic a patient is being prepared for tooth extraction. What drug should be added to the solution of a local anaesthetic in order to prolong its action?
A. Isadrine
+B. Adrenalin hydrochloride
C. Noradrenaline hydrotartrate
D. Salbutamol
E. Octadine

25 Before the infiltration anesthesia a patient had been tested for sensitivity to novocaine. The reaction turned out to be positive. Which of the below listed drugs can be used for anaesthetization in this case?
A. Trimecaine
B. Procainamide hydrochloride
C. Anesthezin
D. Tetracaine
+E. Lidocaine

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		**Module 1**

Unit №3. Drugs affecting the afferent and efferent divisions of peripheral nervous system

Cholinergic agonists (cholinomimetics), acetylcholinesterase inhibitors. Cholinergic antagonists: M-cholinoblockers. N-cholinoblockers (ganglionic blockers, neuromuscular-blocking drugs)

The list of basic terms in the topic

Term	**Definition**
Cholinergic agonists (cholinomimetics)	Drugs that mimic the effects of acetylcholine (ACh) by binding directly to cholinoceptors.
M-cholinomimetics	Drugs that stimulate mainly muscarine-sensitive cholinergic receptors (M-cholinergic receptors).
N-cholinomimetics	Drugs that stimulate mainly nicotine-sensitive cholinergic receptors (N-cholinergic receptors)
Acetylcholinesterase inhibitors (anticholinesterases, indirect-acting cholinergic agonists)	Drugs that indirectly provide a cholinergic action by prolonging the lifetime of ACh produced endogenously at the cholinergic nerve endings. These drugs block the activity of acetylcholinesterase (enzyme that destroys acetylcholine in cholinergic synapses). There are reversible (effect lasts for a few hours) and irreversible drugs (effect lasts from a few days up to a month).
Reactivators of acetylcholinesterase	Drugs that restore the activity of acetylcholinesterase.
Cholinergic antagonists (cholinoblockers, anticholinergic drugs)	Drugs that bind to cholinoceptors, but they do not trigger the usual receptor-mediated intracellular effects.
M-cholinoblockers	Drugs that block mainly muscarine-sensitive cholinergic receptors (M-cholinergic receptors).
N-cholinoblockers	Drugs that block mainly nicotine-sensitive cholinergic receptors (N-cholinergic receptors).
Ganglionic blockers	Drugs that specifically block the nicotinic receptors of both parasympathetic and sympathetic autonomic ganglia. This results in inhibition of transmission of nerve impulses from pre- to postganglionic fibers. Some drugs also block the ion channels of the autonomic ganglia.
Neuromuscular-blocking drugs	Drugs that block cholinergic transmission between motor nerve endings and the nicotinic receptors on the neuromuscular endplate of skeletal muscle. These neuromuscular blockers are structural analogs of ACh, and they act either as antagonists (nondepolarizing type) or agonists (depolarizing type) at the receptors on the endplate of the neuromuscular junction.

Individual work

Theoretical questions:

1. Anatomical and physiological characteristics of the autonomic nervous system. Cholinergic synapses, neurotransmitters and receptors.
2. Classification of drugs affecting the autonomic nervous system. Classification of drugs affecting the functions of cholinergic nerves.
3. Pharmacological effects of cholinergic receptors stimulation.
4. M-cholinomimetics. Pharmacological characteristics of **Pilocarpine**. Effects on eyes, smooth muscles, gland secretion, cardiovascular and urinary systems. Indications and clinical uses. Acute poisoning by muscarine, clinical symptoms and treatment. Antidote therapy.

5. N-cholinomimetics. Pharmacological effects of nicotine. Smoking as a medical and social issue. Drugs used to control nicotine smoking **(Cytisine [Tabex])**.
6. Acetylcholinesterase inhibitors. Classification of anticholinesterases. Mechanism of action, pharmacological effects, indications and clinical uses, side effects. Comparative characteristics of anticholinesterases **(Neostigmine [Proserine], Galantamine, Pyridostigmine)**.
7. Peculiarities of organophosphorus compounds. Acute poisoning by organophosphorus compounds, clinical symptoms and treatment. Reactivators of acetylcholinesterase **(Dipiroxime, Pralidoxime)**.
8. Cholinergic antagonists. M- and N-cholinoblockers.
9. Pharmacology of **Trihexyphenidyl [Cyclodol]**. Indications and clinical uses. Side effects.
10. M-cholinoblockers. Pharmacological characteristics of **Atropine, Tropicamide**. Indications and clinical uses. Acute poisoning by atropine and atropine-containing plants, clinical symptoms and treatment.
11. **Platyphylline, Hyoscine [Scopolamine], Belladonna extract, Ipratropium bromide [Atrovent], Pirenzepine [Gastrozepin]**. Comparative characteristics. Indications and clinical uses. Side effects.
12. N-cholinoblockers. Classification of ganglionic blockers. Mechanism of action. Pharmacological effects, indications and clinical uses, side effects. Characteristics of drugs: **Hexamethonium [Benzohexonium], Trepirium iodide [Hygronium], Azamethonium bromide [Pentamine]**.
13. Classification of neuromuscular-blocking drugs (skeletal muscle relaxants). Pharmacokinetics, pharmacodynamics of **Tubocurarine**. Indications and clinical uses, side effects.
14. Pharmacological characteristics of skeletal muscle relaxants **Pipekuronium [Arduan]**. Overdose by nondepolarizing muscle relaxants, clinical symptoms and treatment. Decurarization.
15. Pharmacological characteristics of depolarizing skeletal muscle relaxants **Suxamethonium chloride [Succinylcholine, Dithylin, Listenon]**. Indications and clinical uses. Overdose by depolarizing muscle relaxants, clinical symptoms and treatment.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Pilocarpine hydrochloride***
2. **Neostigmine [Proserine]***
3. **Galantamine hydrobromide***
4. **Atropine sulfate***
5. **Platyphylline hydrotartrate***
6. **Pipekuronium bromide [Arduan]***
7. **Ipratropium bromide [Atrovent]***
8. **Pirenzepine [Gastrozepin]***
9. Tubocurarine chloride
10. **Dithylin***
11. Hexamethonium [Benzohexonium]
12. Trepirium iodide [Hygronium]

Note: * – drugs for filling in the table

TASK FOR AN EXTRACURRICALAR WORK

Fill in the table:

The drug, dose and dosage form	*Mechanism of action*	*Main indications for use*	*Side effects and contraindications*

Prescribe as a recipe:

1. Proserine for prevention and treatment of 2. Pilocarpine hydrochloride (eye drops).

intestinal atony.

Rp:

Rp:

3. Atropine sulfate (eye drops and ampoules).

Rp:

4. Platyphylline hydrotartrate for treatment of intestinal colic.

Rp:

Rp.:

5. Dithylin for displacement reduction.

Rp:

6. Ipratropium bromide for inhalation.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. A patient with complaints of dizziness, worsening of vision acuity, sickness, salivation and spasmodic stomachaches was taken to the admission department. The diagnosis was poisoning with organophosphorous compounds. What preparations should be included into complex therapy?
A Atropine sulfate and dipiroxim
B Sodium thiosulfate and bemegride
C Tetacin-calcium and unitiol
D Nalorphine hydrochloride and bemegide
E Glucose and bemegride

2. After a surgical procedure a patient felt ill with enteroparesis. What medication from the group of anticholinesterase drugs should be prescribed?
A Proserin
B Carbacholine
C Aceclydine
D Pilocarpine
E Acetylcholine

3. During an operation a patient got injection of muscle relaxant dithylinum. Relaxation of skeletal muscles and inhibition of respiration lasted two hours. This condition was caused by absence of the following enzyme in blood serum:
A Butyrylcholin esterase
B Catalase
C Acetylcholinesterase
D Glucose 6-phosphatase
E Glutathione peroxidase

4. A patient had to go through an operation. Doctors introduced him dithylinum (listenone) and performed intubation. After the end of operation and cessation of anesthesia the independent respiration wasn't restored. Which enzyme deficit prolongs the action of muscle relaxant?
A Pseudocholinesterase
B Succinate dehydrogenase
C Carbanhydrase
D N-acetyltransferase
E K-Na-adenosine triphosphatase

5. Patient with complaints of dryness in the mouth, photophobia and vision violation was admitted to the reception-room. Skin is hyperemic, dry, pupils are dilated, tachycardia. Poisoning with belladonna alkaloids was diagnosed on further examination. What medicine should be prescribed?
A Prozerin
B Diazepam
C Pilocarpine
D Armine
E Dipyroxim

6. Analeptical remedy of reflective type from the H cholinomimetics group was given to the patient for restoration of breathing after poisoning with carbon monoxide. What medicine was prescribed to the patient?
A Lobeline hydrochloride
B Atropine sulphate
C Adrenalin hydrochloride
D Mesaton
E Pentamin

7. A patient suffering from myasthenia has been administered proserin. After its administration the patient has got nausea, diarrhea, twitch of tongue and skeletal muscles. What drug would help to eliminate the intoxication?
A Atropine sulfate
B Physostigmine
C Pyridostigmine bromide
D Isadrine
E Mesatonum

Introduction of a pharmaceutical substance to an experimental animal resulted in reduction of salivation, pupil mydriasis. Next intravenous introduction of acetylcholine didn't lead to any significant changes of heart rate. Name this substance:
A Atropine
B Adrenaline

C Propranolol
D Proserin
E Salbutamol

8. A patient with fracture of his lower jaw was admitted to the maxillofacial department. It was decided to fix his bones surgically under anaesthetic. After intravenous introduction of muscle relaxant there arose short fibrillar contractions of the patient's facial muscles. What muscle relaxant was applied?
A Dithylinum
B Tubocurarin chloride
C Pipecuronium bromide
D Diazepam
E Melictine

9. A patient in postoperative period was prescribed an anticholinesterase drug for stimulation of intestinal peristalsis and tonus of urinary bladder. What drug is it?
A Proserin
B Dichlothiazide
C Reserpine
D Mannitol
E Propanolol

10. A woman was delivered to a hospital for trachea intubation. What of the following drugs should be applied in this case?
A Dithylinum
B Nitroglycerine
C Metronidazole
D Atropine sulfate
E Gentamycin sulfate

11. A patient with drug intoxication presented with the dryness of oral mucous membrane and mydriatic pupils. Such action of this drug is associated with the following effect:
A Muscarinic cholinoreceptor block
B Muscarinic cholinoreceptor stumulation
C Nicotinic cholinoreceptor stumulation
D Adrenoreceptor stimulation
E Adrenoreceptor block

12. A patient with a limb fracture must be administered a depolarizing drug from the myorelaxant group for the purpose of a short-time surgery. What drug is it?
A Dithylinum
B Tubocurarine chloride
C Cytitonum
D Atropine sulfate
E Pentaminum

13. In clinical practice quite often there are cases of poisoning by phosphororganic substances (insecticides, pest-Killers). Alloxim is the drug used to treat this poisoning. Specify the group of drugs to which it belongs.
A * Regenerators of cholinesterase
B M-cholinoblockers
C Sympathomimetics
D Adrenomimetics
E N-cholinoblockers

14. A patient with the diagnosis of glaucoma received proserinum (neostigmine) in the form of eye drops. What compound is inactivated by proserinum that causes the decrease of intraocular pressure?
A. *Acetylcholinesterase
B. Butyrilcholinesterase
C. Cholinacetyltranspherase
D. Pseudocholinesterase
E. Acetylcholine

16. Proserinum (neostigmine) was introduced to the patient with overdosage of tubocurarine. Due to what mechanism of action is proserinum effective in this situation?
A. *Inhibition of cholinesterase activity
B. Blockade to the presinaptic membrane
C. Activation of M-cholinoceptors
D. The increase of cholinesterase concentration
E. Blockade of adrenoceptors

17. What drug is used in intestinal atony?
A. *Proserinum (neostigmine)
B. Benzohexonium (hexomethonium)
C. No-spa (drotaverine)
D. Atropine
E. Pirilenum

18. A 5 years old boy with the diagnosis suffers from disorders of movements coordination and muscular weakness (predominantly in the right leg) after poliomyelitis. What drug should be administered to improve neuromuscular transmission?
A. *Proserinum (neostigmine)
B. Coffeinum
C. Phenaminum (amphetamine)
D. Extractus Eleutherococci
E. Aethimizolum

19. A doctor administered injection of galanthamine to a 63 years old patient after ischemic insult of the brain for recovery of functions of the CNS. What is the mechanism of action of this drug?
A *Inhibition of acetylcholinesterase
B Inhibition of cholinacetylase
C Inhibition of catechol-O-methyltransferase
D Inhibition of dopamin-beta-hydroxylase
E Inhibition of monoamine oxidase

20. A patient was paralyzed after insult. Indicate the drug which can be administered to him for recovery of movement function in paralyzed extremities?
A.*Galanthamine
B.Aceclidine
C.Atropine
D.Carbacholine
E.Mellictinum

21. Indicate the agents used for treatment of the poisoning by phosphor-organic substances?
A. *Cholinesterase regenerators
B. Sympatholytics
C. Adrenomimetics
D. M-cholinoblockers
E. N-cholinoblockers

22. A doctor administered Pilocarpine to the patient with glaucoma. What is the main effect of this agent?
A. *Decrease of intraocular pressure
B. Increase of the cardiac rhythm
C. Stimulation of GIT peristalsis
D. Increase of salivation
E. Increase of myometrium contractility

23. A patient with complains of dryness of the oral cavity visited a dentist, who made the diagnosis: xerostomia. Which of the following drugs should the dentist prescribe?
A. *Pilocarpine
B. Atropine
C. Methacinurn
D. Ipratropium bromide
E. Halazolinum (xylomethazoline)

24. A dentist prescribed an agent stimulating salivation to a patient with xerostomia. Indicate the drug.
A. *Aceclidine
B. Dithylinum (suxamethonium)
C. Armin
D. Scopolamine
E. Atropine

25. Drugs from this group are used to decrease secretion of salivary and gastric glands, eliminate bronchospasm and bradycardia. Indicate the group of drugs.
A. *M-cholinolytics
B. Myorelaxation drugs
C. M-cholinomimetics
D. Cholinesterase inhibitors
E. Cholinesterase regenerators

26. An 8 years old child was poisoned by mushroom fly-agaric. Which of the following drugs should be used as an antagonist?
A. *Atropine
B. Pirenzepine
C. Morphine
D. Ipratropium bromide
E. Aceclidine

27. A 40 years old man was admitted to the toxicological department with poisoning by insectiside from the group of organophosphorous compounds. Which agent blocking peripheral M-cholinoceptors is the most effective for the treatment of the poisoning?
A. *Atropine
B. Pirenzepine
C. Plathyphylline
D. Benzohexonium (hexamethonium)

E. Amizylum (benactlzine)
28. Alloxim is used for treatment of poisonings with phospho-organic insecticides and strong choline esterase inhibitors. Indicate its mechanism of action.
A. *Regeneration of cholinesterase.
B. Blockade of n-cholinoceptors.
C. Stimulation of noradrenaline release
D. Excitation of adrenoceptors.
E. Blockade of m-cholinoceptors.
29. A 48 year-old man had been admitted to the urology department with signs of renal colic. Indicate the drug which main effect is associated with relaxation of smooth muscles
A. * Platyphyllnum
B. Analginum
C. Morphine
D. Omnoponum
E. Promedolum
30. A 50-year-old male farm worker was admitted to the emergency room. He was found fainted in the orchard and since then has remained unconscious. His heart rate is 45 and his blood pressure is 80l40 mmHg. He is sweating and salivating profusely. Which drug from the following should be prescribed?
A. *Atropine
B. Physostigmin
C. Proserine
D. Pentamine
E. Norepinephrne
31. The patient was admitted to a hospital with following symptoms: general excitement, dry and hyperemic skin, dryness of the oral cavity, disorder of vision, dilated pupils and photophobia, tachycardia. The doctor made the diagnosis: the poisining by belladonna's alkaloids. Indicate the main alkaloid of this plant?
A. *Atropine
B. Aceclidine
C. Pilocarpine
D. Armin
E. Galanthamine
32. A patient suffering from bronchial asthma has accompanying disease glaucoma. Indicate the group of drugs which is contraindicated for the patient.
A. *M-cholinotytics
B. Myotropic broncholytics
C. Alfa-beta-adrenomimetics
D. Glucocorticoids
E. Beta-2-adrenomimetics
F. Methacinum
33. In order to do eye inspection, it is necessary to widen the pupils. Choose the agent which can be used for this purpose.
A. *Atropine
B. Amizylum (benactizine)
C. Pilocarpine
D. Noradrenaline
E. Acetylcholine
34. Pharmacological effects of this drug substance are midriasis, decrease of exocrine glands secretion, tachycardia, dilation of the bronchi, inhibition of intestinal peristalsis. This drug does not penetrate into the CNS. Determine the drug.
A. *Methacinum
B. Atropine
C. Adrenaline
D. Isadrinum (isoprenalinej
E. Pirenzepine
35. Atropine sulfate was administered to the patient for treatment of intestinal colic. What accompanying disease confines usage of the drug?
A. *Glaucoma
B. Bronchial asthma
C. Sinus bradycardia
D. Hypotension
E. Dizziness
36. Indicate the drug used for the treatment of pulmonary edema caused by systemic arterial hypertension
A. * Benzohexonium
B. Strophanthinum
C. Bemegridum
D. Cordiaminum
E. Ethyl alcohol
37. During operation on the thyroid gland, to prevent excessive hemorrhage the doctor decided to use a method of controlled hypotension with the help of trickling intravenous introduction of a drug. Specify it.
A. * Hygronium
B. Pirilenum
C. Pentaminum
D. Pachycarpinum
E. Dimecolmum
38. Injection of dithylinum (which had been introduced for simplification of reposition of a dislocation in a shoulder joint) evoked apnea in the patient. What is it necessary to intro-duce to the patient for restoration of breathing?
A. * Fresh citrated blood
B. Bemegridum
C. Dipiroximum
D. Isonitrosinum
E Galanthaminum
39. A 53 year old man was admitted to a hospital in severe state with complaints of headache, vertigo, nausea. BP 220/120 mm Hg. After injection of 1ml of 2,5% benzohexonium solution the patient's state improved. Indicate the mechanism of action of this agent.
A. *Blockade of N-cholinoceptors of vegetative ganglions
B. Blockade or M-cholinoceptors
C. Blockade of $beta_1$-adrenoceptors
D. Excitation of alpha- adrenoceptors
E. Blockade of $alpha_1$-adrenoceptors
40. An agent from the group of ganglion blockers was administered to a patient with essential arterial hypertension. What effect underlies the decrease of BP?
A. * Sympathetic ganglions blockade
B. Blockade of adrenal cortex
C. Blockade of carotide sinuses
D. Vasomotor centre blockade
E. Parasympathetic ganglions blockade
41. Ganglion blocker benzohexonium (hexamethonium) was introduced to a patient with hypertensive crisis. What complication can develop in the patient after introduction?
A. *Orthostatic hypotension
B. Withdrawal syndrome
C. Inhibition of the CMC
D. Disorder of gustatory sensibility
E. Diarrhea
42. What neurotropic hypotensive agent belongs to the group of ganglion blockers and is used to eliminate hypertensive crisis?
A. *Pentaminum (azamethonium)
B. Octadinum (guanethidine)
C. Anaprilinum lpropranolol)
D. Dopamine
E. Reserpine
43. 0,1% solution of hygronium was introduced intravenously in drops to a 50-years-old patient with increased BP (220l110 mmHg). What is the mechanism of action of the drug?
A. *Blockade of N-cholinoceptors
B. Blockade of M-cholinoceptors
C. Blockade of adrenoceptors
D. Blockade of calcium channels
E. Stimulation of alfa-adrenoceptors
44. Sings of tubocurarine overdosage appeared in a patient during operation. What drug should be used as an antagonist?
A. *Cholinesterase inhibitors
B. Alfa-adrenomimetics
C. M-cholinoblockers
D. Ganglion blockers
E. beta-adrenomimetics
45. A 45-year s-old man with dislocation of shoulder joint was admitted to the hospital. What drug can be used to relax skeletal muscles and set the bone?
A. *Dithylinum (suxamethonium)
B. Dimedrolum (diphenhydramine)
C. Analginum (methamizole)
D. Promedolum (trimeperidine)
E. Acetylsalicylic acid
46. Peripheral myorelaxant was introduced to a patient with fracture of humeral bone to facilitate the bona reposition.

Respiratory standstill developed in the patient. The respiration restored after introduction of fresh citrate blood. What myorelaxant was introduced to the patient?
A. *Dithylinum (suxamethonium)
B. Tubocurarine
C. Pancuronium
D. Pipecuronium
E. Vecuronium
47. Myorelaxant dithylinum (suxamethonium) was introduced to a patient with fracture of humeral bone to facilitate the bone reposition. Respiratory arrest developed in the patient. Proserinum (neostigmine) was introduced to a patient (it was the doctor's mistake), but respiration didnTt restore. What drug can be used?
A. *Fresh citrate blood
B. Dipyroxime
C. Isonitrosine
D. Galanthamine
E. Bemegride
48. Dithylinum (suxamethonium) was introduced to a patient with the aim to relax skeletal muscles during operation. It led to myorelaxation during 6 hours instead of 5-7 minutes. This situation can develop due to genetic deficiency of:
A. *Blood plasma cholinestherase
B. Acetylation
C. Oxidative processes
D. Methylation
E. Carboxylation
49. Action of what agent is significantly prolonged in patients with genetic deficiency of buthyrilcholine estherase?
A. *Dithylinum (suxamethonium)
B. Adrenaline hydrochloride
C. Midantanum (amantadine)
D. Tubocurarine
E. Mesatonum (phenylephrine)
50. The patient of 40 years suffered from bronchial asthma for 10 years. Acompanying this disease is cardiac arrhythmia (tachycardia). Specify the drug which may be used for elimination of bronchospasm with keeping into account the acompanying disease?
A. * Salbutamolum
B. Orciprenaline
C. Eohedrine
D. Adrenaline
E. Isadrinum
51. Expressed arterial hypotension had developed in the patient during an operation which had been carried out under phthorotanum-general anesthesia. Which- from the listed medicines below should be introduced to the patient to normalize he's arterial blood pressure?
A. *Mesatonum
B. Strophanthin
C. Ephedrine hydrochloride
D. Noradrenatlnum hydrotartrate
E. Adrenaline
52. Indicate mechanism of broncho-lytic action of salbutamol?
A. *Stimulation of beta-2-adrenoceptors
B. Inhibition of phosphodiesterase
C. Activation of noradrenaline synthesis
D. Blockade of H-f-histamine receptors
E. Blockade of M-cholinoceptors
53. A 40 year old patient has been suffering from bronchial asthma for 10 years accompanied with cardiac arrthymia (tachycardia). Indicate adrenomimetic agent which should be administered for elimination of bronchospasm taking into account accompanied heart disease.
A. *Salbutamolum
B. Adrenaline
C. Isadrinum
D. Orciprenalinum
E. Ephedrinum
54. Salbutamol was administered to a 30 year old woman due to danger of having miscarriage as it causes decrease of contractile ability of myometrium. Indicate mechanism of sympathomimetics.
A. *Stimulation of beta-2-adrenoceptors
B. Stimulation of aipha-2-adrenoceptors
C. blockade of beta- f- adrenoceptors
D. Inhibition of monoaminooxydase
E. Blockade of phosphodiesterase
55. A female patient was admitted to a hospital with complaints of unpleasant sensations in the heart area, attacks of acute weakness, sometimes loss of consciousness. Examination of patient revealed atrioventricular blockade. Indicate the group of drugs that should be appointed in this situation.n
A. *beta-adrenomimetics (Isadrinum)
B. Cardiac glycosides (Digitoxin)
C. beta-adrenoblockers (Anapritinum)
D. Calcium channel blockers (Verapamil)
E. Sympatholytics (Ornidum)
56. Anaphylactic shock has developed in a patient after novocainum (procaine) injection. What agent supresses histamine release from mast ceils and eliminates main symptoms of anaphylactic shock?
A. Beclometasone
B. Euphillinum (aminophilline)
C. *Adrenaline
D. Ketotifen
E. Cromolin natrium (cromoglycic acid)
57. A doctor diagnosed hypoglycemic coma in a patient with diabetes mellitus and administered glucose solution IV to him. Patient's condition improved. What drug can be used additionally as the biochemical antagonist of insulin?
A. *Adrenaline
B. Mesatonum (phenylephrine)
C. Dobutamine
D. Isadrinum (isoprenaline)
E. Dopamine
58. A patient with chronic bronchitis has been taking ephedrine for a long time. What is the mechanism of the drug action?
A. *Stimulation of noradrenaline release into synaptic cleft
B. Blockade of noradrenaline release into synaptic cleft
C. Stimulation of a-adrenoceptors
D. Blokade of b-adrenoceptors
E. Direct influence on smooth muscles of bronchi
59. Indicate the state which requires introduction of ephedrine?
A. *Arterial hypotension
B. Caffeine poisoning
C. Tachycardia
D. Arterial hypertension
E. insomnia
60. A patient with obstructive bronchitis has been taking ephedrine for a long time without doctor's control. What side effect can be observed in the patient?
A. *Excitation of CNS
B. Hypotension
C. Bradycardia
D. Apathy
E. Sleepiness
61. What drug can be used for treatment of hypotension due to peripheral vascular insufficiency?
A. *alfa-adrenomimetic
B. b-adrenomimetic
C. Analeptic
D. Colloidal plasma substitute
E. Salt plasma substitute
62. Mesatonum (phenylephrine) was introduced to a patient with collapse for correction of blood pressure. What is the mechanism of action of the drug?
A. *Stimulation of alfa-adrenoceptors
B. Blockade of alfa-adrenoceptors
C. Blockade of beta-adrenoceptors
D. Stimulation of α-β adrenoceptors
E. Stimulation of b-adrenoceptors
63. Salbupart (salbutamol) was introduced to a 30-years-old pregnant woman with threatened abortion. It reduced contractile activity of myometrium. Indicate the mechanism of action of salbutamol?
A. *Stimulation of beta2-adrenoceptors
B. Blockade of beta f-adrenoceptors
C. Stimulation of alfa2-adrenoceptors
D. Inhibition of monoaminooxidase
E. Inhibition of phosphodiesterase
64. Indicate broncholytic drug from the group of selective beta2-adrenomimetics.
A. *Salbutamol
B. Methacinum
C. Isadrinum (isoprenaline)

D. Euphillinum (aminophilline)
E. Atropine
65. An attack of bronchial asthma developed in 40-years-old woman. Indicate the drug belonging to beta2-adrenomimetics which is effective for elimination of the attack
A. *Fenoterol
B. Ephedrine
C. Adrenaline
D. Plathvphiiline
E. Atropine
66. A 40-years-old patient has been suffering from bronchial asthma for 10 years, fie has also an accompanying disease cardiac arrhythmia (tachycardia). What adrenomimetic can be administered for elimination of bronchospasm?
A. *Salbutamol
B. Adrenaline
C. Isadrinum (isoprenaline)
D. Atropine
E. Ephedrine
67. A patient with bronchial asthma has been taking isadrinum (isoprenaline) inhalation for a long time. He notices the drug leads to tachycardia and headache. Which agent from listed below can be used instead of isadrinum?
A. *Salbutamol
B. Mesatonum (phenylephrine)
C. Anapriiinum (propranolol)
D. Dobutaminum
E. Cordiaminum (nikethamide)
68. A patient with bronchial asthma did not tell doctor that he had attacks of stenocardia sometimes. The doctor administered to him the drugs. After a patient started to take this drug, attacks of bronchial asthma became rare but attacks of stenocardia became more frequent. Indicate the drug which was administered by the doctor?
A. *Isadinum (isoprenaline)
B. Salbutamol
C. Euphillinum (aminophilline)
D. Cromolin natrium (cromoglycic acid)
E. Fenoterolum
69. A patient with bronchial asthma had been taking tablets which caused insomnia, headache, increased blood pressure. What medicine can cause such complications?
A. *Ephedrine
B. Isadrinum
C. Cromolin sodium
D. Euphyline
E. Oxprenololum
70. A dentist was examining a patient and noticed excessive salivation. The dentist applied a medication inducing dryness of oral cavity. What medication is it?
A. Proserin
B. Phentolamine
C. Pilocarpine hydrochloride
++*D. Atropine sulfate
E. Galantamine
71 A patient was delivered to the admission ward with poisoning with an insecticide of anticholinesterase action. What drug able to block muscarinic cholinoreceptors should be prescribed?
A. Pilocarpine hydrochloride
B. Mesatonum
C. Benzohexonium
+D. Atropine sulfate
E. Dithylinum
72 A man got poisoned with mushrooms. They contain muscarine that stimulates muscarinic cholinoreceptors. What symptom is typical for poisoning with inedible mushrooms?
A. Arterial pressure rise
+B. Miosis
C. Heart rate rise
D. Bronchi dilation
E. Mydriasis
73 A patient has a spasm of smooth muscles of bronchi. As the first aid it would be physiologically appropriate to inject the patient the antagonists of the following receptors:
A. N-cholinoreceptors
+B. M-cholinoreceptors
C. β-adrenoreceptors
D. Adenosine receptors
E. α-adrenoreceptors
74 In order to reduce salivation before a stomatological procedure a dentist gave his patient 10 drops of 0,1% solution of atropine sulfate perorally. 30 minutes later the patient started complaining of acute pain in the eyeballs, misty vision, headache, palpitation. These symptoms were eliminated by means of the following drug:
A. Phosphacol
+B. Physostigmine
C. Cytiton
D. Carbacholine
E. Aceclidine
75 On the 2-3 day after stomach resection a patient is still experiencing a failure of intestinal peristalsis. In order to stimulate the motility of gastrointestinal tract the following drug should be administered:
A. Atropine sulphate
B. Noradrenaline hydrotartrate
+C. Proserin
D. Prazosin
E. Cyclodolum
76 A patient in grave condition has been deliveredf to the admission ward. Examination revealed pupil mydriasis, no reaction to the light, considerable reddening and dryness of skin and mucous membranes. What drug might have caused the intoxication symptoms?
A. Dithylinum
+B. Atropine sulphate
C. Proserin
D. Pilocarpine hydrochloride
E. Adrenalin hydrochloride

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Semantic unit № 3. Drugs affecting the afferent and efferent innervation.		
Drugs that affect on transmission of synapses excitation. Adrenomimetics drugs, sympathomimetics.		

The list of basic terms, parameters, characteristics, that must be learned by a student to prepare for lesson.

Terms	Definition
Drugs that acting on adrenergetic receptors.	Drugs that affect on transmission of impulses in the synapses, where the mediator is norepinephrine (adrenaline)
Adrenomimetics drugs with raw action	Drugs that act directly on adrenergic receptors (excite them).
Alpha-adrenomimetics	Drugs that stimulate mainly alpha-adrenergic.
Beta- adrenomimetics	Drugs that stimulate mainly beta-adrenergic.
Sympathomimetics	Indirect alpha- and beta-adrenomimetics, which block the enzyme monoamine oxidase, and thus increase the release of neurotransmitter into the synaptic cleft.

I. Individual work

Theoretical questions:

1. Adrenergic receptors, types, localization, functions.
2. Classification of drugs affecting adrenergic innervation. Adrenergic agonists. Pharmacological characteristics.
3. Pharmacological characteristics of alpha- and beta-adrenomimetics. Pharmacokinetics, pharmacodynamics of **Epinephrine [Adrenaline]**. Effects on cardiovascular system, smooth muscles and metabolism. Indications and clinical uses.
4. Comparative characteristics of alpha-adrenomimetics: **Norepinephrine [Noradrenaline], Phenylephrine [Mesatone], Naphazoline, Xylometazoline**. Pharmacological effects, indications and clinical uses. Side effects.
5. Comparative characteristics of beta-adrenomimetics: **Isoprenaline [Isoproterenol, Isadrine], Salbutamol [Albuterol], Fenoterol [Berotec]**. Pharmacodynamics, indications and clinical uses, contraindications, side effects.
6. Indirect-acting adrenergic agonists (sympathomimetics). Mechanism of action, pharmacological effects, indications and clinical uses of **Ephedrine**. Side effects and contraindications.

THE LIST OF DRUGS FOR COMPULSORY STUDY

1. **Epinephrine [Adrenaline hydrochloride]***
2. **Norepinephrine [Noradrenaline hydrotartrate]***
3. **Phenylephrine [Mesatone]***
4. Naphazoline
5. Xylometazoline
6. **Salbutamol [Albuterol]***
7. **Prazosin***
8. Doxazosin [Cardura]
9. Terazosin

Note: * medicines for prescribing in table

TASK FOR AN EXTRACURRICALAR WORK

Fill in the table:

The drug, dose and dosage form	*Mechanism of action*	*Main indications for use*	*Side effects and contraindications*

Prescribe as a recipe:

1. Salbutamol - for inhalation during asthma attacks

Rp:

2. Adrenaline hydrochloride - to prolong the action of local anesthetics

Rp:

3. Phenylephrine

Rp:

4. Xylometazoline

Rp:

5. Terazosin

Rp:

6. Prazosin - for the treatment hypertrophy of the prostate

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. acompanyng diseases: ciliary arruthmia, stenocardia, and chronic bronchitis. The physician has decided to use a drug from the group of beta-adrenoblockers. Which agent should be used , taking into account the acompanyng diseases?
A. *Metoprololum
B. Timololum
C. Anaprinilum
D. Pindololum
F. Oxprenololum

2. A patient who had been suffering from arterial hypertension was treated with the drug which mechanism of action is connected with exhaustion of noradrenalin content in sympathetic nerve endings. Indicate this drug.
A. *Reserpinum
B. Clopheinum
C. Anaprinilum
D. Prazosine
E. Dibazolum

3. A 40 year old patient suffers from arterial hypertension with hyperkinetic type of circulation and increased level of renin, sternocardia, sinus tachycardia. Indicate the group of drugs which is more preferable for treatment of this patient.
A. *beta-adrenoblockers
B. Organic nitrates
C. α-adrenoblockers
D. Sympatholytics
E. Ganglion blockers

4. Indicate the drug which possesses hypotensive action exactly due to decrease of vascular tone. What drug can be used?
A. *α-adrenoblocker
B. N-cholinoblocker
C. α-β-adrenoblocker
D. M-cholinoblocker
E. β-adrenoblocker

5. Indicate the group of drugs to which prazosine belongs.
A. *α-adrenoblockers
B. Cardioselective β-adrenoblockers
C. Nonselective beta-adrenoblockers
D. Sympatholytics
E. Angiotensin converting enzyme inhibitors

6. A 40-years-old patient suffers from cardiovascular diseases: arterial hypertension of hyperkinetic type and high blood renin level, stenocardia and sinus tachycardia. Indicate the most expedient group of drugs for treatment of the patient?
A. *beta-adrenoblockers
B. Organic nitrates
C. alfa-adrenoblockers
D. Sympatholytics
E. Ganglion blockers

7. Indicate the state in which nonselective beta-adrenoblockers are contraindicated?
A. *Bronchial asthma
B. Thyrotoxicosis
C. Cardiomyopathy
D. Myocardial infarction
E. Arterial hypertension

8. Anaprilin (propranolol) was administered to a patient with hypertension that normalized BP fast. What is the mechanism of action of this drug?
A. *Blockade of beta$_1$- and beta2-adrenoceptors
B. Blockade of beta$_1$- adrenoceptors
C. Inhibition of phosphodiesterase
D. Blockade of alfa$_1$-adrenoceptors
E. Stimulation of atfa$_2$-adrenoceptors

9. Anaprilin was administered to a patient with arterial hypertension accompanied by obstructive bronchitis. After that the attack of bronchospasm occurred in the patient. Indicate the reason of this side-effect.
A. *Blockade of beta 2-adrenoceptors of bronchi
B. Stimulation of beta 2-adrenoceptors of bronchi
C. Blockade of alfa 2-adrenoceptors of bronchi
D. Blockade of beta1-adrenoceptors of bronchi
E. Stimulation of alfa 1-adrenoceptors of bronchi

10. Therapeutic effect of beta-adrenoblocker propranolol during the treatment of stenocadia is explained by:
A. *Decrease of myocardium oxygen demand
B. Inhibition of catecholamines' production
C. Dilation of coronary arteries
D. Increase of sensibility to catecholamines
E. Increase of peripheral arteries resistance

11. Examination of the 42-years-old women revealed stenocardia with following signs: BP = 170/100 mmHg, heart rate - 84lmin, on ECG -extrasystoles. Which drug from listed below is the most suitable for treatment?
A. *Anaprilinum (propranolol)
B. Euphillinum (aminophilline)
C. Nitroglycerin
D. Carbocromen
E. Papaverine

12. Beta-adrenoblocker was prescribed to a patient for the treatment of ischemic heart disease but after some time cough and bronchospasm occured. Indicate the agent which was administered?
A. *Anaprilinum (propranolol)
B. Talinolol
C. Atenolol
D. Phenigidin (nifedipine)
E. Metoprolol

13. A patient suffers from arterial hypertension accompanied by chronic obstructive bronchitis. Indicate hypotensive agent which is contraindicated for the patient ?
A. *Anaprilinum (propranolol)
B. Prazosine
C. Nifedipin
D. Dichfothiazidum (hydrochlorthiazide)
E. Captopril
14. Which of the following antiarrhythmic drug is contraindicated for the patient with cardiac arrhythmia accompanied by bronchial asthma?
A. *Anaprilinum (propranolol)
B. Verapamil
C. Aimalin
D. Nifedipin
E. Novocainamidum (procainamide)

15. Ischemic heart disease accompanied by cardiac arrhythmia was diagnosed in a 50 years-old patient. Indicate the group of drugs which should be administered?
A. *Beta-adrenoblockers
B. Alfa-adrenoblockers
C. Beta-adrenomimetics
D. Alfa-adrenomimetics
E. Sympatholytics

16 What changes will be observed in an isolated heart after introduction of adrenaline into the perfusion solution?
A. Increase of heart force
B. Diastolic arrest
C. Decrease of heart force
D. Increase of heart rate
+E. Increase of heart rate and force

17 A patient had an attack of bronchial asthma in the dentist's offic The attack was arrested by salbutamol. This drug relates to the following group of therapeutic agents:
+A. β_2-adrenomimetics
B. α-adrenomimetics
C. α-β-adrenomimetics
D. Sympatholytics
E. β_1-β_2-adrenomimetics

18 A patient was administered clonidine to be taken parenterally in case of abrupt rise of arterial pressur E. What is its mechanism of action?
A. Block of α_1-adrenoreceptors
B. Stimulation of central α_2-adrenoreceptors
C. Block of α_1- and α_2-adrenoreceptors
D. Block of nicotinic cholinoreceptors of ganglia
E. Stimulation of central imidazole$_1$-receptors

19 A patient with bronchial asthma has been administered inhalations of 0,5% isadrin solution. This helped to relieve bronchiospasms but the patient started complaining of heart pain and palpitation. What is the cause of these presentations?
A. α-adrenoreceptor stimulation
B. M-cholinoreceptor activation
+C. β_1-adrenoreceptor stimulation
D. β_2-adrenoreceptor stimulation
E. Inhibition of acetylcholine synthesis

References:

6. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
7. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
8. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
9. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
10. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Semantic unit № 3. Drugs affecting the afferent and efferent innervation.		
Antiadrenergic drugs: adrenoblockers and, sympatholytics.		

The list of basic terms, parameters, characteristics, that must be learned by a student to prepare for lesson.

Terms	Definition
Antiadrenergic drugs	Drugs that reduce the transmission of impulses in the synapses, where the mediator is norepinephrine (adrenaline)
Alpha- adrenoblockers	Drugs that inhibit mainly alpha-adrenergic
Beta- adrenoblockers	Drugs that inhibit mainly beta-adrenergic
Sympatholytics	Drugs that block the sympathetic innervation of the organs by releasing the mediator from sympathetic nerves endings.

I. Individual work

Theoretical questions:

1. Adrenergic antagonists (antiadrenergic drugs). Adrenoblockers. Classification.
2. Alpha-adrenoblockers: **Prazosin, Doxazosin [Cardura], Terazosin**. Pharmacodynamics, indications and clinical uses, Side effects and contraindications.
3. Beta-adrenoblockers. Pharmacodynamics. Cardioselective and non-cardioselective beta-adrenoblockers. Comparative characteristics of **Propranolol [Anaprilin], Talinolol, Metoprolol**. Intrinsic sympathomimetic activity.
4. Sympatholytics: **Guanethidine [Octadine], Reserpine**. Mechanism of action. Indications and clinical uses. Side effects and contraindications.

THE LIST OF DRUGS FOR COMPULSORY STUDY

1. **Propranolol [Anaprilin]***
2. **Atenolol***
3. Metoprolol
4. Talinolol
5. Reserpine
6. Guanethidine [Octadine]

Note: * medicines for prescribing in table

TASK FOR AN EXTRACURRICALAR WORK

Fill in the table:

The drug, dose and dosage form	*Mechanism of action*	*Main indications for use*	*Side effects and contraindications*

Prescribe as a recipe:

1. Metoprolol tablets.

Rp:

3. Talinolol

Rp:

2. Prazosin - for the prostate hypertrophy treatment

Rp:

4. Atenolol

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. An agent causing decrease of noradrenaline content in vesicles of sympathetic nerve endings was administered to a patient suffering from arterial hypertension. Indicate this drug ?
A. *Reserpin
B. Anaprilin (propranolol)
C. Pirroxanum
D. Dibazolum (bendazole)
E. Clophelinum

2. A 50 years old woman suffering from hypertension has taken a drug. In an hour BP was increased, but in 2 hours it started to decrease. Indicate the drug.
A. *Octadine (guanethidine)
B. Reserpine
C. Prazosin
D. Dibazolum (bendazole)
E. Propranolol

3. A patient with arterial hypertension has been treating with reserpine for a long period of time. 2-3 weeks ago he began to notice stomachache, heartburn, nausea. Indicate the group of drugs which are able to eliminate these symptoms?
A. *M-cholinoblockers
B. Astringent drugs
C. Antacids
D. Proton pump inhibitors
E. H_2-histaminoblockers

4. Elongation of P-Q interval was revealed on ECG. Indicate the drug which can cause this effect.
A. *Atenolol
B. Prazosin
C. Reserpine
D. Qctadinum (guanethidine)
E. Phentoiamine

5. A patient who had been suffering from severe form of arterial hypertension after examination received diagnosis of pheochromocytoma (tumor of adrenal medulla which is accompanied by increased synthesis of adrenaline). Indicate the group of drugs which should be administered to a patient before surgical treatment.
A. *alpha-adrenoblockers
B. Calcium channel blockers
C. Sympatholytics
D. Ganglion blockers
E. beta-adrenoblockers

6. Patient with bronchial asthma was taking tablets which caused insomnia, headache, increased blood pressure. What medecine can cause such complications?
A Ephedrine
B Adrenaline
C Chromolin sodium
D Euphyline
E Izadrine

7. A 63 y.o. man with collapse symptoms was delivered to the emergency hospital. A doctor chose noradrenaline in order to prevent hypotension. What is the action mechanism of this medication?
A Activation of α1-adrenoreceptors
B Activation of serotonin receptors
C Activation of β-adrenoreceptors
D Activation of dopamine receptors
E Block of M-cholinoreceptors

8. Anapriline therapy caused positive effect in the dynamic of the disease of a 44-year-old woman suffering from stenocardia. What is the main mechanism of the effect of this medicine?
A Blockade of β-adrenoreceptors and decrease myocardial requirements to the oxygen.
B Decrease of oxidative exchange in myocardium due to enzyme blockade of Krebs' cycle
C Decreased power inputs of myocardium due to reduced loading
D Increased oxygen supply to the myocardium
E Decreased need in increasing of oxygen supply to the myocardium

9. A patient suffers from diabetes melitus. After the regular insulin injection his condition grew worse: there appeared anxiety, cold sweat, tremor of limbs, general weakness, dizziness. What preparation can eliminate these symptoms?
A Adrenaline hydrochloride
B Butamide
C Caffeine
D Noradrenaline

E Glibutide
10. An ophthalmologist used a 1% mesaton solution for the diagnostic purpose (pupil dilation foreye-ground examination). What is the cause of mydriasis induced by the drug?
A Activation of α1 adrenoreceptors
B Activation of α2 adrenoreceptors
C Block of α1 adrenoreceptors
D Activation of β1 adrenoreceptors
E Activation of M-cholinoreceptors
11. A patient ill with bronchial asthma didn't inform his doctor that he had attacks of stenocardia. Doctor administered him a medication, which taking resulted in less frequent attacks of bronchial asthma, but stenocardia attacks became more frequent. What medication was administered?
A Isadrin
B Salbutamol
C Aminophylline
D Cromolyn sodium
E Phenotherol
12. A patient with coronary artery disease was admitted to the cardiological department. For stenocardia prevention a drug from the group of \beta-adrenoceptor blockers was administered. What drug is it?
A Metoprolol
B Atropine sulfate
C Morphine hydrochloride
D Oxytocin
E Furosemide
13. A 25 year old patient had in the dentist's room a sudden attack of bronchial asthma. The doctor gave him salbutamol in the form of inhalation. What is the mechanism of action of this preparation?
A Stimulates β_2-adrenoreceptors
B Stimulates α-adrenoreceptors
C Blocks H_1-histamine receptors
D Blocks phosphodiesterase
E Blocks M-cholinergic receptors
14. A patient started bleeding after tooth extraction. What action is necessary in this case?
A Adrenalin locally
B Thrombin injection
C Fibrinogen injection
D Vicasol orally
E Neodicumarine orally
15. Name the drug group that can reduce need of myocardium for oxygene, decrease force of heartbeat and inhibit lipolysis:
A β-adrenoceptor blockers
B α-adrenoceptor blockers
C Sympatholytics
D Selective β-adrenoceptor agonists
E α-adrenoceptor agonists
16 A 42-year-old woman has been administered propranolol for the ischemic heart disease. Yet she has been found to have a disease in case of which the use of propranolol is contra-indicated. What disease is it?
A. Arterial hypertension
+B. Bronchial asthma
C. Myasthenia
D. Cholecystitis
E. Duodenal ulcer

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Unit №3. Drugs affecting the afferent and efferent divisions of peripheral nervous system		

Dopaminergic and serotoninergic drugs. The final class «Drugs affecting the afferent and efferent divisions of peripheral nervous system»

The list of basic terms in the topic

Term	Definition
Dopamine	Neurotransmitter of the catecholamine family that plays a number of important roles in the brain and peripheral tissues. In the blood vessels it inhibits norepinephrine release and acts as a vasodilator; in the kidneys it increases sodium excretion and urine output; in the pancreas it reduces insulin production; in the digestive system it reduces gastrointestinal motility and protects intestinal mucosa; and in the immune system it reduces the activity of lymphocytes. A variety of important drugs work by altering the way the body makes or uses dopamine. Dopamine itself is available for intravenous injection: although it cannot reach the brain from the bloodstream, its peripheral effects make it useful in the treatment of heart failure or shock. L-DOPA, the metabolic precursor of dopamine, does reach the brain and is the most widely used treatment for Parkinson's disease. Many antipsychotic drugs act by suppressing the effects of dopamine. Drugs that act against dopamine by a different mechanism are also some of the most effective anti-nausea agents.
Serotonin (5-hydroxy-tryptamine)	Monoamine neurotransmitter. Biochemically derived from tryptophan, serotonin is primarily found in the gastrointestinal (GI) tract, platelets, and in the central nervous system (CNS). Approximately 90% of total serotonin is located in the enterochromaffin cells in the GI tract, where it is used to regulate intestinal movements. The remainder is synthesized in serotonergic neurons of the CNS, where it has various functions. These include the regulation of mood, appetite, and sleep. Also serotonin serves as a vasoconstrictor and helps to regulate hemostasis and blood clotting. Serotonin agonists and antagonists are used in clinical practice as antiemetics, antidepressants and antimigrainous drugs.

Individual work

Theoretical questions:

1. Dopamine as a neurotransmitter. Dopamine receptors, types, localization.
2. Pharmacokinetics and pharmacodynamics of dopamine. Indications and contraindications for use of **Dopamine** and its agonists **(Levodopa, Bromocriptine)** and antagonists **(Aminazin, Metoclopramide)**.
3. The role of serotonin (5-hydroxytryptamine) as a neurotransmitter in regulation of human body functions and in pathogenesis of different diseases. Serotonin receptors, types, localization.
4. Indications and clinical uses of serotonin agonists **(Sumatriptan)** and antagonists **(Ondansetron)**.

SOLVE SITUATIONAL TASKS:

1. Determine the drug.

This drug contains glycoside sinigrin and enzyme myrosinase. Warm water (up to 40°C) causes enzymatic decomposition of sinigrin with formation of essential oil, that is due to its irritating properties causes therapeutic effect.

ANSWER_____

2. Determine the antidote for treatment of the patient.
A patient was delivered to emergency room in serious condition. Examination revealed narrowing of the pupils, increased salivation, sweating, difficult breathing, hypotension, bradycardia, spasms of abdominal smooth muscles, cramps. What antidote must be administered for this patient?
ANSWER_____

3. Determine the drug.
A 45 years old male suffers from bronchial asthma. A drug prescribed for him dilates bronchi and improves breathing. However tachycardia, hypertension, excessive CNS stimulation and sleep disturbances appeared in the patient. What drug could be prescribed for the patient?
ANSWER_____

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Unit №4. Drugs affecting the central nervous system		

Psychotropic drugs. Sedative drugs, neuroleptics, tranquilizers (anxiolytic drugs), mood stabilizers

The list of basic terms in the topic

Term	Definition
Hallucination	Disorders of perception, the subjective sensual experience of perception of images, objects, events, objects, but non-existent. This is a condition when the visions, sounds, objects, smells seem they do but they do not exist in reality.
Delirium	Thought disorder, manifested painfully distorted assessment of facts, wrong judgments, and conclusions that are not amenable to correction. Distinguish nonsense attitude (I think that all are hostile), delusions of persecution, delusions of poisoning, delusions of self-accusation, delusions of grandeur, delusions of jealousy, etc.
Neurosis-kind syndromes	Asthenic - manifested fatigue, emotional instability, irritability, which is replaced by indifference. Hysterical - stormy emotional manifestation of all actions, facial expressions, gestures, words are accompanied by an affectation, tears, shouting, hand-wringing, pulling hair, fainting
Phobia	Fear
Deprimiruyuschee action	Depressing action type of on the CNS
Antipsychotic action	Ability to eliminate delusions, hallucinations, agitation, ie effects of acute psychosis/
Anxiolytic effects (from Lat. Anxius - «alarming" and Greek. Lysis - «dissolution")	Antiphobic, antianxiety effect - ability to manage anxiety, fear, panic, tension - the hallmark of tranquilizers. Another name for these drugs - ataraktix (from the Greek. Ataraxia - «equanimity"), psychosedatives, anti neurotic drugs.
Normothymic action	Ability to maintain a steady, normal mood

Individual work

Theoretical questions:

1. Classification of psychotropic drugs with ihibitory action.
2. Neuroleptics. Definition, classification, mechanisms of action. Indications. Pharmacological effects of **Chlorpromazine, Triftazin, Droperidol, Haloperidol, Clozapine, Chlorprothixene, Sulpiride, Ftorfenazina**. The side effects of neuroleptics.
3. Combined use of drugs other pharmacological groups. The concept of neuroleptic analgesia.
4. Tranquilizers. Definition, classification. The concept of the benzodiazepine receptor.
5. The main types of pharmacological effects of tranquilizers. Pharmacology **Hlozepid, Diazepam (Sibazon), Phenazepam**, daily tranquilizers **(Gidazepam, Medazepam).**
6. Indications for tranquilizers use, main side effects.
7. Sedatives. Definition, classification, indications and clinical uses. Pharmacology bromides.
8. Bromism – clinical symptoms, prevention, treatment. Sedatives plant **(Tincture of Valerian, Motherwort tincture, Korvaldin)**.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Tincture of valerian***
2. Motherwort tincture
3. Korvaldin
4. **Chlorpromazine***
5. Triftazin
6. **Droperidol***
7. **Haloperidol***
8. Clozapine
9. **Chlorprothixene***
10. Sulpiride
11. **Hlozepid***
12. **Diazepam***
13. **Phenazepam***
14. **Gidazepam***
15. Medazepam

Note: * – drugs for filling in the table

TASK FOR AN EXTRACURRICALAR WORK

Fill in the table:

The drug, dose and dosage form	*Mechanism of action*	*Main indications for use*	*Side effects and contraindications*

Prescribe as a recipe:

1. Diazepam in tablets.

Rp:

2. Droperidol for neuroleptic analgesia.

Rp:

3. Aminazin during psychosis.

Rp:

4. Tincture of valerian.

Rp:

5. Gidazepam - daily tranquilizer.

Rp:

6. Phenazepam.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. A patient was admitted to a surgical department for an operation. He has to undergo neuroleptanalgesia. To achieve neuroleptanalgesia it would be rational to combine fentanyl with the following medicine:

A. Droperidol
B . Cholosasum
C . Salbutamol
D . Pilocarpine
E . Fraxiparine

2. A patient who has been traeted in a neurological clinic with sedatives for a long time has the following complications: cough, rhinitis, lacrimation. What preparation might have caused such disorders?

A . Sodium bromide
B. Diazepam

C . Valerian
D . Phenazepam
E . Reserpine

3. A 40 year-old patient was admitted to the psychiatric clinic in an agitated state. He was aggressive, and delirated. Indicate the best drug to be given
A. *Aminazine (chlorpromazine)
B. Sodium bromide
C. Diazepam
D. Tinctura Valerianae
E. Peserpinum

4. A man with disorders of psychoemotional state and sleeplessness, was treated with diazepamum. Upon which receptors this drug influence?
A. * Benzodiazepine receptors
B. Alfa-adrenoreceptors
C. Beta-adrenoreceptors
D. M-cholinoceptors
E. N-cholinoceptors

5. Impairment of movement co-ordination, shivering of the hands and sleepiness developed in the patient had been suffering from schizophrenia under the treatment by psychotropic drugs. Indicate this group of drugs.
A. *Neuroleptics
B. Analgesics
C. Tranquilizers
D. Antidepressants
E. Psyco stimulants

6. Introduction of aminazine(chlor-promazine), which was made to a patient who had been suffering from chronic alcholism for elimination of agression and delirium, caused loss of consiousness in this patient. Indicate the probable reason of this complication.
A. *Orthostatic collapse.
B. Inhibition of the reticular formation.
C. Impairment of coronary circulation.
D. Suppression of the limbic system. .
E. Impairment of oxidative processes in the brain tissue.

7. Indicate the drug for elimination of the acute psychosis from the group of derivatives of phenothiazine.
A. A.*Aminazinum (chlorpromazine)
B. Diazepam.
C. Haloperidol
D. Amitriptylin
E. Natrii oxybutyras (oxybate sodium)

8. Determine the group of drugs which doesn't cause drug dependence.
A. * Neuroleptics
B. Tranquilizers
C. Barbiturates
D. Opioid analgesics
E. Psychostimulants -phenylalkylamine derivatives

9. A doctor administered aminazinum (chlorpromazine) to the patient suffering from schizophrenia to eliminate delirium, hallucinations, to decrease aggression and psychomotor excitement. What is the mechanism of antipsychotic action of aminazinum?
A. Excitation of M-cholinoreceptors in the CNS
B. Stimulation of opioid receptors
C. *Blockade of adrenoreceptors and dopamine receptors in the CNS
D. Excitement of adrenoreceptors and dopamine receptors in the CNS.
E. Inhibition of MAO

10. A neuroleptic (butyrophenone derivative) was administered to a patient with alcohol psychosis. Determine this drug.
A. Aminazinum (chlorpromazine)
B. Sulpirid
C. Diazepam
D. Triftazinum (trifluoperazine)
E. * Haloperidol

11. Neuroleptoanalgesia was made to a patient because of myocardial infarction. What drug from the group of neuroleptics is used more often in combination with fentanyl?
A.* Droperidol
B. Aethaperazinum (perphenazine)
C. Diazepam
D. Chlozepidum (chlordiazepoxide)
E. Sulpind

12. A patient had been suffering from schizophrenia accompanied by arterial hypertension. A doctor administered neuroleptic possessing expressed hypotensive activity. Indicate this drug.
A. *Aminazinum (chlorpromazine)
B. Risperidone
C. Haloperidol
D. Diazepam
E. Triftazinum (trifluoperazine)

13. A 35-years-old woman was addressed to a doctor with complaints of temper tiredness, insomnia, internal tension. The doctor had diagnosed neurosis and administered tranquilizer (diazepam). Which of the effects of this drug is more important in this situation?
A. *Anxiolytic
B. Antiemetic
C. Anticonvulsive
D. Myorelaxation
E. Antipsychotic

14. The majority of drugs from this group exert expressed sedative - hypnotic and myorelaxation action, that is why they decrease concentration and reactions of the cured patients. Determine this group of drugs.
A. *Tranquilizers
B. Salicylates
C. Nootropic agents
D. Sedative
E. Ca channel blockers

15. A dentist introduced sibazonum (diazepam) to a 48-years old woman before extraction of tooth. Explain the mechanism of its anxiolytic action.
A. *Agonist of benzodiazepine receptors
B. Stimulation of opioid receptors
C. Excitation of adrenoreceptors and dopamine receptors in the CNS.
D. Inhibition of α-adrenoreceptors
E. Agonist of M-cholinoreceptors

16. A patient was addressed to a doctor with complaints of emotional unstability. feeling of psychoemotional tension and fear in meetings with the chief often accompanied by significant tachycardia, pain in the heart area, hyperemia of the face, headache, hand tremor, sweating. Administer the necessary drug.
A. *Chlozepidum (chlordiazepoxide)
B. Aethaperazinum (perphenazine)
C. Aethtmizolum
D. Analginum (metamizole)
E. Sulpirid

17. What group of drugs is used for the treatment and prevention of manias?
A. * Lithium
B. Sedatives
C. Neuroleptics
D. Tranquilizers
E. Antidepressants

18. These drugs amplify and concentrate the inhibitory processes in the brain cortex. They exert sedative action, relieve irritability, and do not eliminate the feeling of fear, anxiety. Determine this group.
A. * Sedatives
B. Tranquilizers
C. Antidepressants
D. Neuroleptics
E. Psychostimulants

19. A patient was addressed to a doctor with complaints of irritability, insomnia, fatigue. A doctor administered a sedative drug to him. In two weeks the patient began to complain of cough, sleepiness, decrease of memory, phenomena of rhinitis, conjunctivitis, dermatitis. What group of the drugs was administered by the doctor?
A. *Bromides
B. Valeriana
C. Lithium
D. Tranquilizers
E. Neuroleptics

20. The patient has taken the mixture prescribed by neuropathologist for neurasthenia for 2 weeks. Patient felt better but developed coryza, conjunctivitis, rash, inertia, decrease of memory. Bromizm was diagnosed. What should be prescribed to decrease symptoms?
A. Natrium chloride
B . Glucose solution 5%
C . Asparcam
D . Polyglucin
E . -

21. The patient was treated medically for psychosis for 2 weeks. Patient's condition improved but rigidity, tremor, hypokinesia developed. Which of the drugs can cause such complications?
A. Aminazine
B . Diphenine
C . Sydnocarb
D . Imipramine
E . Chlordiazepoxide

22. A 45-year-old patient suffers from neurosis characterized by irritability, sleeplessness,
motiveless anxiety. What drug would eliminate all the symptoms?
A . Diazepam
B . Valerian extract
C . Pyracetam
D . Caffeine sodium benzoate
E . Levodopa

23. A patient with myocardial infarction was admitted to the cardiological department. For pain relief it was decided to potentiate fentanyl action with a neuroleptic. Which of the following
neuroleptics is the most suitable for neuroleptanalgesia?
A . Droperidol
B . Aminazine
C . Triftazine
D . Haloperidol
E . Sulpiride

24. A patient who has been treated in a neural clinic and has been taking a sedative for a long
time got the following complication: cough, rhinitis, epiphora. What drug caused these
disturbances?
A . Sodium bromide
B . Diazepam
C . Valerian
D . Phenazepam
E . Reserpine

25 A patient with myocardium infarction was admitted to the cardiological department. In order to relieve his pain it was decided to potentiate action of fentanyl by a certain neurolepti C. What is the most suitable neuroleptic for neuroleptanalgesia?
A. Triftazine
B. Sulpiride
+C. Droperidol
D. Aminazine
E. Haloperidol

26 A male patient waiting for tooth extraction has developed a strong sense of anxiety. Which drug should be given to him in order to relieve him of this discomfort?
+A. Diazepam
B. Analgin
C. Aethimizolum
D. Carbamazepine
E. Aminazine

27 Before a tooth extraction a 48-year-old female patient received an injection of diazepam. Anxiolytic effect of this drug can be explained by:
A. α-adrenoreceptor block
+B. Interaction with benzodiazepine receptors
C. Dopamine receptor block
D. M-cholinoreceptor activation
E. β-adrenoreceptor block

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Unit №4. Drugs affecting the central nervous system		
Hypnotic, antiepileptic and antiparkinsonic drugs		

The list of basic terms in the topic

Term	Definition
Hypnotics drugs	Drugs that inhibit the function of the central nervous system and cause sleep close to the physiological.
Antiepileptics drugs	Drugs that prevent or eliminate cramps and other symptoms of epilepsy.
Antiparkinsonian drugs	Drugs that reduced paralysis agitans (Parkinson's disease).

Individual work

Theoretical questions:

1. Modern views on the sleep nature. The main types of insomnia.
2. Classification of hypnotic drugs by chemical structure and their general characteristics. Possible mechanisms of action. **Phenobarbital, Nitrazepam, Bromizoval, Donormil, Chloral hydrate, Zopiclone, Zolpidem**. Comparative characteristics of different groups of hypnotics.
3. Indications and clinical uses of hypnotic drugs, side effects (affect syndrome, aftereffects, drug adiction). Acute **barbiturate** poisoning, help facilities.
4. **Anticonvulsant drugs**. Cramps as symptoms of various manifestations of pathological conditions. The use of drugs by different pharmacological groups to eliminate crapms **(tranquilizers, muscle relaxants, hypnotics, anesthetic drugs, myotropic antispasmodics)**.
5. **Antiepileptic drugs**. Classification of antiepileptic drugs for indications. **Phenobarbital, Phenytoin, Carbamazepine, Clonazepam, Ethosuximide, Sodium valproate, Lamotrigine**. Comparative characteristics, side effects Antiepileptic drugs.
6. **Antiparkinsonian drugs**. Classification of antiparkinsonian agents. Basic mechanisms of action. **Levodopa, Amantadine, Biperiden, Selegelin, Nacom**. Use in clinical practice**.**
7. Drugs for the treatment of muscle spasticity **(benzodiazepines, GABA-ergic drugs (Baclofen), Midokalm)**. General characteristics, features of the application.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Phenobarbital***
2. **Nitrazepam***
3. Bromizoval
4. Donormil
5. **Zopiclone***
6. Cyclodol
7. Difenin
8. **Carbamazepine***
9. Clonazepam
10. **Lamotrigine***
11. Ethosuximide
12. **Sodium Valproate***
13. **Levodopa***
14. Amantadine
15. Biperiden
16. **Selegiline***
17. **Nacom***

Note: * – drugs for filling in the table

TASK FOR AN EXTRACURRICALAR WORK

Fill in the table:

The drug, dose and dosage form	*Mechanism of action*	*Main indications for use*	*Side effects and contraindications*

Prescribe as a recipe:

1. Zopiclone

Rp:

2. Nitrazepam

Rp:

3. Lamotrigine

Rp:

4. Carbamazepine

Rp:

5. Sodium valproate

Rp:

6. Levodopa

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. A patient who suffers from insomnia caused by emotional disorder was prescribed a hypnotic drug with tranquillizing effect. What hypnotic was prescribed?

A Nitrazepam
B Phenobarbital
C Chloral hydrate
D Sodium ethaminal
E Bromisoval

2. A patient consulted a physician about muscle rigidity, constrained movements, permanent arm tremor. The patient was diagnosed with Parkinson's disease. What preparation should be administered?

A Levodopa
B Phenytoin
C Phenobarbital
D Diazepam
E Ethosuximide

3. The patient of 70 years has appealed to the doctor with complaints of superficial short-term sleep with often awakenings caused by sense of internal tension, anxiety, fear. The diagnosis has been made as: senile sleeplessness. Make a rational choice of a hypnotic agent in the given situation.

A. * Nitrazepam
B. Aethaminalum-natrium (pentobarbital)
C. Phenobarbital
D. Bromisovalum
E. Chloral hydrate

4. The patient suffering from parkinsonism has been treating for a long time by the drug with central cholinolytic mechanism of action which efficiency has gradually decreased. Indicate drug which should be administered instead of used one for improving of antiparkinsonic action?

A. Levodopa
B. Cyclpdolum
C. Mydocalmum
D. Tropacinum
E. Bellataminalum

5. A patient had been suffering from Parkinson's disease was admitted to the neurological department. Indicate the drug inhibitting cholinergic influences which is used for treatment of this disease.

A.*Cyclodolum (trihexyphenidyl)
B. Levodopa
C. Bromocriptin
D. Midantanum (amantadine)
E Selegilin

6. A patient with convulsions was delivered by the ambulance to the hospital where the diagnosis of status epilepticus was given. Indicate the drug of the first choice in this situation.

A. *Diazepam
B. Trimethinum (trimethadione)
C. Phenobarbital
D. Dipheninum (phenytoin)
E. E.Carbamazepine

7. An attack of generalized tonoclonic convulsions accompanied by loss of consciousness and general suppression of the CNS developed in a patient after trauma. What drug should be administered to this patient?

A. *Phenobarbital
B. Cyclodolum (trihexyphenidyl)
C. Levodopa
D. Teturam (disulflram)
E. Midantanum (amantadine)

8. A 57-years-old woman was admitted to the hospital in coma with inhibition of breathing, decreased BF', signs of cardiac insufficiency, decreased body temperature, inhibition of reflexes. Due to anamnesis she had been suffering from insomnia and a doctor administered to her hypnotic agent. What drug can cause this poisoning?

A. *Phenobarbital
B. Sodium bromide
C. Valeriana tincture
D. Scopolamine
E. Promedolum (trimeperidine)

9. What agent should be administered to a patient in the case of poisoning by barbiturates to normalize acid-base state?
A. *$NaHC0_3$
B. Solution of arginine
C. Vitamins
D. Antibiotics
E. Physiological solution of Natrium

10. A 68-years-old patient was addressed to the doctor in the polyclinic with complaints of mental disorders after usage of Phenobarbital for a long period of time accompanied by insomnia. What drug will the doctor administer to this patient as hypnotic.
A. *Nitrazepam
B. Cyclobarbital
C. Chloral hydrate
D. Natrii oxybutyras (oxybate sodium)
E. Halopendol

11. Determine the hypnotic drug which doesn't influence the structure of sleep.
A. *Nitrazepam
B. Phenobarbital
C. Barbital
D. Aethammalum-natrium (pentobarbital)
E. Bromisoval

12. The doctor administered a drug with a tranquilizing effect to the patient with insomnia after emotional disorders. What drug was administered to the patient?
A. *Nitrazepam
B. Phenobarbital
C. Chloral hydrate
D. Aethammalum-natrium (pentobarbital)
E. Bromisoval

13. An 18-years-old patient complained of insomnia which manifested by not being able to sleep that led to fatigue, weakness, difficulty in learning the following day. The clinical examination revealed the following: the patient was easily irritated, emotionally unstable, heart rate and arterial pressure were altered during conversations. The doctor determined that insomnia was associated with a neurosis-like state and vegetovascular distonia. Make the most rational choice of hypnotic drug.
A. *Nitrazepam
B. Phenobarbital
C. Chloral hydrate
D. Aethaminalum-natrium (pentobarbital)
E. Bromisoval

14. A 65-years-old woman with Parkinson's disease has been treated with cyclodolum. Determine the mechanism of action of this drug.
A. *Blockade of central cholinoreceptors
B. Stimulation of dopamine receptors
C. Stimulation of serotonine receptor
D. Blockade of histamine receptors
E. Blockade of dopamine receptors

15. Determine the group of drug which can cause medicinal Parkinsonism.
A. *Neuroleptics
B. Hypnotic drugs
C. Antidepressants
D. Tranquilizers
E. Nootropic agents

16. A patient took reserpinum for the treatment of hypertonic disease for a long period of time. One day the patient felt muscles weakness, restriction of motion. Medicamentous parkinsonism was diagnosed. What drug should be administered to eliminate these side effects?
A. *Cyclodolum (trihexyphenidyl)
B. Aminazinum (chlorpromazine)
C. Haloperidolu
D. Phenobarbital
E. Tubocurarine

17 A patient with epilepsy and depressive reaction has been administered a drug that reduced epilepsy manifestations and improved the patient's psychic condition.
+A. Sodium valproate
B. Phenobarbital
C. Amitriptyline
D. Ethosuxemide
E. Phenytoin

18 A patient presents with dysfunction of cerebral cortex accompanied by epileptic seizures. He has been administered a biogenic amine synthetized from glutamate and responsible for central inhibition. What substance is it?
A. Serotonin
B. Acetylcholine
C. Histamine
D. Dopamine
+E. Gamma-amino butyric acid

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Unit №4. Drugs affecting the central nervous system		

General anesthetics. Pharmacology and toxicology of ethyl alcohol *(Self-study)*

The list of basic terms in the topic

Term	Definition
Anesthesia	Functional state of temporary paralysis of the central nervous system characterized by loss of pain and other kinds of sensitivity, consciousness, most reflexes, decreased tone of skeletal muscles, while maintaining the function of vital centers at a sufficient level to sustain life.
Anesthesia drugs	Drugs causing anesthesia
Induction anesthesia	Component of combined anesthesia. Short-term anesthetic with non-inhalation agent, warning excitement phase.
Basic anesthetic	Component of combined anesthesia. Prolonged anesthesia non-inhalation agent that reduces the required number of inhaled drug and its toxic effect on the parenchymal organs
Synergistic anesthesia	Anesthesia, reinforced by non-anesthetical drugs.
Premedication	Drug treatment given to a patient before a (surgical or invasive) medical procedure. These drugs are typically sedative or analgesic.

Individual work

Theoretical questions:

1. General characteristics of the anesthesia state. Theory of anesthesia. Types of anesthesia.
2. Classification of narcotic anesthetic drugs. Requirements for anesthetic drugs.
3. Inhaled anesthetic agents. **Ether for anesthesia, Isoflurane, Nitrous oxide.** Comparisons, side effects. Combined use of drugs for anesthesia and other pharmacological groups.
4. Non-inhaled anesthetic agents. Classification by duration. Pharmacological characteristics: **Propofol, Ketamine hydrochloride, Thiopental sodium, Hydroxybutyrate sodium**. Comparative characteristics of drugs.
5. The concept of the premedication, induction, base, combined anesthesia.
6. **Ethyl alcohol**. Pharmacology and toxicology **Ethyl alcohol**, its use in clinical practice. Acute and chronic alcohol poisoning. Treatment for alcoholism. Mechanism of action of **Disulfiram [Antabuse, Teturam].**

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. Ether for anesthesia
2. Isoflurane
3. Nitrogen oxide
4. **Propanidid***
5. **Ketamine***
6. **Thiopental sodium***
7. **Sodium hydroxybutyrate***
8. Phthorotan
9. Disulfiram

Note: * – drugs for filling in the table

TASK FOR AN EXTRACURRICALAR WORK

Fill in the table:

The drug, dose and dosage form	*Mechanism of ion*	*Main indications for use*	*Side effects and contraindications*

Prescribe the drugs:

1. Ketamine.

Rp:

2. Sodium hydroxybutyrate.

Rp:

3. Thiopental sodium.

Rp:

4. Diazepam for premedication.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. A 58 year old patient was being prepared to cholecystectomy operation. Drug complex of narcosis premedication included benzohexamethonium. What part does this medication play in the narcosis?
*A. Functional blockade of visceral reflexes
B. Reduction of excitement stage
C. Increase of retrograde amnesia
D. Relaxation of smooth muscles

2. During the ether narcosis a patient had evident bradycardia with threat of cardiac arrest. What medication should be used to accelerate heartbeat under condition of narcosis that shouldn't be interrupted?
***A** Atropine
B Caffeine
C Adrenaline
D Camphor
E Isadrine

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Unit №4. Drugs affecting the central nervous system		
Narcotic (opioid) analgesics		

The list of basic terms in the topic

Term	Definition
Analgesics	Drugs that selectively with resorptive effect reduce or eliminate pain sensitivity. Do not turn off the mind, have little effect on other types of sensitivity, do not violate the motor functions.
Narcotic analgesics	Drugs that have a strong analgesic activity, especially with injuries (surgery, injury), and in cases involving severe pain (myocardial infarction, cancer, etc.). Repeated application have a particular impact on the human central nervous system, reflected in the development of the euphoria and the appearance of syndromes of mental and physical dependence (addiction) and withdrawal.
Drugs-opiate receptor agonists	- directly binding to opiate receptors, they have an effect similar to natural antinociceptive substances (enkephalins and endorphins) (eg promedol, morphine, fentanyl)
Drugs-opiate receptor antagonists	- binding to opiate receptors, they block the effects of endorphins, enkephalins and exogenous opiates (eg, naloxone)
Agonist-antagonist opioid receptors (drugs mixed action or synergistic antagonists)	- Could be agonistsof one and the antagonists of other opiate receptor (eg, pentazocine, nalorphine)
Euphoria (from the Greek. Eu - good, phoria - feeling, mood)	The state of "bliss and pleasure" - drug intoxication – semi-realnoe, semi-fantastic sensation of pleasure, that is, inner experience of positive emotions, regardless of the reality. Euphoria accompanied by worsening auditory, visual and tactile sensitivity and the appearance of peculiar hallucinations, as well as a variety of pleasant bodily sensations. At this time, the negative emotions are suppressed.
Addiction (addiction)	A painful addiction to the constant need
Tolerance	Reduction of biological behavioral response to repeated administration of the same amount of narcotics, or the need for increased doses of the drug to achieve the same desired effect.
Psychological addiction	Characterized by non-physical symptoms that occur after the cessation of drug use. These include: an uncontrollable drug craving, restlessness, anxiety, and depression. Drug use reduces both physical and psychological withdrawal symptoms and promote mood elevation.
Withdrawal symptoms (from the Latin «abstinentio»-abstinence)	A painful condition that occurs in the absence of the next dose of drugs. Drug abstinence, is characterized by weakness, pain in various parts of the body, muscle cramps, irritability, reaching sometimes to anger, depressed mood, sleep disturbance, severe somatic disorders.

Individual work

Theoretical questions:

1. General characteristics of analgesic agents. The difference from the non-narcotic analgesic drugs.
2. Classification of opioids by origin, chemical structure and affinity to opiate receptors.
3. Essential medicines from narcotic analgesics group and their comparative characteristics **(Morphine hydrochloride, Omnopon, Codeine phosphate, Promedol, Fentanyl, Pentazocine, Tramadol, Buprenorphine)**.
4. The mechanism of analgesic action of Morphine. Pharmacokinetics, particularity biotransformation and elimination. Indications.
5. Effect of **Morphine** on breathing, cough and vomiting center, circulation and tone of smooth muscles of internal organs.

6. The side effects of **Morphine** and the mechanisms of their development. Acute morphine intoxication and measures to help with it.
7. **Morphine** ability to cause psychic and physical dependence. The concept of drug withdrawal.
8. Antagonists of narcotic analgesics, their mechanisms of action **(Naloxone, Naltrexone)**, application.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Morphine hydrochloride***
2. Omnopon
3. Codeine phosphate
4. **Promedol***
5. Fentanil
6. Pentazotsin
7. **Tramadol***
8. **Buprenorfin***
9. Nalorfin hydrochloride
10. **Naloxon***
11. Naltrexon

Note: * – drugs for filling in the table

TASK FOR AN EXTRACURRICALAR WORK

Fill in the table:

The drug, dose and dosage form	*Mechanism of action*	*Main indications for use*	*Side effects and contraindications*

Prescribe as a recipe:

1. Morphine hydrochloride

Rp:

2. Promedol

Rp:

3. Tramadol

Rp:

4. Naloxone

Rp:

5. Buprenorphine

Rp:

6 Omnopon

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. A 4 year old child was admitted to the orthopaedic department with shin fracture together with displacement. Bone fragments reposition requires preliminary analgesia. What preparation should be chosen?
A Promedol
B Analgin
C Morphine hydrochloride
D Panadol
E -

2. Examination of a patient revealed extremely myotic pupils, sleepiness, infrequent Chain-Stoke's respiration, urinary retention, slowing-down of heart rate, enhancement of spinal reflexes. What substance caused the poisoning?
A Morphine
B Atropine
C Phosphacole
D Caffeine
E Barbital

3. Patient in the unconscious state was admitted to the emergency room. Skin is cold, pupils are delayed, breathing is heavy, with cycles of the Cheyne-Stokes type, blood pressure is decreased, urinary bladder is overloaded. Poisoning with what substance is the most likely?
A Narcotic analgesics
B Sedatives
C Non-narcotic analgesics
D M-cholinergic antagonists
E -

4. A patient with hip fracture was prescribed a narcotic analgetic. Its anesthetic action is determined by interaction with the following receptors:
A Opiate receptors
B Adrenoreceptors
C Cholinoreceptors
D Benzodiazepine receptors
E GABA-ergic receptors

5. A patient with acute morphine poisoning was delivered to a hospital. What specific narcotic antagonist should be chosen in this case?
A Naloxone
B Paracetamol
C Methacin
D Digoxin
E Unithiol

6. An unconscious patient was admitted to the hospital. Objectively: cold skin, miotic pupils, heavy breathing, Chaine-Stokes' periodicity, low arterial pressure, overfull urinary bladder. What caused the poisoning?
A Narcotic analgetics
B Tranquilizers
C Nonnarcotic analgetics
D Muscarinic receptor blockers
E -

7. A patient with myocardium infarction was prescribed an analgetic in order to stop pain syndrome. The patient felt better but overdose caused weakness, myosis, respiratory depression. What medication was prescribed?
A Morphine
B Baralgine
C Sedalgine
D Ibuprofen
E Paracetamol

8. A synthetic analgesic agent which increases contractile activity of myometrium and relaxes the neck (cervix) of uterus was prescribed to a woman in labour. Indicate this agent.
A. .* Promedolum (trimeperidine)
B. Omnoponum
C. Analginum (methamizole)
D. Morphine
E. Fentanylum

9. A patient has signs of acute poisoning by morphine: sharp miosis, loss of consciousness, decrease of the arterial blood pressure and Cheyne-Stokes respiration. Choose the proper antagonist to be given.
A. * Naloxonum
B. Camphor
C. Lobeline
D. Cytitonum
E. Cordiaminum (nikethamide)

10. A man of 26 years complaints of headache. Previously, the man suffered from peptic ulcer for the past 4 years. What drug is more preferable in this situation for the relief of his headache.
A.* Paracetamolum
B. Diclofenac-sodium
C. Acetylsalicylic acid
D. Ibuprofenum
E. Indomethacinum

11. A 30 years old man was admitted to a hospital due to fracture of the crus with dislocation and expressed pain syndrome. Promedolum (trimeperidine) was introduced to eliminate pain. Indicate the mechanism of action of this drug.
A. .* Stimulation of the opioid receptors in the CNS.
B. Blockade of the opioid receptors in the CNS.
C. Stimulation of dopamine receptors in the CNS.
D. Blocade of GABA receptors in the CNS.
E. Blocade of dopamine receptors in the CNS.

12. Naloxone was introduced to a 25 years old woman because of intoxication by morphine. After injection the state of the woman became better. Indicate the mechanism of action of this drug.
a. *Blockade of the opioid receptors of the CNS.
b. Blockade of GABA receptors of the CNS.
c. Blockade of the serotonin receptors of the CNS.
d. Blockade of benzodiazepin receptors of the CNS
e. Stimulation of the opiod receptors of the CNS.

13. A drug addict was admitted to the emergency department in coma with signs of poisoning by opioid analgesics. What side effect of morphine contributed to the poisoning?
A. *Tolerance
B. Euphoria
C. Obstipation
D. Inhibition of breathing
E. Reduction of diuresis

14. A 52-years-old patient who had been suffering from urolithiasis was delivered to the emergency department with renal colic. A doctor administered atropine together with opioid analgesic with spasmolytic activity to prevent development of the pain shock. Choose this drug.
A. *Promedolum (trimeperidine)
B. Tramadol
C. Ibuprofen

D. Ketorolac
E. Morphine
15. Nonopioid analgesic was administered to the patient with neuritis of nervus trigeminus. This drug has fast effect, short time of action, can cause allergic reaction of immidiate type. It may be indicated in tablets and solution for injections. Determine this drug.
A. *Analginum (metamizole)
B. Ibuprofen
C. Mefenamic acid
D. Piroxicam
E. Indomethacin
16. Pains in the small of the back developed after the lifting of gravity (heavy loads). Radiculitis was diagnosed. It is known from the anamnesis that the patient was suffering from ulcer of the duodenal bulb for a long period of time. Make the most rational choice of nonopioid analgesics :
A. *Meloxicam
B. Ortophenum (diclofenac sodium)
C. Indomethacin
D. Butadion
E. Ibuprofen
17. Gum bleeding arose in the patient after extraction of the tooth, rom anamnesis it was revealed that the patient suffered from rheumatic arthritis, and was treated with the anti-inflammatory agent acetyl-salicylic acid(aspirin). Indicate the reason of arisen bleeding.
A. *Suppression of synthesis of thromboxane
B. Promotion ol thrombolysis
C. Inhibition ot hemopoesis
D. Decreasing of blood coagulation
E. Suppression of synthesis of uric acid
18. A patient with respiratory disease with high temperature took the drug from the group of non-opioid analgesics. This drug exerts predominantly anti-inflammatory action which excels the salicilates and butadionum. It is highly absorbed in the intestine and acts long. The side effects appear often. Determine this drug.
A. *Indomethacin
B. Meloxicam
C. Ortophenum (diclofenac sodium)
D. Butadion
E. Ibuprofen
19. A patient with various complaints addressed to the doctor. After through clinical examination the following diagnosis was made: myositis, peptic ulcer of the stomach in remession, leukopenia. Determine the analgesic drug for the treatment of myositis to this patient.
A. *Paracetamol (acetaminophen)
B. Acetylsalicylic acid (aspirin)
C. Amitriptyline
D. Morphine
E. Butadionum (phenylbutazone)
20. Non-steroidal anti-inflammatory agents are used for the treatment of following pains, except:
A. Fractures of bones
B. Headache
C. Arthritis
D. Neuritis
E. Toothache
21. Non-steroidal anti-inflammatory agent was administered to a patient with rheumatic polyarthritis. In several weeks weakness and indisposition were arisen. The clinical examination of the patient revealed necrotic quinsy and leucopenia. What drug could cause this complication?
A. Analginum (Metamizole)
B. Paracetamolum
C. Nitrazepam
D. Omnopon
E. Morphine
22. Indicate the synthetic opioid analgasic which possesses analgesic activity 100-400 times more than morphine.
A. *Phentanyl
B. Promedolum (trimeperidine)
C. Pentazocin
D. Omnoponom
E. Codein
23. A patient with acute poisoning with morphine was delivered to the hospital ward. What specific antagonist of narcotic analgesics is to be applied in this case?
A. Digoxin
B. Unithiol
C. Methacin
D. Paracetamol
*E. Naloxone
24 A patient with myocardium infarction was delivered to the resuscitation department. What drug should be injected to the patient for prophylaxis of pain shock?
A. Analgin
+B. Promedol
C. Paracetamol
D. Celecoxib
E. Naloxone
25 After parenteral introduction of a medication a patient fell into a com A. He had Cheyne-Stokes respiration, apparently miotic pupils. The patellar reflex was preserve D. What medication might have caused the intoxication?
+A. Morphine hydrochloride
B. Diazepam
C. Aminazine
D. Analgine
E. Phenobarbital
26. A patient diagnosed with morphinism has been admitted to the narcological department. A doctor noted a decrease in pharmacological activity of morphin e. Repetitive use of a drug may result in tolerance to its effect, and this phenomenon is called:
A. Allergy
+B. Addiction
C. Antagonism
D. Tachyphylaxis
E. Cumulation
27 A patient with a malignant neoplasm on the upper jaw had been administered morphine hydrochloride for analgesia. The injection induced respiratory depression, pupil constriction, cyanosis, hypothermia, loss of consciousness. What antidote must be used?
A. Promedol
B. Droperidol
C. Adrenalin hydrochloride
D. Atropine sulfate
+E. Naloxone

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Unit №4. Drugs affecting the central nervous system		

Non-narcotic (non-opioid) analgesics. Nonsteroidal anti-inflammatory drugs

The list of basic terms in the topic

Term	Definition
Non-narcotic (non-opioid) analgesics, antipyretics	Drugs with antipyretic and analgesic effect, almost no anti-inflammatory effect and does not cause drug dependence (addiction). These include Analgin, paracetamol, ketorolac (ketanov).
Nonsteroidal anti-inflammatory drugs (NSAIDs)	These drugs, along with antipyretic and analgesic activity, have a pronounced anti-inflammatory effect, which is predominant in the drugs that approximates in potency to that of steroid hormone drugs. However, they do not have the steroid structure. In addition, these drugs have the effect of antiaggregant and moderate immunosuppressive activity. These include derivatives of phenylacetic, phenylpropionic acid, salicylic acid, indole derivatives, and other oxicams
Cyclooxygenase (COX) or prostaglandine synthetase	Main enzyme that catalyzes the biosynthesis of prostaglandins. It exists in several isoforms - COX-1 (constitutive), COX-2 (inducible, activated during inflammation), and the recently isolated COX-3 (in the hypothalamus). Anti-inflammatory effect of most NSAIDs due to their inhibitory effect on COX-2, and the main side effect - COX-1.
Nonselective inhibitors of COX-1 and COX-2	Most of NSAIDs (acetylsalicylic acid (aspirin), indomethacin, diclofenac, ketoprofen, naproxen, piroxicam, ibuprofen, etc.)
Selective COX-2 inhibitors	Nimesulide, meloxicam, coxibs (celecoxib, rofecoxib, etoricoxib, parecoxib, etc.)

Individual work

Theoretical questions:

1. Definition of non-narcotic analgesics, differences from the drug analgesics.
2. Classification of non-narcotic analgesics. General characteristics of the groups.
3. Mechanisms of analgesic, antipyretic and anti-inflammatory effects of drugs of NSAIDs.
4. Pharmacological characteristics of analgesic-antipyretics: **Analgin, Paracetamol**. Indications. Side effects.
5. Pharmacological characteristics of the actual non-steroidal anti-inflammatory drugs: **Selective COX-1 and COX-2: Acetylsalicylic acid (Aspirin), Ibuprofen, Diclofenac sodium (Ortofen), Indomethacin, Piroxicam, selective COX-2 inhibitors: Nimesulide**, **Meloxicam (Movalis) Celecoxib (Celebrex)**. Indications and clinical uses, side effects and their prevention.
6. Features and application of other drugs from the group of non-narcotic analgesics **(Amizon)**.
7. Combination products: Baralgin **(Spazmalgon).** Features and application.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Acetylsalicylic acid***
2. **Analgin***
3. **Paracetamol***
4. Ibuprofen
5. Mefenamic acid
6. **Diclofenac sodium***
7. **Indometacin***
8. **Piroxicam***
9. Nimesulid
10. Amizon
11. **Meloxicam***
12. **Celecoxib***

Note: * – drugs for filling in the table

TASK FOR AN EXTRACURRICALAR WORK

Fill in the table:

The drug, dose and dosage form	*Mechanism of action*	*Main indications for use*	*Side effects and contraindications*

Prescribe as a recipe:

1. Acetylsalicylic acid

Rp:

2. Paracetamol

Rp:

3. Celecoxib

Rp:

4. Diclofenac sodium

Rp:

5. Analgene

Rp:

6. Meloxicam

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. Signs of gastropathy develop in the patient with rheumatoid arthritis who was treated with indometacin. With what activity of the drug can this complication be connected?

A Anticyclooxygenase
B Antiserotonin
C Antihistamine
D Antikinine
E Local irritating

2. A female patient consulted a doctor about pain and limited movements in the knee joints. Which of the following nonsteroid anti-inflammatory drugs should be administered taking into consideration that the patient has a history of chronic gastroduodenitis?

A Celecoxib
B Diclofenac sodium
C Promedol
D Acetylsalicilic acid
E Butadiounum

3. To prevent possible negative effect upon the gastric mucsa a patient with rheumatoid arthritis was administered a nonsteroid anti-inflammatory drug - a COX-2 selective inhibitor. Specify this drug:

A Celecoxib
B Analgine
C Acetylsalicinic acid
D Butadion
E Ibuprofen

4. To subdue the fever and relieve tooth ache a patient was prescribed paracetamol. What is the action mechanism of this medication?

A. Phosphodiesterase blocking
B. Lipoxygenase blocking
C. Cholinesterase blocking
D. Monoamine oxidase blocking
++*E. Cycloxygenase blocking

5. All nonsteroidal anti-inflammatory drugs can be harmful for stomach mucous membrane In order to find substances that don't cause such complication it is necessary to know factors it is connected with. What molecular substrate should be less affected in order to reduce intensity of this complication?

A. Cyclooxygenase 2
B. Adenylate cyclase
C. Lysosomal enzymes
D. Kallikrein
++*E. Cyclooxygenase 1

6 A patient consulted a dentist about the temporomandibular joint arthritis. The dentist administered an ointment containing diclofenac sodium. What is its mechanism of action?

A. Opiate receptor block
B. Phospholipase inhibition
C. Opiate receptor activation
+D. Cyclooxigenase inhibition
E. Cyclooxigenase activation

7 A patient has the pronounced pain syndrome induced by neuralgia. What drug from the group of nonsteroidal anti-inflammatory drugs will reduce pain sensitivity?

A. Droperidol
B. Codeine phosphate
+C. Diclofenac sodium
D. Lidocaine hydrochloride
E. Ketamine hydrochloride

8 A patient with arthritis and varicose veins has been taking a nonsteroidal anti-inflammatory drug for a long time, which caused the thrombosis of cutaneous veins. Which of the listed drugs might have caused this complication?

A. Ibuprofen
B. Indomethacin
+C. Celecoxib
D. Phenylbutazone
E. Aspirin

9 A 42-year-old female patient consulted a doctor about pain in the knee joints. Objectively there is swelling, redness, hyperthermia in the region of these joints. Laboratory testing revealed positive acute phase reactants. What drugs should be used to treat this patient?

A Anti-inflammatory drugs
B Narcotic analgesics
C Antidepressants
D Antibiotics
E Sulfonamides

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 1
Unit №4. Drugs affecting the central nervous system		

Psychomotor stimulants. Analeptics. Antidepressants. Nootropic drugs. Adaptogenes. Actoprotectors

The list of basic terms in the topic

Term	Definition
Psychomotor stimulants	Drugs that enhance the physical and mental capacity to work, mood, eliminate fatigue, need for food, causing psychomotor activation of patients and healthy individuals.
Analeptics	Drugs that stimulate the cerebral cortex **(caffeine)**, the vital centers of the medulla oblongata - respiratory and vasomotor **(kordiamin, etimizol, Bemegride, sulfokamfokain, etc.)**, as well as spinal cord (strychnine). Their action occurs only with CNS depression.
Psychodysleptics (hallucinogens)	Drugs that excite central nervous system and cause significant mental disorders that are accompanied by delusions, hallucinations, loss of self control, ie the ability to produce psychosis, and have no value for the treatment of mental illness. These include the lysergic acid diethylamide (LSD-25), phytochemicals (mescaline, psilocybin, cannabis products (plan, marijuana, hashish). Prolonged use psychosomimetic provokes addictive - substance abuse.
Depression	Manifest sleep disorders (most early awakening), fatigue (reduced activity), a sense of hopelessness, futility (pessimistic perception of), diurnal mood or activity chanding (in the morning usually worse condition than in the evening), and various pains, decreased sexual desire and the inability to experience pleasure from the ordinary (everyday) pleasures. Proper mood may be less depressed, much annoyed, apathetic or anxious.
Panic	Periodic sudden occurrence of anxiety, fear or discomfort accompanied by symptoms of diencephalic crisis (feeling short of breath, dizziness, fainting, heart palpitations, tachycardia, chest pressure, tremors, sweating, sudden sweating, nausea, abdominal discomfort, sudden hot flashes and cold, etc.). Less frequent, fear of death, insanity or loss of control.
Antidepressants	Group of drugs with predominant effect on the pathologically depressed mood or depressive affect. Also shown in psychosomatic illnesses (irritable bowel syndrome, peptic ulcer, asthma, neurodermatitis, etc.), panic attacks, anorexia nervosa or bulimia, narcolepsy, a variety of pain syndromes, vegetative diencephalic crises, and chronic fatigue syndrome. No euphoric effect, in healthy individuals does not cause mood elevation.
Adaptogens (General tonic)	Preparations mainly from plants and animals that have a tonic effect on the central nervous system and the function of the whole body, increase the body's resistance to harmful factors of physical, chemical and biological nature, help to adapts to changing conditions in the environment.
Actoprotector	Stimulants physical ability to work, which increase the body's resistance to acute hypoxia, high or low ambient temperatures.
Nootropic drugs	Drugs that improve cognitive and integrated brain function, memory and increase the stability of the brain to the adverse effects.

Individual work

Theoretical questions:

1. General characteristics of psychomotor stimulants. Chemical structure classification.
2. The main pharmacological properties of purine derivatives **(Caffeine, sodium benzoate)**, fenilalkilamin derivatives **(Amphetamine, Sidnokarb)** piperidine derivatives **(Meridia)**. Indications and clinical uses, contraindications, side effects.

3. Classification analeptics by preemptive effect on different parts of the central nervous system: a) cortex **(Caffeine)**, b) the medulla **(Etimizol, Kordiamin, Bemegride, sulfokamfokain, carbogen)**, c) the spinal cord **(Strychnine)** and by type of action: a) direct action **(Bemegride, Caffeine, Etimizol)**, b) the reflex action **(Lobeline hydrochloride, Ammoni solution)**, c) analeptics mixed action **(Kordiamin, Sulfokamfokain, Carbogen)**.
4. The main pharmacological effects of analeptics, indications, side effects.
5. The concept of psychosomimetic (hallucinogen) and amphetamines **(Phenamin)**. Formation an adiction and social significance.
6. The concept of anti-depressants and their classification according to the mechanism of action.
7. Pharmacodynamics of antidepressants. Comparative characteristic of oppressive neuronal monoamines uptale: indiscriminate blocking neuronal uptake of serotonin and norepinephrine **(Imizin (Melipramin), Amitriptyline)** and selective blocking the uptake of serotonin **(Fluoxetine (Portal), Sertraline (Zoloft), Paroxetine (Paxil))**; and norepinephrine uptake blocker **(Maprotiline (Lyudeomil)**.
8. Characteristics of monoamine oxidase inhibitors (MAOIs): indiscriminate irreversible action **(Nialamide) (Nuredal)** and selective reversible action **(Moclobemide)**. Another antidepressant effects of these drugs (psychostimulant, sedative and balancing).
9. Indications and clinical uses of the drugs in this group. The side effects of antidepressants, measures to prevent them. Contraindications and clinical uses.
10. The concept of adaptogens **(General tonic)**. Sources of adaptogens. Pharmacodynamics.
11. Indications and clinical uses of adaptogens **(tincture Lemongrass, Ginseng, liquid extracts of Siberian Ginseng, Echinacea and Pantokrin)**. Side effects. Contraindications. Chronopharmacology features for ginseng.
12. Actoprotectors. Definition. Pharmacodynamics, indications and clinical uses, possible side effects of biometile.
13. Nootropics, Definition and classification.
14. Possible action mechanisms of nootropic drugs, indications and clinical uses
15. Pharmacological characteristics of **Piracetam, Fezam, Aminalon, Glycine, Hydroxybutyrate sodium**.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Caffeine sodium benzoate***
2. **Ginseng Tincture***
3. Schisandr tincture
4. **Liquid extract of Eleutherococcus***
5. Pantocrinum
6. **Piracetam***
7. **Aminalon***
8. Glycine
9. **Phenibut***
10. **Pantogam**
11. **Picamilone***
12. **Cinnarizinum***
13. Nimodipine
14. Cavinton
15. **Nicergoline***
16. Trental
17. Imizine
18. **Amitriptyline***
19. Maprotiline
20. **Fluoxetine***
21. **Sertraline***

Note: * – drugs for filling in the table

TASK FOR AN EXTRACURRICALAR WORK

Fill in the table:

The drug, dose and dosage form	*Mechanism of action*	*Main indications for use*	*Side effects and contraindications*

Prescribe as a recipe:

1. Caffeine sodium benzoate

Rp:

2. Piracetam

Rp:

3. Amitriptyline

Rp:

4. Fluoxetine

Rp:

5. Ginseng Tincture

Rp:

6. Cinnarizinum

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. After tooth extraction the blood pressure of a patient fell dramatically, the patient lost consciousness. Collaptoid state was diagnosed. What drug should be used?
A Cordiamin
B Strophanthine
C Isadrin
D Sustac
E Nitroglycerine
2. A 36 year old man with craniocerebral trauma has diminished breath sounds, thready pulse, reflexes are absent. What route of pyracetam introduction is the most suitable in this case?
A Intravenous
B Rectal
C Subcutaneous
D Oral
E Inhaling
3. An aged patient complains of headache, dizziness, quick tiredness, worsening of memory. Anamnesis: craniocerebral injury. Medicine of what group should be prescribed?
A Nootropics
B Somnific
C Neuroleptics
D Analgetics
E Sedatives
4. A 36 y.o. man has a craniocerebral trauma. Objectively: diminished breath sounds, thready pulse, no reflexes. What way of pyracetam introduction will be the most apropriate in this case?
A Intravenous
B Rectal
C Subcutaneous
D Peroral
E Inhalation
5. During the operation under general anesthesia the patient's respiration was inhibited. Specify, which breathing stimulant should be used in this situation without pausing the general anesthesia
A. * Aethimizolum
B. Coffeinum
C. Bemeqridum
D. Cytitonum
E.Lobelini hydrochoridum
6. A woman tried to commit suicide, her psychiatrist made the diagnosis of endogenic depression. What drug should be given for her treatment?
A. *Amitriptyllinum
B. Nootropilum
C. Sydnocarbum (mesocarbe)
D. Aethimizoium
E. Coffeinum
7. The patient was admitted to the neurology department because of complaints of decrease of memory, mental and work capacity, sleepiness and vertigo. His symptoms were connected to a brain concussion, which took place 2 years ago as a result of an automobile accident. What drug should be indicated to improve his condition.
A. A.* Pyracetamum (Nootropilum)
B. Natrii oxybutyras (oxybate sodium)
C. Sydnocarbum
D. Coffeinum
E. Cordiaminum (nikethamide)
8. Specify indication for use of coffeinum.
A. *Sleepiness.
B. Arterosclerosis.
C. Arterial hypertension.
D. Tachycardia.
E. E Nausea.
5. 5.Indicate the drug which posseses analeptic and psycho stimulant activity.
A. *Coffeinum
B. Bemegridum
C. Aethimizoium
D. Cordiaminum (nikethamide)
E. Strychnine
9. The patient was addressed to a doctor with complaints of tiredness, decrease of capacity for mental and physical work, worsening of mood. In examination the doctor revealed arterial hypertension and administered the drug from the group of psychostimulants. What agent is contraindicated in this situation ?
A. *Phenaminum (amphetamine)
B. Coffeinum
C. Ginseng
D. Piracetam
E. Sydnocarbum (mesocarbe)
10. What is the main mechanism of psycostimulant action of coffeinum?
A. A.* Blockade of the adenosine receptors
B. Agonist of M-cholinoreceptors
C. Stimulation of opioid receptors
D. Excitation of adrenoreceptors and dopamine receptors in the CNS.
E. Inhibition of α-adrenoreceptors
11. The patient addressed to a doctor with complaints of bad mood, that was accompanied by expressed sedative action, feeling of fear, anxiety. The clinical examination revealed psychical depression. What drug should be administered to this patient?
A. Droperidolum
B. Ammazinum (chlorpromazine)
C. Coffeinum
D. D.* Amitriptylinum
E. Ortophenum (diclofenac-sodium)
12. A doctor administered amitriptyline to a patient with endogenous depression. Explain the mechanism of action of this drug.
A. *Inhibition of the neuronal reuptake of noradrenaline and serotonin
B. Inhibition of the neuronal reuptake of serotonin
C. MAO inhibitor
D. Increase of release of noradrenaline and serotonin
E. Inhibition of the neuronal reuptake of noradrenaline
13. A man was addressed to the psychiatrist with complaints of dreary spirits, feeling of hopelessness and desperation, tendency to suicide. Determine the group of drugs for the treatment of this patient?
A. .* Antidepressants
B. Sedatives
C. Neuroleptics
D. Tranquilizers
E. Lithium
14. This drug is used for the treatment of disorders of memory, cerebral atherosclerosis, after cerebral injuries, alcohol

encepholpathy, dementia. It improves the processes of memorizing and cognitively. Determine this drug.
A. *Piracetam
B. Amitriptylinum
C. Paracetamol
D. Bemegridum
E. Sibazonum (diazepam)
15. A patient with traumatic encephalopathy was admitted to the neurological department with complaints of disorders of memory, intellect, headache, vertigo. Choose the group of drugs for the treatment of the patient.
A. *Nootropic agents (cognitive enhancers)
B. Analeptics
C. Psychostimulants
D. Antidepressants
E. Adaptogens
16. Specify the characteristic side-effect of analeptics
A. *Convultions
B. Bronchospasm
C. Hepatitis
D. Arterial hypertension
E. Gastritis
17. Specify the main effect of Piracetam (Nootropil).
A. *Improves the processes of memorising and cognitivity
B. Tranqulizing effect
C. Inhibition upon excitation in the CNS
D. Stimulation of myocardium activity
E. Deacreases the neuronal stability to hypoxia
18. This group of drug includes psychotropic agents of plant origin, These drugs are used in asthenic states after severe infectious diseases. They increase general vital tonicity of the organism and its resistance to infectious diseases. These drugs are used in the form of tinctures or liquid extracts. Choose this group of drug.
A. *Adaptogens
B. Sedative
C. Psychostimulants
D. Antidepressants
E. Nootropic agents
19. This drug has stimulating action promoting synthesis of proteins and ATP, increases the capacity for physical and psychical work,. It is used for a long time and it shouldn't be taken before sleep.
A. *Tincture of Ginseng
B. Tincture of Valeriana
C. Barboval
D. Nialamide
E. Natrium bromide
20. A patient has been taking a mixture prescribed by neuropathologist for neurasthenia for two weeks. The patient feels better but has developed coryza, conjunctivitis, rash, inertia, decrease of memory. She is diagnosed with bromizm. What drug should be prescribed to decrease the symptoms?
A. *Natrium chloride (salty food)
B. Potassium chloride
C. Polyglucinum
D. Asparcam
E. Glucose solution 5%
21. A patient who attempted suicide in a state of serious depression was delivered to a hospital by an ambulance. What drugs should be administered?
A. Neuroleptics
B. Sedative
C. Lithium salts
D. Tranquillizers
++*E. Antidepressants
22 A patient with toxic paralysis of respiratory centre was given several cordiamin injections intended to stimulate the respiratory centr E. What side effect may arise?
A. Bronchiospasm
B. Tonic convulsions
C. Arrhythmia
D. Collapse
+E. Clonic convulsions
23 While under barbituric anaesthesia a 65-year-old male patient developed respiratory inhibition. Anesthesiologist made him a 10 ml intravenous injection of 0,5% bemegride solution. The patient's condition got better, the pulmonary ventilation volume increase D. What phenomenon underlies the interaction of these medivcations?
+A. Direct antagonism
B. Indirect synergism
C. Indirect antagonism
D. Direct synergism
E. Unilateral antagonism
24 Depressions and emotional disorders result from noradrenaline, serotonin and other biogenic amines deficiency in brain. Concentration of these compounds in synapses can be increased by means of antidepressants that inhibit the activity of the following enzyme:
A. D-amino acid oxidase
B. L-amino acid oxidase
+C. Monoamine oxidase
D. Diamine oxidase
E. Phenylalanine-4-monooxigenase

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №5. Pharmacology of metabolism		

Drugs affecting the endocrine system. Hormonal drugs, their synthetic analogs and antagonists

The list of basic terms in the topic

Term	Definition
Hormones	Medications that act like natural hormones.
Antihormones	Medications that reduce or stop the specific effect of hormones.
Thyroid (antithyroid) Medications	Medicinal medications, stimulants (reducing) the synthesis and secretion of thyroid hormones.
Hypoglycemic Medications	Medications that reduce blood glucose levels.
Term	Definition
Glucocorticoids	Hormones and hormonal drugs synthesized in the adrenal cortex.
Mineralocorticoids	Hormones and hormonal drugs produced in the adrenal medulla.
Estrogens	Secreted by cells of the inner lining of the follicle in the development of the ovary.
Progestins (progestogens)	Secreted by lyuteotsitami corpus luteum, placenta, and the net area of the cortex of adrenal glands, testicles partially.
Contraceptive medications (contraceptives)	This group of medications used to prevent pregnancy, reduce menstrual bleeding, menstrual pain. Regular and prolonged use of these medications significantly reduced the incidence of malignant tumors of the uterus and its appendages, the emergence of mastitis and post-menopausal osteoporosis.
Anabolic steroid	Medicinal medications, which are similar in structure to androgens, but with selective anabolic activity and weak androgenic

Individual work

Theoretical questions:

1. General characteristics of hormones, their classification by origin, chemical structure, clinical application.Types and principles of hormone therapy.
2. Hormones agents of the hypothalamus and pituitary. Mechanism of action of ***Corticotropin***, indications, side effects. Analogs of growth hormone (***Somatropin, Norditropin***) and somatostatin (***Octreotide***).
3. Pharmacological characterization of gonadotropic hormones (***Gonadotrophins chorionic and Menopausal****).*
4. Pharmacodynamics of hormones posterior pituitary (***Adiurecrinum, Pituitrinum, Oxytocin, Vasopressin***), their synthetic analogues (*Demoxytocin, Desmopressin*).Indications and clinical uses.
5. Pharmacology of thyroid hormones (***L-thyroxine, Triiodothyronine***). Indications and clinical uses, side effects.Hormonal drug of parathyroid glands (***Parathyroidin***), its application.
6. Antithyroid medications: classification by mechanism of action, indications and contraindications and clinical uses, side effects of *Mercazolil, Iodine Medications*. Medications of Calcitonin (***Calcitrinum, Miacalcic***), indications.
7. Hypoglycemic medications.Classification by mechanism of action. Insulin Medications, the classification of the sources of obtaining and duration of action. Short-acting insulin (***Actrapid, Monodar, Humorap Farmasulin N, Humulin R***), average (***Suspension Insulin Semilente, B-insulin monodar B,farmasulin NPH***), long-acting (***Suspension Insulin ultralente, Suinsulin-long, Farmasulin HL***) and their characteristics.

8. Pharmacokinetics, pharmacodynamics, indications and contraindications of the insulin using. Side effects. Particular using in hyperglycemic coma. Overdose of insulin help with hypoglycemic coma.
9. Synthetic (oral) antidiabetic medications. Classification.Mechanisms of action, indications and clinical uses.Comparative characteristics of individual medications from the group of sulfonylurea (***Glibenclamide, Glipizide***), biguanide (***Metformin),*** and other medications (***Acarbose***).Hormonal drugs of glucocorticoids,its classification.Pharmacological effects, indications, contraindications and clinical uses, dosing regimen.Comparative characteristics of ***Hydrocortisone acetate, Prednisolone, Dexamethasone, Triamcinolone, Flumetazona, Beclomethasone, Sinaflan.*** Side effects of glucocorticoids, prevention.
10. Pharmacology of mineralocorticoids medications (**Deoxycorticosterone acetate**). Indications.
11. Sex hormones, classification. Medications of male sex hormones (***Testosterone propionate, Methyltestosterone, Testenat***).Pharmacological characteristics.Indications and clinical uses, side effects. Androgen receptor antagonists (***Cyproterone, Flutamide***).
12. Pharmacology of anabolic steroids.Medications (***Retabolil, Fenobolin, Methandrostenolone***).Mechanism of action, indications and clinical uses.Side effects of anabolic steroids.Non-steroidal anabolic medications (***Riboxin, Potassium orotate***).Indications and clinical uses.
13. General characteristics of the female sex hormones, their classification.Medications of estrogen - ***Estrone, Estradiol Dipropionate, Ethinylestradiol, Sinestrol***.Mechanism of action, indications and clinical uses, side effects. Antiestrogenic medications (***Tamoxifen***).
14. Mechanism of action, indications and clinical uses, side effects gestagen products - progesterone. ***Hydroxyprogesterone caproate, Progestin***.Hormonal antagonists (***Mifepristone***).
15. Contraceptive medications.Classification, principles of combination. Indications and contraindications and clinical uses, side effects.Comparative characteristics of contraceptives - ***Marvelon, Postinor, Depo-provera, Logest.***

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Hydrocortisone**
2. **Prednisolone***
3. Corticotropin
4. **Dexamethasone***
5. **L-Thyroxine***
6. Merkazolil
7. **Aktropid***
8. **Glibenclamide***
9. **Metmorfin***
10. Estradiol
11. **Oxytocin***
12. Sinestrol
13. **Progesterone***
14. Testosterone
15. **Retabolil***
16. Postinor

Note: * – drugs for filling in the table

TASKS FOR EXTRACURRICULAR WORK

Fill in the table:

The drug, dose and form	*Mechanism of action*	*The main indications for assignment*	*Side effects and contraindications*

Prescribe as a recipe:

Prednisolone

Rp:

L-thyroxine

Rp:

Oxytocin

Rp:

Retabolil

Rp:

Hormonal hypoglycemic agent fast and short-acting

Rp:

Synthetic hypoglycemic drug - a derivative of sulfonylurea

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. After prolonged treatment of thyrotoxicosis with an antithyroid drug, suppressing synthesis of thyroid hormones in a thyroid gland, the patient complained of the dyspeptic disorders, appearance of a tumescence on the front surface of a neck. Analysis of the blood revealed leukopenia and agranulocytosis. With what antithyroid drug was the patient treated?
   A. * Mercazolilum
   B. Diiodotyrosine
   C. Iodine
   D. Radioactive iodine
   E. Potassium perchlorate
2. The patient suffering from diabetes mellitus complained of flaccidity, apathy, difficulty of respiration. Investigation of the patient revealed: confused consciousness, paleness and dryness of the skin and mucous membranes, sunken eyes, sharp pointed features of the face. The blood pressure is 100/60 mmHg. Pulse is weak and frequent. Odour of acetone from the mouth. The diagnosis of hyperglycemic coma was given. Which drug should be introduced for the elimination of the given state?
   A * Insulin
   B. Glibutidum
   C Bucarbanum
   D. Protamine-zinc-insulin
   E. Butamidum
3. Hypoglycemic state arose in the patient who had been suffering from diabetes mellitus and was treated with insulin's drug of prolonged action. Indicate the endocrine drug which should be introduce to eliminate this plate.
   A. *Glucagonum
   B Hydrocortisone
   C. Triamcinolonum
   D. Noradrenaline
   E. Prednisotonum
4. Specify the hormonal agent which is used in diabetes insipidus.
   A. *Adiurecrinum
   B. Oxytocin
   C. Insulin
   D. L-thyroxin
   E. Prednisolonum
5. Specify a synthetic analogue of glucocorticoid hormones.
   A *Prednisolonum
   B. Adrenaline
   C. Pituitrinum
   D. Cortisone
   E. Testosterone
6. A patient, 42 years old, took glucocorticoids in relation with rheumatoid arthritis. In 3 weeks the signs of arthritis were almost eliminated and the patient stopped taking him drugs. But a day after there was a relapse, and the new attack was significantly more severe than at the beginning of the disease. What's the reason of the developed complication?
   A. *Decrease of release of glucocorticoids
   B. Increase of methabolism of glucocorticoids
   C. Slowing down of transport of glucocorticoids
   D. Speeding-up of elimination of glucocorticoids
   E. Increase of glucocorticoids' receptors adaptation
7. A woman, 28 years old, was admitted to a hospital in relation with danger of miscarriage. Earlier she had two cases of preliminary labor. Specify the drug of the hormone of corpus luteum that needs to be introduced in this case.
   A. *Progesterone
   B. Praegninum
   C. Diazepam
   D. Magnii sulfas
   E. Tocopherol
8. In a woman during labor, weakness of labor activity is determined. What hormone drug should be introduced for stimulation of myometrium contractions?
   A. *Hormone of n. supraopticus of the hypothalamus (oxytocin)
   B. Follicle stimulating hormone
   C. Prolactin
   D. Luteinizing hormone
   E. Hormone of n. paraventricularis of the hypothalamus (vasopressin)
9. After removal of the thyroid in a patient the attacks of convulsions are observed. What drug needs to be administered?
   A. *Parathyreoidin
   B. Somatotropin
   C. Insulin
   D. Prednisolonum
   E. L-thyroxin
10. A patient had been taking glucocorticoids for a long time. When the drug was withdrawn he developed the symptoms of disease aggravation, decreased blood pressure arid weakness. What is the reason of this condition?
   A. *Appearance of adrenal insufficiency
   B. Sensibilization
   C. Habituation (tolerance)
   D. Hyperproduction of ACTH
   E. Cumulation
11. A patient with severe inflammatory disease had been treated by prednisolone during 10 months. Due to improvement of patients state the doctor has reduced a dose of prednisolone and added corticotropin. What purpose has he pursued, administering corticotropin?
   A. *Stimulation of suprarenal glands activity
   B. Potentiotion of drugs effects
   C. Replacement of prednisolone
   D. Decrease of side-effects of prednisolone
   E. Prophylaxis of tolerance to prednisolone
12. A patient was treated for a long time by a glucocorticoid drug. After sharp stopping of taking a drug the following complaints were arisen: undue fatigability, emotional lability, sleeplessness, headache, decrease of appetite, nausea. The syndrome was diagnosed. What drug should be administered for correction of this state?
   A. *ACTH
   B. Glucocorticoids
   C. Adrenaline
   D. Corticosteroids
   E. Mineralocorticoids

13. Specify the drug of posterior pituitary hormone applied to stimulation of labor activity of uterus.
A. *Oxytocin
B. Dinoproston
C. Pachycarpin
D. Dinoprost
E. Salbutamol

14. A 25 years old woman was delivered to a maternity home for delivery. Due to uterine inertia a doctor administered her a hormonsil agent. Indicate this drug.
A. *Oxytocin
B. Retabolilum
C. Progesterone
D. Gonadotropin chorionic
E. Testosterone

15. Specify the hormones entering into composition of pituitrin.
A. *Oxytocin and Vasopressin
B. Oxytocin and progesterone
C. Oxytocin and oestradiol
D. Vasopressin and oestradiol
E. Vasopressin and progesterone

16. To the patient after a subtotal resection of thyroid gland the drug of replaceable therapy is administered. Specify this agent.
A. * L thyroxine sodium
B. Potassium perchlorate
C. Mercazolilum
D. Rifathyreline
E. Potassium iodide

17. Impairment of enamel and dentine formation is diagnosed in a child owing to the under content of calcium ions in blood. What hormonal drug can be administered to correct this state?
A. *Calcitonin
B. Thyroxine
C. Somatotropinum
D. Prednisolone
E. Cortisone

18. Mercazolilum (methimazole) had been administered to the patient, suffering from thyrotoxicosis. What effect underlies antithyroid activity of a drug?
A. *Decrease of thyroid hormones production
B. Depression of production of thyrotropic hormone
C. Depression of uptake of iodine by thyroid gland
D. Destruction of cells of thyroid gland
E. Oppression of metabolism in thyroid gland

19. Convulsions were developed at the patient after thyreoidectomy. By usage of what drug is it possible to eliminate this state?
A. *Calcium chloride
B. Tubocurarine
C. Calcitrinum
D. Triiodothyronine
E. Ergocalciferol

20. At investigation of a sick woman hyperactivity of thyroid gland is revealed. What drug should be administered to her?
A. * Mercazolilum (methimazole)
B. L-thyroxine
C. Triiodothyronine
D. Lugol's solution
E. Thyreoidinum

21. A drug of iodine is administer, to the patient, suffering from hyperthyroidism of an initial stage. What effect underlies antithyroid activity of this drug?
A. * Oppression of release by pituitary body of thyrotropic hormone
B. Oppression of activity of the enzymes participating in synthesis of iodine-containing hormones of thyroid gland
C. Activation of production by hypothalamus of thyroliberine
D. Inhibition of the process of iodation of hormones' molecules
E. Destruction of tissue of thyroid glan

22. Radioiodine (J 131) is administered to a 65 years old patient suffering from Basedow's disease, considering inefficiency of treatment by the basic drugs and impossibility of a surgical intervention. What is the mechanism of action of this agent?
A. * Causes destruction of follicles of thyroid gland
B. Inhibits functions of thyroid gland
C Oppresses synthesis of hormones of thyroid gland
D. Accelerates excretion of iodides from thyroid gland
E. Blocks entering of iodine in thyroid gland

23. Numbness of extremities and paresthesia were developed at the 52 years old patient soon after the operation of thyreoidectomy, hypocalcemia is laboratory diagnosed. What hormonal drug is necessary for administering?
A. * Parathyroidin
B. Thyreoidinum
C. Calcitrinum
D. Thyroxine
E. Triiodothyronine

24. The patient after removal of thyroid gland suffers from attacks of convulsions. What drug is necessary for administering in this case?
A. *Parathyroidin
B. Insulin
C. Prednisolone
D. Thyroxine
E. Somatotropin

25. Insulin was introduced to the patient, suffering from diabetes melliyus. What is the main mechanism of action of this agent?
A. * Activation of glucose transport from blood to tissues
B. Oppression of glycogenesis
C. Inhibition of transport of amino-acids
D. Activation of synthesis of triglycerides
E. Activation of glycogen synthesis

26. Hyperglycemic coma is developed at the patient, suffering from diabetes mellitus. What drug should be administered in this situation?
A. *Insulin of short action
B. Insulin of long duration of action
C. Drug from the group of biguanide derivatives
D. Insulin of intermediate duration of action
E. Drug from the group of sulfonylurea derivatives

27. Which agent from listed below should be introduced for treatment of hyperglycemic coma?
A. *Insulin
B. Metformin
C. Protamin-Zincum-insulin
D. Chlorpropamide
E Bytamidum (Carbutamide)

28. To the patient, suffering from diabetes mellitus the nurse has wrongly introduced almost double dose of insulin. In 2 hours sweating, tachycardia, convulsions and loss of consciousness has developed. Hypoglycemic coma is diagnosed. What drug should be introduced to the patient?
A. *Glucose
B. Insulin
C. Lydasum
D. Somatotropinum
E. Noradrenaline

29. A 60 years old patient has been suffering within 9 years from diabetes mellitus and is treated by insulin. 10 days ago his doctor has administered to him beta adrenoblocker propranolol (anaprilinum) due to arterial hypertension. In an hour after last introduction of propranolol hypoglycemic coma has developed. Indicate a reason of arising of hypoglycemia in this case?
A. * Oppression of glycogenolysis
B. Prolongation of action of insulin
C. Decrease of release of glucagon
D. Magnification of bioavailability of insulin
E. Diminution of absorption of glucose

30. A 60 years old patient has been suffering within 9 years from diabetes mellitus and is treated by insulin. 10 days ago his doctor has administered to him beta- adrenoblocker propranolol (anaprilinum) in connection with arterial hypertension. In an hour after last introduction of propranolol he has felt asthenia, darkening in eyes, arterial pressure was depressed and in some minutes the patient has lost consciousness. Indicate the condition which has developed at the patient.
A. * Hypoglycemic coma
B. Hyperglycemic coma
C. Cardiogenic shock
D. Sharp impairment of cerebral circulation
E. Allergic reaction

31. A 60 years old patient has been suffering within 9 years from diabetes mellitus and is treated by insulin. 10 days ago his doctor has administered to him hypotensive agent to treat arterial hypertension. In an hour after last introduction of this

drug hypoglycemic coma has developed. Which of the numbered drugs could cause this complication?
A.* Propranolol (anaprilinum)
B. Prazozin
C. Verapamil
D. Captopril
E. Nifedipine

32. A 60 years old patient has been suffering within 9 years from diabetes mellitus and is treated by insulin. 10 days ago his doctor administered to him hypotensive agent to treat arterial hypertension. In an hour after last introduction of this drug hypoglycemic coma has developed. Which of the numbered drugs should be used for treatment of this state?
A. * Glucose
B. Insulin
C. Noradrenaline
D. Natrii hydrocarbonas
E. Bemegride

33. The state of the patient, suffering from diabetes mellitus was worsened after the injection of insulin with long action duration: general asthenia, cold sweat, tremor of extremities developed hypoglycemic coma was diagnosed. Intravenous injection of glucose solution didn't cause improvement of the state. What drug should be used in this situation?
A. * Adrenaline
B. Insulin
C. Isadrinum (isoprenaline)
D Dobutamine
E. Dopamine

34. The 56-years old patient complained of thirst and frequent emiction. After investigation in endocrinology the diagnosis of diabetes mellitus was established, and Butamidum (carbutamide) was administered to him. Determine the mechanism of action of this agent.
A. * Stimulates beta-cells of pancreatic islets of Langerhans
B. Promotes utilization of glucose by tissues of an organism
C. Facilitates glucose transport through cellular membranes
D. Oppresses beta-cells of pancreatic islets of Langerhans
E. Increases a level of glucose in a blood

35. What drug stimulating release of endogenic: insulin is a derivative of sulfonylurea with average action duration (8-24 hours)?
A. * Butamidum (carbutamide)
B. Buforminum
C. Metforminum
D. Gilipizid
E. Chlorpropamide

36. Specify a drug, which is suitable to be used in patients suffering from diabetes mellitus with lowered ability of pancreas to produce insulin
A. * Butamidum (carbutamide)
B. Insulin
C Adrenaline
D. Glucagon
E. Calcitrinum

37. The patient of advanced age addressed to the doctor with complaints of dryness in a mouth, polyuria, weight loss. At examination hyperglycemia and glycosuria are revealed. It is diagnosed: diabetes mellitus, II type (non insulin dependent), an intermediate degree of gravity. Which of the numbered drugs should be administered to the patient?
A. *Butamidum (carbufamide)
B. Insulin
C. Acarbose
D. Glucose
E. Adrenaline

38. At the examination of 70 years old patient hyperglycemia is revealed. What drug is expedient for treatment of this state which is used orally?
A. *Glibenclamide
B. Mercazolllum
C. Parathyroidin
D. Iinsulin
E. Cortisone

39. Indicate the synthetic antidiabetic drug from the group of biguanide derivatives.
A. *Metformin
B. Acarbose
C Butamidum (carbutamide)
D. Glibenclamide
E. Glipizid

40. The patient of 45 years complains of constant thirst and expressed polyuria. The level of glucose in blood plasma is normal, and in urine glucose misses. What drug should be chosen for his treatment?
A. *Adiurecrinum
B. Desoxycorticosterone
C Insulin
D. Hydrocortisone
E. Prednisolone

41.What drug oppresses absorption of glucose in small intestine?
A. * Acarbose
B. Insulin
C. Butamidum (carbutamide)
D. Metformin
E. Glucose

42. Acute bronchitis is arisen in a patient suffering from diabetes mellitus. What antimicrobial drug is undesirable for administering to this patient?
A. *Biseptol (co-trimoxazole -combined sulfonamide)
B Amptcillin (antibiotic)
C. Tetracycline (antibiotic)
D. Azithromycin (antibiotic)
E. Cefotaxim (antibiotic)

43. The patient's state requires introduction of glucocorticoids. How is it necessary to administer them taking into account physiological change of these hormones' content in a blood?
A. *2/3 of the dose in the morning, the rest in the afternoon
B. All dose in the evening
C. All dose in the morning
D. Evenly within day
E. 2/3 of the dose in the evening, the rest in the morning

44. Indicate the mechanism of antiinflammatory action of Prednisolone.
A. * Inhibition of phospholipase A2 activity
B. Inhibition of transcription
C. Inhibition of COX activity
D. Inhibition of translation
E. Stimulation of COX activity

45. A doctor had administered several drugs (anti-inflammatory, antibacterial and so on) to a patient who suffered from rheumatic carditis. After a while hyperglycemia has arisen at him. What group of drugs is (capable to cause such side-effect?
A. * Glucocorticoids
B. Nonsteroid anti-inflammatory drugs
C. Antibiotics of Penicillin group
D. Ascorbic acid
E. Sedatives

46. Specify synthetic analogue of glucocorticoid hormones.
A. *Prednisolone
B. Pituitrine
C Adrenaline
D. Cortisone
E. Testosterone

47. The patient suffering from severe form of diabetes mellitus is netted by insulin. Now his condition requires administering of antiinflammatory agent. Specify the drug which can demand correction of a dose of insulin?
A. * Prednisolone
B Diclofenac-sodium
C. Ibufrofen
D. Indomethacin
E. Butadionum (phenylbutazone)

48. The man of 50 years suffers from tuberculosis of the skin. Which of numbered drugs, used for treatment of dermal diseases, is contra-indicated to this patient?
A. * Prednisolone
B. Tetracycline
C. Sulfur ointment
D. Ergocalciferol
E. Retinol acetate

48. What drug cannot be used at infectious affections of skin?
A. * Prednisolone ointment
B. Gentamvcin ointment
C Tetracyclin ointment
D. Yellow mercury ointment
E. Brilliant green

50. The daily dose of what drug should be parted on unequal portions according to phases of a circadian rhythm?
A. *Dexamethasone
B. Indomethacin
C. Ibufrofen
D. Diclofenac-sodium
E. Butadionum (phenylbutazone)

51. Specify a drug from the group of glucocorticoids, which is poorly absorbed into the blood in application to the skin.
A. *Synaflanum (fluoclnolone)
B. Dexamethasone
C. Triamcinolone
D. Desoxycorticosterone
E. Prednisolone

52. The doctor has administered an ointment containing glucocorticoid to the patient suffering from allergic dermatitis. The advantage of this drug is - it is not absorbed into the blood from the skin. Specify this drug.
A. *Flumethasone
B. Dexamethasone
C. Becfomethasone
D. Hydrocortisone
E. Prednisolone

53. Glucocorticoid agent (Prednisolone) had been administered to the patient of 42 years who suffered from rheumatoid arthritis, in 3 weeks patient's state had improved and he had discontinued taking of the drug. However in a day his condition was worsened. What was the reason of this complication?
A. * Production of glucocorticoids had dropped
B. Transport of glucocorticoids was inhibited
C. Elimination of glucocorticoids had been accelerated
D. Adaptation of receptors to glucocorticoids had strengthened
E. Metabolism of glucocorticoids had strengthened

54. After long-term treatment by glucocorticoid agent this drug was abolished, but patient's state was worsened: exacerbation of the current disease, decrease of arterial pressure; asthenia had developed. Indicate a reason of the arisen condition.
A. * Insufficiency of suprarenal glands
B. Drug tolerance
C. Sensibilization
D. Hyperproduction of ACTH
E. Cumulative action

55. A patient of 60 years has tolerated mastectomy. After a course of radiation therapy the doctor has administered a synthetic drug of nonsteroid structure which eliminates stimulatory influence of oestrogens on tumoral growth. Specify this drug.
A. *Tamoxifen
B. Fosfestrol
C. Rubomvcin
D. Diethylstiibestrol
E. Cisplatin

56. The woman of 28 years was admitted to the department of pathology of pregnancy due to threat of abortion. In her anamnesis there are two events of premature birth. Specify a drug of the yellow body hormone which should be administered in this case.
A. * Progesterone
B. Praegninum
C. Diazepam
D. Magnesium sulfate
E. Vitamin E.

57. Cancer of mammary gland is diagnosed at the woman of 6 years. What hormonal drug should be administered?
A. *Testosterone
B. Synoestroium
C. Phenoboline
D. Progesterone
E. Insulin

58. Indicate the drug which stimulates synthesis of proteins, exerts positive influence on calcium and nitrogen exchange and also promotes increase of appetite and body weight.
A. * Retabolilum (nandrolone decanoate)
B. Prednisolone
C. Dexamethasone
D. Progesterone
E. Corticotropin

59. The doctor has administered Retabolilum (nandrolone decanoate) to a female patient after consolidation of fracture of a bone for acceleration of recovery, Indicate characteristic undesirable effect of this drug at women.
A. * Masculinization
B. Decrease of body weight
C. Catabolic effect
D. Feminization
E. Asthenia

60. A 19-year-old female suffers from tachycardia in resting condition, weight loss, excessive sweating, exophthalmos and irritability. What hormone would you expect to find elevated in her serum?
A. *Thyroxine
B. Cortisol
C. ACTH
D. Mineralocorticoids
E. Insulin

61. A 56-year-old patient with complains of thirst and frequent urination was diagnosed to have
diabete mellitus and butamin was prescribed. What is the mechanism of action of this
medicine?
A It stimulates beta-cells of Langergans' islets
B It helps to absorb the glucose by the cells of the organism tissues
C It relieves transport of glucose through the cells' membranes
D It inhibits alpha cells of Langergans' islets
E It inhibits absorption of glucose in the intestines

62. Patient was on glucocorticoids for a long time, discontinuation of usage caused exacerbation
of the illness, decreased BP, weakness. How can you explain it?
A Insufficiency of adrenal glands
B Adaptation to the medicine
C Sensitization
D Hyperproduction of ACTH
E Cumulation

63. Testosterone and it's analogs increase the mass of skeletal muscles that allows to use them
for treatment of dystrophy. Due to interaction of the hormonwith what cell substance is this
action caused?
A Nuclear receptors
B Membrane receptors
C Ribosomes
D Chromatin
E Proteins- activators of transcription

64. A patient ill with neurodermatitis has been taking prednisolone for a long time. Examination
revealed high rate of sugar in his blood. This complication is caused by the drug influence
upon the following link of carbohydrate metabolism:
A Gluconeogenesis activation
B Glycogenogenesis activation
C Intensification of glucose absorption in the bowels
D Inhibition of glycogen synthesis
E Activation of insulin decomposition

65. Continious taking of a drug can result in osteoporosis, erosion of stomach mucous
membrane, hypokaliemia, retention of sodium and water, reduced content of corticotropin in
blood. Name this drug:
A Prednisolone
B Hydrochlorothiazide
C Digoxin
D Indometacin
E Reserpine

66. A patient suffers from diabetes melitus. After the regular insulin injection his condition grew
worse: there appeared anxiety, cold sweat, tremor of limbs, general weakness, dizziness.
What preparation can eliminate these symptoms?
A Adrenaline hydrochloride
B Butamide
C Caffeine
D Noradrenaline
E Glibutide

67. Examination of a 70 year old patient rrevealed insulin-dependent diabetes. What drug should
be administered?
A Glibenclamid
B Insulin
C Mercazolilum
D Parathyroidin
E Cortisone
68. Examination of a 60 y.o. patient revealed hyperglycemia and glucosuria. A doctor
administered him a medication for internal use. What medication is it?
A Glibenclamid
B Furosemide
C Oxytocin
D Pancreatine
E Corglycon
69. An elderly female patient suffers from the type 2 diabetes mellitus accompanied by obesity,
atherosclerosis, coronary artery disease. Basal hyperinsulinemia is also present. What
treatment would be the most appropriate?
A Glibenclamid
B Insulin
C Retabolil
D Lovastatin
E Amlodipine
70 A patient suffering from non-insulin-dependent diabetes mellitus was prescribed glibenclamid internally. What is the mechanism of its hypoglycemic action?
+A. It stimulates generation of endogenous insulin by beta cells
B. It inhibits glucose absorption in the bowels
C. It inhibits alpha glucosidase and polysaccharide breakdown
D. It inhibits gluconeogenesis in liver
E. It intensifies utilization of glucose by peripheral tissues
71 A nurse accidentally injected a nearly double dose of insulin to a patient with diabetes mellitus. The patient lapsed into a hypoglycemic com a. What drug should be injected in order to help him out of coma?
+A. Glucose
B. Insulin
C. Lidase
D. Somatotropin
E. Noradrenaline
72 During an acute experiment some of diluted solution of hydrochloric acid was injected into the duodenal cavity of an experimental animal. This will result in hypersecretion of the following hormone:
A. Motilin
+B. Secretin
C. Histamine
D. Neurotensin
E. Gastrin
73 Chronic overdosage of glucocorticoids leads to the development of hyperglycemia. What process of carbohydrate metabolism is responsible for this effect?
+A. Gluconeogenesis
B. Pentose-phosphate cycle
C. Glycogenolysis
D. Aerobic glycolisis
E. Glycogenesis
74 A patient with diabetes mellitus complicated by angiopathy has been recommended a drug which is a sulphonyl urease derivate of the second generation. It improves microcirculation and is known for its relatively good tolerance. What drug is it?
A. Glibutidum
B. Insulin
C. Acarbose
D. Adrenalin
+E. Glibenclamide
75. A 26-year-old woman at 40 weeks' gestation was admitted to the maternity ward. Examination revealed that the cervix was open, but uterine contractions were absent. The doctor gave her a hormonal drug to induce labor. Specify this drug:
A. Testosterone
B. ACTH
C. Estrone
+D. Oxytocin
E. Hydrocortisone
76 A patient has a systemic inflammatory lesion of connective tissue. Which anti-inflammatory drug will reduce all the inflammatory phases?
+A. Prednisolone
B. Diclofenac sodium
C. Phenylbutazone
D. Contrycal
E. Indomethacin

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №5. Pharmacology of metabolism		
Vitamins. Enzymatic drugs and their inhibitors		

The list of basic terms in the topic

Term	Definition
Water-soluble vitamins	Drugs like water-soluble vitamins.
Lipid soluble vitamins	Drugs like lipid soluble vitamins
Antivitamins	Substances that reduce absorption of vitamins

Individual work

Theoretical questions:

1. Definition of vitamins Medications. Types of vitamin therapy.
2. Classification of vitamins medications.
3. General characteristics of the water-soluble vitamins medications.Pharmacology of ***Thiamine Chloride (bromide), Riboflavin, Pyridoxine, Nicotinic Acid, Cyanocobalamin, Folic Acid, Ascorbic Acid, Calcium Pangamat, Calcium Pantothenate.***
4. Indications and clinical uses, side effects of water-soluble vitamins.
5. Notions of bioflavonoids (***Rutin,Quercetin,Corvitin***),coenzyme preparations
6. General characteristics of the Liposoluble vitamins.Pharmacology of ***Retinol Acetate, Ergocalciferol, Tocopherol acetate, Menadione.***
7. Indications and contraindications to the use of liposoluble vitamins Medications.
8. Side effects of liposoluble vitamins medications. The concept of antivitamin.
9. Multivitamin preparations (***Askorutin, Revit, Dekamevit, Multitabs***)
10. Enzyme medications and their inhibitors.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Ascorbic acid***
2. **Thiamine chloride***
3. Pyridoxine Hydrochloride
4. **Nicotinic acid***
5. **Cyanocobalamin***
6. Folic acid
7. **Tocopheryl Acetate***
8. **Retinol Acetate***
9. **Ergocalciferol***
10. **Lidaza***
11. **Panangin***
12. **Calcium Gluconate***

Note: * – drugs for filling in the table

TASKS FOR EXTRACURRICULAR WORK

Fill in the table:

The drug, dose and form	*Mechanism of action*	*The main indications for assignment*	*Side effects and contraindications*

Prescribe as a recipe:

1. Ascorbic acid

Rp:

2. Nicotinic acid

Rp:

3. Tocopheryl Acetate

Rp:

4. Lidaza

Rp:

5. Vitamin for the treatment of burns, inflammation of mucous membranes

Rp:

6. Drug for the treatment of neuritis and polyneuritis

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. A 64 year old woman suffers from night blindness (hemeralopia). What vitamin drug should be recommended?

A. * Retinolum
B. Riboflavin
C. Tocopherolum
D. Pyridoxinum
E. Ascorbic acid

2. A 58 year old woman suffers from cerebral atherosclerosis. Complex of her pharmacotherapy includes drug of vitamin E & C. Which pharmacological effect of these drugs is the main for treatment of this disease?

A. * Inhibition of free-radical oxidation of lipids
B. Increase of gonadotropic hormones synthesis in the pituitary body
C. Decrease of glucocorticoids release by adrenals
D. Strengthening of the antitoxic function of the liver
E. Improvement of the coronary circulation

3. A patient who had been taking л vitamin drug for the prevention of cerebrovascular spastic reactions began to complain of unpleasnt feelings: hyperemia of the face and upper part of the body, vertigo, feeling of blood influx into the head. What drug may cause these side-effects

A. *Nicotinic acid
B. Tocopheroli acetas
C. Nicotinamidum
D. Thiamin/ bromidum
E. Calcii pangamas

4. A patient had been taking vitamin D for a long time for treatment of rickets. Soon the signs of vitamin D intoxication developed: loss of appetite, nausea, headache, fatigue, increase of body temperature, etc. What vitamin decreasing the toxic influence of vitamin D should be administered?

A *Vitamin A
B. Vitamin C
C. Vitamin B_{12}
D. Vitamin PP
E. Vitamin B_2

5. A 55 year old patient was admitted to the haemotological department with signs of acute anemia. After laboratory examination megaloblastic hyperchromic anemia was diagnosed, which drug must be administered to the patient first of all?

A. *Cyanocobalaminum
B. Hemostimulinum
C. Ferroplexum
D. Ferrum-Lek
E. Folic acid

6. A 55 year old patient suffering from hyperchromic anemia obtained long-term treatment with vitamin B_{12} parenterally. Why is the parenteral way of introduction of vitamin B_{12} prefered more than the peroral way?

A.*It isn't absorbed in the intestine in oral introduction due to deficit of gastromucoproiein
B. It is faster absored
C It is longer circulated in the blood
D. It is faster penetrated to the bone marrow
E. it isn't destroyed in the liver

7. A patient has diarrhoea, dementia and dermatitis. What vitamin has to be included into the complex pharmacotherapy?

A. *Nicotinic acid
B. Thiaminum
C. Cyanocobalaminum
D. Panthotenic acid
E. Riboflavinum

8.There is an inhibited coagulation in the patient with bile ducts obstruction, bleeding due to the low level of absorbtion of a vitamin. What vitamin is in deficiency?

A. *Vitamin K

B. Vitamin D
C. Carotene
D. Vitamin A
E. Vitamin E.

9. A patient with diabetes mellitus is treated by injections of vitamin B1 to eliminate metabolic acidosis. Which biochemical mechanism of action of vitamin B1 ensures the positive effect?

A. * Activation of dehydrogenases of the Krebs cycle
B. Activation of adenylate cyclase
C. Blockade of phosphodiesterase
D. Acceleration of acetylcholine synthesis
E. Acceleration of adrenaline synthesis

10. Metabolic acidosis arose in a patient due to impairment of carbohydrate metabolism and accumulation of ketoacids in the organism, indicate the vitamin drug which promotes its elimination due to decrease concentration of ketoacids.

A. *Thiamine
B. Pyridoxins
C. Folic acid
D. Riboflavine
E. Ascorbic acid

11. A patient suffers from chronic alcoholism with the following symptoms: pain in arms and legs, impairment of skin sensitivity, muscle weakness, edemas and increased amount of pyruvate. Which vitamin drug should be prescribed to the patient?

A. * Thiamine
B. Ergocalciferol
C. Retinol
D. Rutin
E. Vikasoium (Menadione)

12. 55 years old patient was admitted to the hematological department with acute anemia: RBCs - 1,5 x 10^{12}/litre; Hb - 80g%, colour index - 1,3. Hyperchromic anemia was diagnosed. Which drug should be administered for treatment of this disease?

A. *Cyanocobalamine
B. Ferroplexum
C. Hemostimuline
D. Ferrum-lek
E. Folic acid

13.Which of the acids below decreases permeability of connective tissue structures, possesses antioxidant activity due to ability to be transformed from the oxidized form into reduced and on the contrary?

A. * Ascorbic acid
B. Hydrochloric acid
C. Mefenamic acid
D. Aspirin (acetylsalicylic acid)
E. Aminocaproic acid

14. For synthesis of the basic substances of connective tissue (mucopolysaccharides and collagen) an essential agent is:

A. * Ascorbic acid
B. N icotinic acid
C. Folic acid
D. Salicylic acid
E. Acetylsalicylic acid

15. Radiation therapy is performed to the patient. What vitamin drug with antioxidant properties is necessary for administration to increase stability of tissues in this case?

A. * Ascorutinum
B. Vitamin B_6
C Thiamine chloride
D. Cyanocobaiamine
E. Folic acid

16. The woman of 25 years who wanted to get thin was on a diet that consisted of 2 cups of coffee without sugar, 3 crackers from white bread, 2 sausages or 2 eggs in a day within 1,5 months. The mass of a body has dropped on 5 kg, but there were developed strong headaches, often nasal bleedings, bleeding, sickness of gums, shaking of teeth, -.helling of sfcin and shedding of hair.What vitamin drug is expedient in this case?

A. *Ascorbic acid
B. Folic acid
C. Retinol acetate
D. Cyancobalamine
E. Vikasolum (Menadione)

17. The patient who was treated by a vitaminic drug for prophylaxis of vasospasms of the brain, has developed complaints of the unpleasant sensations related to taking of this medicine: reddening of the face and the upper half of a trunk, giddiness, sense of flush of blood to a head. For what drug the specified side-effects are characteristic?

A. *'Nicotinic acid
B. Nicotinamidum
C. Thiamine bromide
D. Tocoferol acetate
E. Calcium pangamate

18. Bioflavonoids (rutin, quercetin) possess all listed below pharmacodynamic effects, except for:

A. * Dilation of capillaries
B. Antioxidant activity
C. Inhibition of hyaluronidase activity
D. Decrease of permeability of capillary wall
E. Protections of ascorbic acid, assistance to its transport and accumulation

19. 64 years old woman suffers from hemeralopia (disturbance of vision in darkness). What vitaminic drug should be recommended her first of all?

A. *Retinoli acetate
B. Tocoferol acetate
C. Pyridoxin
D. Ascorbic acid
E. Riboflavin

20. What vitamin promotes growth and development of epithelial cells, including epidermal ones?

A. *Retinol
B. Ergocalciferol
C. Ascorbic acid
D. Nicotinic acid
E. Lipoic acid

21. 39 years old patient suffers from hyperkeratosis, disturbance of vision in darkness, frequent infectious diseases. What vitaminic drug should be administered for treatment .

A. *Retinol acetate
B. Pyridoxin
C. Riboflavin
D. Ergocalciferol
E. Tocoferol acetate

22. What vitamin is formed in skin under influence of ultraviolet radiation?

A. *Cholecalciferol
B. Ascorbinic acid
C. Retinole acetate
D. Calcium pantotenate
E. Riboflavin

23. To the child with signs of rachitis the pediatrist and the "dentist administered a liposoluble vitamin which influences an exchange of phosphorus and calcium in an organism, promotes sedimentation of calcium in bone tissue and dentins. Determine a drug.

A. *Ergocalciferol
B. Tocoferol acetate
C. Retinoli acetate
D. Vikasolum (Menadione)
E. Thyreoidinum

24. Parasthesia, xeroderma arid sticking out of fontanel was observed in a 6 months child under the treatment by a vitaminic drug. Specify this drug.

A. *Ergocalciferol
B. Pyridoxine
C. Riboflavin
D. Retinoli acetate
E. Tocoferol acetate

25. The dentist administered to his patient liposoluble vitamin with antioxidant activity for treatment of parodontitis. Specify this vitaminic drug.

A. * Tocoferol acetate
B. Ascorbic acid
C. Rutin
D. Nicotinic acid
E. Ergocalciferol

26.A doctor administered tocoferol acetate to a patient with ischemic heart disease. What effect of the drug does the doctor expect?

A. *Antioxidant
B. Spasmolytic
C. Hypotensive
D. Increase of oxygen delivery to myocardium
E. Positive inotropic

27. What enzymatic drug is used with the purpose of dropping of density and rising of permeability of connective tissue structures?

A. *Lidase
B. Lipase
C. Cocarboxylase
D. Cholines terase
E. Amylase

26. Examination of a child who hasn't got fresh fruit and vegetables during winter revealed numerous subcutaneous hemorrhages, gingivitis, carious cavities in teeth. What vitamin combination should be prescribed in (his case?
A. Riboflavin and nicotinamide
B. Calciferol and ascorbic acid
C. Thiamine and pyridoxine
++D. Ascorbic acid and rutin
E. Folic acid and cobalamin

49. In compliance with the clinical presentations a man was prescribed pyridoxalphosphate. What processes are corrected by this preparation?
A. Synthesis of purine and pyrimidine bases
++B. Transamination and decarboxylation of amino acids
C. Oxidative decarboxylation of keto-acids
D. Protein synthesis
E. Deamination of purine nucleotides

163. In order to prevent gum inflammation and to improve regeneration of epithelial periodontium cells manufacturers add to the tooth pastes one of the following vitamins:
A. Biotin
++*B. Retinol
C. Phyloquinone
D. Thiamine
E. Calciferol

106. In order to speed up healing of the thermal injury it is required to prescribe a drug that facilitates epithelization of skin and mucous membranes. What drug is it?
A. Ergocalciferol
B. Tocopherol acetate
C. Ascorbic acid
+D. Retinol acetate
E. Nicotinic acid

120 A 10 month old child has high excitability, sleep disturbance, amyotonia, retarded dentition, teeth erupt with inadequate enamel calcification. These changes are caused by deficiency of the following vitamin:
+A. Cholecalciferol
B. Nicotinamide
C. Thiamine
D. Riboflavin
E. Retinol

135 Treatment of many diseases involves use of cocarboxylase (thiamine pyrophosphate) for supplying cells with energy. What metabolic process is activated in this case?
A. Amino acids decarboxylation
+B. Oxidizing decarboxylation of pyruvate
C. Glutamate deamination
D. Decarboxylation of biogenic amines
E. Detoxication of harmful substances in liver

86 Examination of a child who hasn't got fresh fruit and vegetables during winter revealed numerous subcutaneous hemorrhages, gingivitis, carious cavities in teeth. What vitamin combination should be prescribed in this case?
+A. Ascorbic acid and rutin
B. Folic acid and cobalamin
C. Thiamine and pyridoxine
D. Calciferol and ascorbic acid
E. Riboflavin and nicotinamide

171. A sportsman needs to improve his sporting results. He was recommended a drug containing carnitine. What process is activated by this compound in the first place?
A. Transport of calcium ions
B. Transport of amino acids
+C. Transport of fatty acids
D. Transport of glucose
E. Transport of vitamin K

193 A few days before an operation a patient should be administered vitamin K or its synthetic analogue Vicasol. Vitamin K takes part in the following post-translational modification of the II, VII, IX, X blood clotting factors:
+A. Carboxylation
B. Deamination
C. Decarboxylation
D. Transamination
E. Glycosylation

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №5. Pharmacology of metabolism		

Pharmacology of blood. Drugs affecting hematopoiesis, blood coagulation, platelet aggregation and fibrinolysis

The list of basic terms in the topic

Term	*Definition*
Antiplatelet and inhibitors of aggregation	Medications, that depressing effect of aggregation (clumping) and adhesion (sticking) of platelets.
Anticoagulants	Medications that suppress or retard the process of coagulation (clotting) of blood.
Activators of fibrinolysis (fibrinolytics)	Medications that activate the process of resorption of fibrin clots.
Stimulants of aggregation (agreganty)	Medications, which accelerating adhesion and adhesion of platelets
Coagulants	Medications, which accelerate the process of blood clotting
Inhibitors of fibrinolysis	Medications, which suppress fibrinolytic activity of the blood that maintain blood clot.
Angioprotectors	Medications, which normalize the permeability of blood vessels, reducing the swelling of tissues, improve microcirculation and metabolic processes in the vessel wall and protect this wall from various damages.
Term	Medications
Erythropoiesis	The formation of red blood cells (in the spleen, bone marrow).
Leucopoiesis	The formation of white blood cells.
Anemia	Decrease below the normal number of red blood cells in 1 mm3 and the amount of hemoglobin or the number of red blood cells per 100 ml of blood, which occurs when an imbalance between blood loss from bleeding or destruction and formation.
Erythropenia	Insufficient number of red blood cells.
Erythremia	Increase of the total number of red blood cells.
Leukopenia	Reducing the number of leukocytes in the blood to below 5000 mm3. Its subtypes called agranulocytosis, neutropenia, bazopeniya.
Leukocytosis	Fleeting increase in the number of leukocytes in the blood, often accompanied by fever, infections, inflammation, bleeding.

Individual work

Theoretical questions:

A. Natural anti-thrombotic factors that ensure the functioning of the system and maintain anticoagulation liquid blood. Diseases (thrombosis, heart attack, thrombophlebitis), arising from deficiency of antithrombotic factors. Antithrombotic drugs used to prevent or treat them:

1. Antiplatelet and inhibitors of aggregation ***- Acetilsalicylic acid (Aspirin, Aspekard) Ticlopidine (Tiklid), Clopidogrel (Plavix), Pentoxyfilin (Trental).*** Their mechanism of action, indications and contraindications and clinical uses.
2. Anticoagulants direct ***(Heparin, Fraxiparin, Hirudin*)** and indirect ***(Neodikumarin, Warfarin, Fenilin)*** actions. Their mechanisms of action, the indication to application, side effects. Overdose, help measures ***(Protamin sulfate, Vikasolum).***
3. Fibrinolytics: System (***Streptokinase, Urokinase***) and (***recombinant Urokinase, recombinant tissue plasminogen activator (rt-PA-alteplase or Actilyse, tenecteplase (Metalize).*** Their role in vascular recanalization, indications and contraindications and clinical uses, side effects.

B. Natural factors that accelerate blood clotting, which ensure the functioning of the system of coagulation and hemostasis in vascular damage. Groups of Medications that accelerate blood clotting and stop bleeding (antihemorrhagic or hemostatic Medications):

1. Coagulants direct ***(Calcium chloride, Calcium gluconate, Hemostatic sponge)*** and indirect ***(Vikasol, Nettles, Yarrow)*** actions. Their mechanisms of action, indications and contraindications and clinical uses.
2. Inhibitors of fibrinolysis ***(Aminocaproic Acid)***. Mechanism for the preservation of blood clot, indications and contraindications and clinical uses.
3. Stimulants aggregation (agreganty) - ***Serotonin adipate***. Indications and clinical uses.
4. Reduce the permeability of blood vessels or Angioprotectors (***Askorutin, Adroxon, Etamsylate (Dicynone) Troxevasin (Venoruton))***. Functions that are assigned to their testimony.

C. Drugs affecting hematopoiesis:

1. Classification of agents affecting hematopoiesis: stimulating erythro- and leucopoiesis, depressing erythro and leucopoiesis.
2. Erythropoiesisa stimulants, their use for the treatment of anemia:
    a) The causes of iron deficiency anemia. Iron supplements to treat them***: Ferroplex, Tardiferon, Aktiferrin, Ferrum-lek Ferkoven.*** Their pharmacokinetics and pharmacodynamics, side effects. Poisoning with iron, measures of assistance (***Deferoxamine***). Pharmacology of ***Coamide***.
    b) The causes of aplastic anemia, Medications to treat them. Preparations of erythropoietin ***(Epoetin Alfa or Eprex)*** and colony stimulating factor ***(Leukomax or Molgramostim)***.
    c) The causes of hemolytic anemia and Medications for their treatment (glucocorticoids).
    d) The causes of megaloblastic B12-folate deficiency anemia. Medications for their treatment ***(Cyanocobalamin, Cobalamid, Folic Acid***). Their mechanism of action, indications and contraindications and clinical uses.
3. Medications, which suppress erythropoiesis***: Imifos, radioactive sodium phosphate.*** Indications.
4. Stimulants leucopoiesisa: ***Sodium nucleinate, Metiluracil, Pentoxyl, Leucogen, Leucomax (Molgramostim)***. Indications and contraindications for their use.
5. Medications, which depressing leucopoiesis: antineoplasmic, pyrazolones, sulfonamides, antibiotics.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Acetylsalicylic acid***
2. Ticlopidine
3. **Heparin***
4. Warfarin
5. **Protamine sulfate***
6. Ferum-Lek
7. Etamzilat
8. **Aminocaproic acid***
9. **Alteplase***
10. Methyluracil
11. **Fraxiparine***
12. **Vikasol***
13. **Dipyridamole***

Note: * – drugs for filling in the table

TASKS FOR EXTRACURRICULAR WORK

Fill in the table:

The drug, dose and form	*Mechanism of action*	*The main indications for assignment*	*Side effects and contraindications*

Prescribe as a recipe:

1. Heparin.

Rp:

2. Vikasol.

Rp:

3. Aminocaproic acid.

Rp:

4. Alteplase.

Rp:

5. Antiplatelet drug for prevention of myocardial infarction and stroke.

Rp:

6. Indirect anticoagulant for treatment of thrombosis.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. The patient was admitted to the traumatologic department due to fracture of chin bones, damages of soft tissues and massive bleeding. Examination revealed paleness of the skin, pain in palpation of area of trauma, swelling of the skin, bleeding on the whole surface of the wound. Specify a drug for local use to stop the bleeding.
A. * Thrombinum
B. Calcii chloridum
C. Vikasolum
D. Aminocapronic acid
E. Ambenum

2. Drugs delaying blood coagulation (anticoagulants) are used for prevention and treatment of thrombosis. Specify an anticoagulant whose antagonist is protamine sulfate.
A. * Heparinum
B. Meodicoclmarin
C. Syncumarum
D. Phenilinum
E. Sodium hydrocitrate

3. A patient was delivered to a hospital with complaints of loss of appetite, decrease of body weight, fatigue, pain around the epigastric area. Examination of the blood revealed megaloblastic anemia. Specify the main agent for the treatment of this disease.
A. *Cyanocobalaminum
B. Ferri lactas
C. Folic acid
D. Fercovenum
E. Coamidum

4. Specify the antagonist of the anticoagulants with indirect action.
A. *Vikasolum
B. Fercovenum
C Pentoxylum
D. Protamini sulfas
E. Contrykalum

5. Specify the coagulant agent available for local use only (to stop bleedings from small blood vessels).
A. *Hemostatic sponge
B. Vikasolum
C Calcii chtoridum
D. Fibrinogen
E. Aminocapronic acid

6. Specify the thrombolytic agent which belongs to direct action plasma proteins.
A. *Fibrinolysin
B. Streptokinase
C. Contrycalum
D. Urokinase
E. Streptodecase

7. Inhibition of leukopoiesis is observed in a 43 years old roentgenologist. The amount of leukocytes $3,5*10^9$/l. Specify the agent to be used for correction of leukopoiesis.
A. *Pentoxylum
B. Ferroplexum
C. Hemostimulinum
D. Cvanocobalaminum
E. Ascorbic acid

8 A patient with myocardium infarction was admitted to the resuscitation department. What drug should be injected to the patient in order to prevent thrombosis?
A. Thyroxine
B. Dimedrol
C. Chingamin
D. Biseptol-480
+E. Heparin

9 A patient complains about shin pain which is getting worse during walking. Objectively: there is an edema and reddening along the vein. A doctor administered a direct coagulant to be applied topically. What drug can be applied for this purpose?
A. Butadion ointment
B. Salicylic ointment
C. Troxevasin ointment
+D. Heparin ointment
E. Thrombin

10 A 46-year-old female patient needs a surgery in the maxillofacial region. It is known that the patient is disposed to increased hemocoagulation. What natural anticoagulant can be used in order to prevent thrombosis?
+A. Heparin
B. Fibrinolysin
C. None of the listed drugs
D. Sodium citrate
E. Hirudin

11 In the framework of complex treatment of gingivitis a patient has been administered a drug that stimulates leucopoiesis, accelerates wound healing, enhances the growth and proliferation of cells, has the anti-inflammatory effect. It is applied for treatment of leukopenias of different genesis, in the dental practice it is used for treatment of inflammatory diseases of the oral mucosa. Identify the drug:
A. Cyanocobalamin
B. Methotrexate
C. Mercaptopurine
D. Coamide
+E. Pentoxylum

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №5. Pharmacology of metabolism		

Drugs affecting allergy and immunity. The final class «Pharmacology of metabolism»

The list of basic terms in the topic

Term	Definiton
Allergy	Response of the body in response to an allergen.
Sensibilization	Immunological-mediated hypersensitivity to antigens (allergens) of exogenous or endogenous origin.
Immediate-type allergic reaction	Allergic rash, allergic rhinitis, drug allergy, anaphylaxis, angioedema, serum sickness
Delayed hypersensitivity	Contact dermatitis, tuberculin reaction, autoimmune diseases - systemic lupus erythematosus, rheumatoid arthritis, rheumatism
Antihistamine Medications	Medications that fully or partially block the biological effects of histamine.
Immunostimulators	Medications that increase (normalize) immune responses. Use in treatment of immunodeficiency.
Immunosuppressants	The medications that inhibit the immunological reactions. Indicated for the treatment of autoimmune diseases, cancer, and transplant rejection.

Individual work

Theoretical questions:

1. Classification of antiallergic agents.
   I. Drugs that are used for allergic reactions of immediate type:
      1.1. Drugs that inhibit the release of histamine and other biologically active substances, steroids: ***Hydrocortisone Acetate, Prednisolone, Dexamethasone, Beclomethasone Dipropionate;***
      1.2. Drugs that prevent the release of mediators of allergy by sensitized basophils: ***Cromolyn Sodium, Ketotifen;***
      1.3. H_1-histamine blockers: ***Diphenhydramine, Promethazine, Fenkarol, Loratadine, Diazolin;***
      1.4. Antisense Medications - ***Gistaglobulin;***
      1.5. Inhibitors of the complement system: ***Heparin, Aminocaproic Acid;***
      1.6. Symptomatic medications:
      - adrenomimetics - ***Adrenaline Hydrochloride, Ephedrine, Mezaton***;
      - bronchodilators myotropic action - ***Aminophylline.***

   II. Anti-allergic drugs, which are assessed by delayed-type reactions: non-steroidal anti-inflammatory medications, immunosuppressants.

Pharmacodynamics, indications, side effects.

2. The basic principles of first aid in anaphylactic shock.
3. Classification of immunostimulants:
   3.1. Drugs which mainly stimulate nonspecific protective factors - purine and pyrimidine derivatives;
   3.2. Drugs of thymus: ***Timalin, T-activin;***
   3.3. Drugs which mainly stimulate macrophages: ***Prodigiozan, Pyrogenal***.
   3.4. Drugs which mainly stimulate T-cells: ***interferons, lymphokines***;
   3.5. Synthetic drugs - ***Levamisole.***

Pharmacodynamics, indications.

   3.6. Pharmacology of immunosuppressants - ***Azathioprine, Cyclosporine***, indications. Corticosteroids, cytostatics. Indications and clinical uses, side effects.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Diphenhydramine***
2. Suprastin
3. **Diazolin***
4. Fenkarol
5. **Loratadine***
6. Timalin
7. Amizon
8. Azathioprine
9. Cyclosporine
10. **Prednisolone***

Note: * – drugs for filling in the table

TASKS FOR EXTRACURRICULAR WORK

Fill in the table:

The drug, dose and form	*Mechanism of action*	*The main indications for assignment*	*Side effects and contraindications*

Prescribe as a recipe:

1. Diphenhydramine.

Rp:

2. Diazolinum.

Rp:

3. Loratadine.

Rp:

4. Timalinum.

Rp:

5. Immunostimulatory agent in tablets.

Rp:

6. Drug for treatment of anaphylactic shock.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. A 40 year-old patient working as a driver suffers from chronic conjunctivitis of an allergic genesis. Which antihistamine drug' should be administered to a patient, taking into account his profession?

A. * Diazolinum
B. Dimedrolum
C. Diprazinum
D. Suprastinum
E. Ketotifenum

2. In a 55 years old patient on the 4-th day of treatment with indomethacinum gastric hemorrhage developed due to ulcering of gastric mucous membrane. By what is the ulcerogenic effect of the drug caused ?

A. *Decrease of synthesis of prostaglandin E1
B. Decrease of synthesis of prostaglandin E2
C. Decrease of synthesis of leucotriens
D. Decrease of synthesis of cyclic endoperoxydes
E. Decrease of synthesis of thromboxane

3. After prolonged taking of a drug in relation with acute respiratory disease a patient began to complain of headache, vertigo, noise in ears, nausea, epigastric pain. Specify the drug that might cause such clinical picture.

A *Acetylsalicylic acid
B. Vitamin C
C. Naphthyzinum
D. Bromhexinum
E. Midantanum

4. In a woman, 33 years old, after long-term pharmacotherapy of chronic polyarthritis arterial hypertension, redistribution of fatty tissue, menstrual disorders were observed. What drug did the patient take?

A. *Prednisolonum
B. Indomethacinum
C. Butadionum
D. Synaphlanum
E. Beclomethasonum

5. Specify the most typical side-effects of butadionum,

A. *Dispeptis disorders
B. Suppression of the CNS
C. Hypothermia
D. Arterial hypotension
E. Allergic reactions

6. Which drug is the most preferable to local treatment of allergic dermatitis?

A. *Hydrocortisone ointment
B. Hippophea oil
C. Furacilinum solution
D. Afethyisalicylate liniment
E. Ichthyolum ointment

7. The patient with systemic lupus erythematosus was treated for a long time by non-steroid anti-inflammatory agents. However, recently his condition has considerably worsened. Which drug is necessary to administer to the patient?

A. * Prednisolone
B. Analginum (Metamizole)
C. Dimedrolum (Diphenhydramine)
D. Thymalinum
E. Polyvitamins

8. The woman of 33 years on a phone of long-lasting medicamental therapy of chronic polyarthritis, began to mark herself increase of arterial pressure, change of allocation of fatty tissue (accumulation mainly in the area of the face and neck), disorder of menstrual cycle. What drug did the patient take?

A. * Prednisolone
B. Indornethacin
C. Butadionum (Phenylbutazone)
D. Synaflanum (Fluoclnolone)
E. Beclomethasone

9. The 60 years old woman who had been suffered from arthritis of knee joint was treated for a long time by Dexamethasone. Indicate the mechanism of anti-inflammatory action of this drug?

A. *Blockade of phosphlipase A_2
B Blockade of cyclooxygenase-1
C. Blockade of cyclooxygenase- 2
D. Blockade of folate synthase
E. Blockade of folate reductase

10. The patient suffering from arthritis has been treated for several months by glucocorticoid agent Dexamethasone. Recently he has begun to complain of nausea, frequent stomach aches. Clinical examination has revealed ulcer of the stomach. What is the mechanism of ulcerogenic action of glucocorticoids?

A Inhibition of protein synthesis due to activation of gluconeqgenesis
B. Blockade of prostaglandin synthase
C. *Impairment of microcirculation in gastric mucousa
D. Initiation of n. vagus
E. Blockade of gastrin synthesis

11. A patient suffers from systemic inflammatory affection of connective tissue. Indicate the drug inhibiting all phases of inflammation which should be administered to the patient?
A. *Dexamethasone
B. Butadionum (Phenylbutazone)
C. Contrycal (Aprothtin)
D. Indomethacine
E. Diclofenac-sodium

12. Nonsteroid anti-inflammatory agents are effective at treatment of rheumatic disease owing to ability to oppress:
A. *Cyclooxygenase-2
B. Phospholipase-A2
C. Cyclooxygenase-1
D. Adenylatcyclase
E. Peroxidase

13. It is known, that nonsteroid anti-inflammatory drugs are widely used for treatment of rheumatic disease. They influence which of the inflammatory process?
A. *Exudative
B. Phase of alteration
C. Phase of a proliferation
D. All phases of an inflammation
E. Autoimmune

14. The patient was treated by nonopioid analgesic due to backache. In several days he started to complain of dyspeptic disorders and stomachache (in anamnesis the patient had hyperacidic gastritis). Indicate the reason for the arisen complication.
A.* Inhibition of synthesis of prostaglandins in gastric mucosa
B. Stimulation of parasympathetic innervation by the stomach
C. Inhibiton of mucous production by the gastric mucosa
D. Inhibition of regeneratory activity of the gastric mucosa
E. Inhibition of organotrophic sympathetic influences upon the stomach

15. Following signs have developed at the patient after several days of treatment by the drug with analgesic, antipyretic and anti-inflammatory activity: headache, giddiness, sonitus, nausea, pain in epigastric area. Specify the drug which could produce similar clinical pattern.
A. * Aspirin
B. Naphthyzinum (naphazoline)
C. Bromhexinum
D. Midantanum (amantadine)
E. Vitamin C

16. The doctor has administered an ointment containing anti-infiammatory agent from the group of pyrazolone derivatives to the patient with arthritis of maxillofacial joint. What agent is contained in the ointment?
A. * Butadionum (phenylbutazone)
B. Mefetmmic acid
C. Ibufrofenum
D. Indomethacinum
E. Diclofenac-sodium

17. Indicate the drug from the group of nonsteroid anti-inflammatory agents which exerts the most prominent anti-inflammatory action in collagenoses?
A. *Iindomethacinum
B. Aspirin (acetylsalicylic acid)
C. Ibuprofenum
D. Butadionum (phenylbutazone)
E. Ortophenum (diclofenac-sodium)

18. The 55 years old patient, developed gastric hemorrhage on the 7-th day of treatment with Indomethacinum. Indicate the pharmacological effect of the drug which explains this complication.
A. * Diminution of formation of Prostaglandin El
B. Diminution of formation of letuotrien
C Diminution of formation of Prostaglandin E2
D. Diminution of formation of cyclic endoperoxides
E. Diminution of formation of thromboxane

19. Reduce of influence on which molecular substrate leads to decrease of ulcerogenic action of nonsteroid anti-inflammatory agents?
A. *Cyclooxvgenase-1
B. Kallikrein
C. Lysosomal enzymes
D. Cyclooxvgenase-2
E. Adenylate cyclase

20. The 63 years old patient with arthritis on a background of treatment by aspirin (acetyisalicylic acid) has complained of nausea, gravity in epigastrium. The doctor has abolished aspirin and has administered the antiinflammatory agent from the group of selective COX-2 inhibitors. Indicate this drug.
A. *Meloxicam'
B. Voltarenum (diclofenac-sodium)
C. Indomethacinum
D. Naproxenum
E. Butadionum (phenylbutazone)

21. Dimedrolum (diphenhydramine) is administered to a patient with urticaria to reduce itching rashes on the skin. What mechanism provides its efficiency in this case?
A. * Competitive blockade of HI-histamine receptors
B. Inhibition of synthesis of histamine
C. Suppression of release of histamine
D. Acceleration of histamine destruction
E. Blockade of H2-his famine receptors

22. What drug should be administered to the patient who suffers from rashes due to allergic reaction accompanied by reddening, edema, and strong itch of skin which causes sleeplessness?
A. *Dimedrolum (diphenhydramine)
B. Nitrazepamum
C. Chlorall hydrate
D. Natrii oxybutyrate (oxybate sodium)
E. Phenobarbitalum

23. The patient with allergic rhinitis has taken antihistamine drug PO. In an hour the patient felt dryness in mouth, retardation and sleepiness. Indicate this drug.
A. *Dimedrolum (Diphenhydramine)
B. Diazolinum (Mebhydrolin)
C. Phenobarbitalum
D. Diazepamum
E. Paracetamolum

24. Indicate "day time" antihistamine agent (with the least expressed sedative and hypnotic activity).
A. *Diazofinum (Mebhydroline)
B. Dirnedrplum diphenhydramine)
C. Diprazinum (Promethazine) [1]
D. Tavegilum (Clemastine}
E. Suprastinum (Chloropyramine)

25. A 40 years old outpatient (driver) suffers from chronic conjunctivae, of allergic genesis. What antihistamine drug is necessary to administer taking into account his occupation?
A. *Diazolinum (Mebhydroline)
B. Diprazinum (Promethazine)
C. Suprastinum (Chloropyramine)
D Dimedrolum (Diphenhydramine)
E. Ketotifenum

26. It is necessary to administer antihistaminic agent to a patient work requires mental concentration. Indicate this drug.
A. * Diazolinum (Mebhydroline)
B. Dimedrolum (Diphenhydramine)
C. Diprazinum (Promethazine)
D. Suprastinum (Chloropyramine)
E. Phencarolum (Ouifenadine)

27 It is necessary to administer antihistaminic agent to a woman suffering from seasonal vasomotor rhinitis, who works

as a dispatcher on the railway. Indicate the drug from this group which doesn't possess sedative and hypnotic properties.

A. * Diazolinum (Mebhydroline
B. Dimedrolum (Diphenhydramine)
C. Diprazinum (Promethazine)
D. Suprastinum (Chtoropyraine)
E. Tavegilum (Clemastine)

28. A girl was treated with antibiotic from the group of semisynthetic Penicillins due to acute bronchitis. On the 3rd day of treatment allergic dermatosis has developed. Indicate an antiallergic drug which should be administered to the patient.

A. * Suprastinum (Chloropyramine)
B. Levamisole
C. Aspirin (Acetylsalicylic acid)
D. Biseptol (Co-trimoxazole)
E. Mefenamic acid

29. Allergic dermatitis has been diagnosed in a patient of 43. The doctor has administered to him complex therapy including the blocker of HI-histamine receptors. Indicate this drug.

A. *Diprazinum (promethazine)
B. Cromolin sodium (cromoglicic acid)
C. Prednisolone
D. Adrenaline
E. Hydrocortisone

30. Indicate the group of antiallergic agents which loratadine belongs to.

A. * Blockers of histamine receptors
B. Membrane stabilizers
C. Antagonists of leucotriene receptors
D. Glucocorticoids
E. Blockers of serotonine receptors

31. Treatment by anti-inflammatory drugs was administered to the patient with rheumatic endocarditis. After a while hyperglycemia was seen in. What group of drugs is capable to provoke such side-effect?

A. * Glucocorticoids
B. Antibiotics of the group of Penicillins
C. Ascorbic acid
D. Sedatives
E. Nonsteroid anti-inflammatory agents

32. The patient of 35 years, suffering from bronchial asthma, is hospitalized in a state of anaphylactic shock. Which of the numbered drugs is necessary to introduce first of all as first aid?

A. *Adrenaline
B. Dimedrolum (diphenhydramine)
C. Chromoglicic acid
D. Salbutamol
E. Ephedrine

33. The patient of 35 years, suffering from bronchial asthma, is hospitalized in a state of anaphylactic shock. Which of the numbered drugs is necessary to introduce first of all as first aid?

A. *Adrenaline
B. Dimedrolum (diphenhydramine)
C. Chromoglicic acid
D. Salbutamol
E. Ephedrine

34. Anaphylactic shock was developed at the patient after intracutaneous test on sensitivity to Penicillin. The doctor had administered a drug which eliminated bronchospasm and arterial hypotension, indicate this drug.

A. * Adrenaline
B. Noradrenaline
C. Mesatonum (Phenylephine)
D. Atropine
E. Salbutamol

35. Many kinds of pathological states (inflammation, pulmonary edema, shock of different origin) are accompanied by violation of permeability of vessels. Which of the listed below drugs can be used for elimination of this reaction at any of the termed states?

A. * Prednisolone
B. Indomethacinum
C. Dimedrolum (diphenhydramine)
D. Aspirin (acetylsalicylic acid)
E. Beclomethasone

36. Indicate the drug which is the most expedient for use to topical treatment of allergic dermatitises?

A. *Hydrocortisone ointment
B. Solution of furacilinum (nitcofural)
C. Liniment of n>ethylsalicylate
D. Ointment of ichthyolum (ichthammot)
E. Sea buckthorn oil (Oleum Hippophae)

37. The patient with chronic relapsing dermatitis of allergic genesis requires treatment by a glucocorticoid agent. Indicate the drug from this group which exerts only local action on skin and does not cause systemic side-effects.

A. * Synaflanum (fluocinolone)
B. Prednisolone
C. Hydrocortisone
D. Dexamethasone
E. Triamcinolone

38. A doctor administered chromoglycic acid to the patient suffering from bronchial asthma to prevent attacks. Indicate the principle of action of this drug.

A. *Stabilization of membranes of mast cells
B. Binding of free histamine
C. Decrease of concentrations of immunoglobulins
D. Inactivation of histamine
E. Blockade of histamine receptors

39. A 45 years old patient suffers horn seasonal allergic rhinitis related lo blooming of ragweed. What agent should be used for prevention of this disease?

A. *Ketotifenum
B. Phencarolum (quifenadine)
C. Diazolinum (mebhydroline)
D. Tavegilum (clemastine)
E. Dimedrolum (diphenhydramine)

40. The patient took Levomycetinuin (chloramphenicole) for a long time without doctor's permission. Now the patient's examination revealed leucopnia. What drug should be administered for stimulation of leucopoiesis.

A.* Pentoxytum
B. Methotrexate
C. Mercaptopurine
D. Cyancobalamine
E. Prednisolone

41. The patient with chronic infection disease requires treatment with specific immunostimulant agent. Indicate this drug.

A. *Pentoxylum
B. Methotrexate
C. Mercaptopurine
D. Actinomycin
E. Cyclophosphanum

42. 48 years old woman who is from exacerbation of chronic pneumonia requires treatment with stimulant agent. Indicate this drug.

A. *Thymalinum
B. Sulfocamphocainum
C. Biseptol (co-trimoxazole)
D. Dimedrolum (diphenhydramine)
E. Levamisole

43. Indexes of immune response are worsened in a patient during chemotherapy of malignant tumour. What drug should be administered in this state?

A. * Thymalinum
B. Cyancobalamine
C. Iron preparations
D. Prednisolone
E. Acetylsalicylic acid

44. A drug from the group of immunostimulant which is an analogue of natural biogenic substrate and almost doesn't

exert side effects is administered to a 4 years old child. Indicate this drug.

A. * Interferon
B. Prodigiosanuin
C. Thymalinum
D. Pyrogenatum
E. Levamisole

45. Indicate the immunostimulant drug which is also well known as antihelmintic agent.

A. * Levamisole
B. Interferon
C. Methyluracil
D. Pyrantelum
E. Natrium nucleinate

46. A patient suffering from chronic generalized parodontics requires the treatment with immunostimulant agent which possess anthelmintic activity. Indicate this drug.

A. *Levamisole
B. Seeds of pumpkin
C. Pyrantelum
D. Chloxile
E. Piperazine adipate

47. Indicate the drug which significantly increases body temperature.

A. *Pyrogenatum
B. Acetylsalicylic acid
C. Methyluracil
D. Aminazine (Chlorpromiazine)
E. Molgramostim

48. A 45-year-old woman suffers from allergic seasonal coryza caused by Ambrosia blossoming. What drug from the group of stabilizers of mast cells can be used for prevention of the disease?

A. *Ketotifen
B. Phencaroi
C. Tavegil
D. Dimedrol
E. Diazoline

49 A patient has allergic rhinitis with profuse mucous discharges, itching, frequent sneezing. What drug should be chosen if you know that it selectively blocks histamine receptors?
A. Adrenaline hydrochloride
+B. Loratadine
C. Prednisolone
D. Naphthizin
E. Mesatonum

50 A 12-year-old child presents with intolerance to some foodstuffs. Their consumption causes an allergic reaction in form of itching skin eruption. What antihistaminic drug should be administered that won't have any negative impact on the child's school studies (with no sleepiness effect)?
A. Sodium diclofenac
+B. Loratadine
C. Dimedrol
D. Aminophylline
E. Mesatonum

51 A 30-year-old driver complains of allergic rhinitis that usually excerbates in spring. He has been administered an antihistamine drug with a slight sedative effect and 24-hour period of action. Which of the listed drugs has been administered?
A. Dimedrol
B. Heparin
+C. Loratadine
D. Vicasol
E. Oxytocin

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №6. Drugs affecting the functions of peripheral executive systems and organs		
Pharmacology of the respiratory system		

The list of basic terms in the topic

Term	Definiton
Cough	Reflex act, which is coordinated by the cough center (medulla oblongata) and its defensive reaction, helps eliminate irritants from the respiratory tract.
Expectorant	Medicinal Medications, which contribute to facilitate sputum, discharge.
Antitussive drug	Medicinal Medications, which suppress the cough's different mechanisms.

Individual work

Theoretical questions:

1. Expectorants. Classification by mechanism of action. Pharmacological characteristics of secretory and mucolytic medications: ***Thermopsis grass infusion, decoction of marshmallow root, Mukaltin, Crystalline trypsin, Bromhexine, Ambroxol, NAC.*** Pharmacokinetics and pharmacodynamics. Side effects.
2. Amphetamine synthesis of surfactant. General characteristics of the funds. Pharmacological characteristics, indications ***Ambroxol (Mucosolvan).***
3. Antitussive Medications. Classification. General characteristics of the products of the central and peripheral actions: ***Codeine Phosphate, Glautsin, Oxeladin, Libexin, Butamirat***. Indications. Side effects.
4. Bronchodilator medications. Classification. Pharmacology of adrenoagonists Medications: ***Salbutamol, Ortsiprenalin sulphate, Fenoterol***. Pharmacology of M-cholinergic antagonists: ***Ipratropium bromide (Atrovent), Platifillin***. Pharmacology of myotropic bronchodilators: ***Theophylline, Aminophylline, Papaverine.*** Pharmacokinetics, pharmacodynamics, side effects.
5. Possibility of allergy and desensitizing agents for the treatment of bronchial asthma ***(Cromolyn Sodium, Ketotifen).***
6. The use of hormonal anti-inflammatory Medications in the treatment of bronchial asthma ***(Fluticasone propionate, Beclomethasone dipropionate, Triamcinolone).***
7. Respiratory stimulants. Classification. Pharmacological characteristics of Medications: ***Etimizol, Sulfocamfocain, Cordiamin, Carbogen.*** Indications and clinical uses, side effects.
8. Drugs which are used in pulmonary edema. Tactics assistance with pulmonary edema, the choice of treatment ***(cardiac glycosides, ganglionic, diuretics, adrenergic agonists, narcotic analgesics, alcohol, steroids).***

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Sulfocamfocain***
2. Montelukast
3. Kodterpin
4. Glaucine hydrochloride
5. **Libexin***
6. Acetylcysteine
7. Kordiamin
8. **Ambroxol***
9. **Salbutamol***
10. **Ipratropium bromide***
11. **Aminophylline***
12. Ketotifen
13. **Beclomethasone dipropionate***
14. Fluticasone propionate

Note: * – drugs for filling in the table

TASKS FOR EXTRACURRICULAR WORK

Fill in the table:

The drug, dose and form	*Mechanism of action*	*The main indications for assignment*	*Side effects u contraindications*

Prescribe as a recipe:

1. Libexin.

Rp:

2. Ambroxol.

Rp:

3. Aminophylline.

Rp:

4. Beclomethasone dipropionate.

Rp:

5. Centrally active antihypertensive agent with a strong cough.

Rp:

6. Drugs for prevention of bronchial asthma attacks.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. A patient who had been suffering from chronic bronchitis, was treated with an expectorant drug. In a week the symptoms of rhinitis, tearing, itching of the skin and rashes appeared. What agent may cause these side effects.

A. * Potassium iodide
B. Terpinhydratum
C Acetylcysteinum
D. Infusum herbae Thermopsidis
E. Alatriihydrocarbonas

2. A 40 year old patient has been suffering from bronchial asthma, accompanied with cardiac arrythmia (tachycardia) for 10 years. Indicate adrenomimetic which should be administered for treatment taking into account accompanied disease.

A. *Salbutamol
B. Adrenaline
C. Isadrinum
D. Orciprenalin
E. Ephedrine

3. Indicate broncholytic which should be administered to a patient suffering from bronchial asthma accompanied with stenocardia.

A *Salbutamol
B. Ephedrine
C. Isadrinum
D. Orciprenalin
E. Adrenaline

4. A child was born with asphyxia. What agent is necessary to introduce for stimulation of breath?

A. Promedolum
B.*Aetlumlzole
C. Prazozin
D. Atropine
E. Proserinum

5. Specify an analeptic which possesses sedative activity and can be used as desensibilizing agent in bronchial asthma

A. *Aethimizole
B. Camphor
C. Cordiaminum
D. Carbogen
E. Dimedrolum

6. Indicate antitussive agent possessing properties of opioid analgesics

A.*Codeine
B. Libexinum
C. Tussuprex
D. Glaucine
E. FalimInt

7. An antitussive agent (1 tablet 3 times a day) was administered to a patient. Cough has decreased but the patient has started complaining of dizziness, general weakness and arterial hypotension has been' revealed. Indicate the drug.

A. *Glaucine
B. Codeine
C Libexinum
(prenoxdiazine)
D. Oxeladine
E. Faiimint

8. Indicate the drug oppressing a peripheral link of cough reflex

A. * Libexinum
B. Codeine phosphate
C. Ethylmorphine hydrochloride
D. Bromhexinum
E. Atropine suifate

9. The mechanism of expectorant' action of Thermopsis herb infusion is:

A. *It stimulates bronchial secretion reflexively irritating the stomach receptors
B. Directly stimulates peristalsis of bronchial smooth muscles
C. It destroys proteins of sputum
D. Irritates bronchial glands during excretion that leads to stimulation of their secretion
E. It inhibits the cough center

10. Indicate an expectorant agent possessing the reflex type of action

A, * Thermopsis herb infusion
B. Bromhexinum
C. Acetylcysteine
D. Trypsine

E. Potassium iodide

11. A patient with acute bronchitis I suffers from intolerable dry cough. What from the enumerated agents can transform dry cough into wet cough?
A. *Thermopsis grass infusion
B. Codeine phosphate
C. Libexinum
D. Glaucine hydrochloride
E. Falimint

12. Indicate an expectorant agent that is an inorganic substance and is usually used orally as a solution, rarely as an inhalation and exerts direct irritating action on bronchial glands.
A. *Kalium iodide
B. Bromhexinum
C. Trypsin
D. Acetylcysteine
E. Libexinum

13. Mark the group of drugs used for elimination of bronchial asthma attacks
A. *Beta-adrenomimetics
B. M-chotinomimetics
C. Sympatholytics
D. Beta-adrenoblockers
E. M-chotinomimetics

14. A patient with bronchial asthma was treated with the combined drug in tablets that caused insomnia, irritability, headache and rise of arterial pressure. What agent could cause these side-effects?
A. *Ephedrine
B. Adrenaline
C. Libexinum
D. Euphyliinum
E. Furosemide

15. A patient suffering from bronchial asthma was treated with the drug that caused in several days insomnia and tachycardia. Indicate this drug.
A. * Ephedrine
B. Plathyphylline
C. Adrenaline
D. Euphyllinum (aminiphylline)
E. Salbutamolum

16. Indicate the mechanism of the broncholytic effect of adrenaline
A. * Stimulation of beta2-adrenoceptors
B. Stimulation of beta1 and beta2-adnenoceptors
C Blockade of beta2-adrenoreceptors
D. Stimulation of alpha1 and alpha2-adrenoceptors
E. Blockade of N-cholinoceptors

17. Indicate the diuretic agent which should be used to treat pulmonary edema
A. *Furosemide
B. Hydrochlorthiazide
C. Triamteren
D. Spironolactone
E. Acetazolamide (diacarbum)

18. Indicate the drug used for elimination of pulmonary edema caused by systemic arterial hypertension.
A. * Pentaminum
B. Strophanthin
C Bemegridum
D. Cordiaminum
E. Spiritus aethylicus

19. Indicate the drug used in pulmonary edema accompanied by formation of foam to decrease superficial tension of bubbles to turn foam into
A. *Spiritus aethylicus
B. Pentaminum
C. Strophanthin
D. Bemegridum
E Cordiaminum (nikethamide)

20 A female patient suffering from acute bronchitis complains about respiratory obstruction and cough with thick viscous sputum. She was prescribed a mucolytic agent that stimulates surfactant synthesis. What mucolytic agent was prescribed?
A. Glaucin
B. Theophylline
C. Morphine hydrochloride
D. Sodium hydrocarbonate
+E. Ambroxolum

21 A patient with chronic bronchitis has been administered an expectorant that disintegrates disulphide bonds of sputum glycosaminoglycan thus reducing its viscosity. The patient has been also warned about possible bronchospasm. What drug has been administered?
A. Sodium hydrocarbonate
B. Thermopsis herb
C. Bromhexine
+D. Acetylcysteine
E. Libxine

22 A patient has acute laryngotracheitis with nonproductive cough that is very exhaustive. Prescribe an antitussive drug:
A. Mucaltin
B. Ambroxol
+C. Glaucine
D. Herba Thermopsidis
E. Acetylcystein

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №6. Drugs affecting the functions of peripheral executive systems and organs		
Pharmacology of the gastrointestinal (digestive) system		

The list of basic terms in the topic

Term	Definiton
Anorexia	Lack of appetite
Bulimia	Excessive eating, gluttony
Cachexia	Emaciation
Anorectic	Medications,which are suppressing appetite
Antisecrets	Medications, which suppress gastric secretion (formation of hydrochloric acid and pepsin)
Antacids	Medications,which are neutralizing already allocated hydrochloric acid
Coattails (patronage)	Protection
Hepatoprotection, gastroprotection	Medications,which protect hepatocytes and gastric mucosa from damage, increase the stability of these organs to pathological or toxic effects
Choleretics	Medications,which increase the secretion of (generation) hepatocyte bile
Cholagoga	Medications, which are conducive to active ejection of bile from bile cyst.
Holeoletisc medications	Medications, which are capable to dissolve gallstones (cholesterol) stones.
Prokinetic effect	Ability to raise the tone of the stomach and intestines, increase their motility (reducing top-down), accelerates gastric emptying
Reparants	Medications wich facilitate to healing and recovery

Individual work

Theoretical questions:

1. Drug which are affecting appetite. Stimulate the appetite: bitterness **(*Tincture bitter*),** insulin, anabolic drugs. Their use for the treatment of anorexia, cachexia. Anorectics, are used to treat bulimia and obesity. Pharmacology **Orlistat (Xenical).**
2. Stimulants of gastric secretion **(Pentagastrin, Histamine)** and medications of replacement therapy ***(Natural gastric juice, Pepsin, Hydrochloric acid, Acidin-Pepsin, Pepcid).*** Indications.
3. Medications, which suppress gastric secretion (antisekretics). Pharmacological characteristics of the M-cholinergic antagonists: Pirenzepine ***(Gastrotsepin),*** H2-histamine blockers ***(Ranitidine, Famotidine),*** proton pump blockers ***(Omeprazole).*** Their use in treatment of peptic ulcer, hyperacidity gastritis, reflux esophagitis.
4. Pharmacological characteristics of antacids, which reduce acidity of gastric juice ***(Sodium Hydrogen Carbonate, Magnesium Oxide, Aluminum Hydroxide).*** Use in clinical practice combined antacid***(Almagel,Maalox).***
5. Pharmacological characteristics of the local action of antacid **(Sucralfate, De-Nol)** that offer mechanical protection of the mucous membrane, as well as Medications to enhance mucosal resistance to damaging factors (Misoprostol). Indications for their use. The concept of gastroprotectors
6. Medications of substitute therapy in low excretory function of the pancreas ***(Pancreatin Panzinorm forte, Festal, Mezim forte, Creon).*** Indications.
7. Antienzymatic or antiproteases Medications of oppressive excretory function of the pancreas ***(Contrycal, Aminocaproic Acid).*** Indications.

8. Bile Medications: 1) increasing the formation of bile (choleretics - ***Allohol, Holenzim***), 2) enhancing the flow of bile (cholekinetics - ***Magnesium sulfate***), and 3)choleantispasmodic (***Atropine, No-spa***), 4) plant origin ***(Flowers Immortelle, Corn stigmas hips, Holosas).*** Indications and clinical uses of different groups cholagogue.
9. Hepatic (***Legalon, Darcy, Essentiale, Gepabene, Thiotriazolin)*** and cholelitazis (***Henofalk, Ursofalk***) medications. Indications.
10. Medications,which are stimulating motility and are used to treat stomach and intestinal atony: M-cholinomimetics and anticholinesterase (***Neostigmine***) antagonists of dopamine and serotonin receptors (***Motilium or Domperidone, Metoclopramide***).
11. Centrally acting emetics (***Apomorphine***), mechanism of action, the possible use.
12. Laxatives, classification and localization of the origin. Saline laxatives (Magnesium sulfate), laxatives containing antraglycosides (***Senadexin***), vegetable oils (***Castor Oil***), synthetic ***(Guttalax, Bisacodyl, Dufolak***), combined (***Kafiol, Regulax***). Mechanisms of action, indications and clinical uses.
13. Medications,which oppress motility and eliminate spasms of smooth muscles: M-holinoblocators(Atropine), antispasmodics (No-spa), a combination of drugs (or Baralgin Spazgan),ganglionic. Indications.
14. Antiemetics central action: neuroleptics (Etaperazin, Tietilpirazin or Torekan), M-cholinoblockers, histamine blockers, dopamine and serotonin receptors (Motilium, Metoclopramide, Ondansetron). Their pharmacological characteristics, indications and contraindications.
15. Antiemetic peripheral (reflex) effects: local anesthetics (Anestezin) overlying (Menthol). Their possible application.
16. Antidiarrheals binder, coating, absorbent action, synthetic opioids (***Loperamide or Imodium***), salt preparations, anti-microbials. Antiflatulents (***Peppermint, Chamomile, Espumizan)***. Indications.
17. Drugs which are stimulating repair processes (reparants) for the treatment of gastric ulcers ***(Sea Buckthorn Oil, Dalargin).***

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Thiotriazolin***
2. **Metoclopramide***
3. **Omeprazole***
4. **Pirenzepine***
5. **Ranitidine***
6. **Almagel***
7. Pancreatin
8. **Contrycal***
9. **Ondansetron***
18.
10. Apomorphine hydrochloride
11. Allohol
12. Maalox
13. **Essentiale***
14. Magnesium sulfate
15. Buckthorn extract dry
16. **Bisacodyl***
17. Loperamide

Note: * – drugs for filling in the table

TASK FOR AN EXTRACURRICULAR WORK

Fill in the table:

The drug, dose and the form of	*Mechanism of action*	*The main indications for assignment*	*Side effect and contraindications*

Prescribe as a recipe:

1. Metoclopramide.

Rp:

2. Omeprazole.

Rp:

3. Essentiale.

Rp:

4. Loperamide.

Rp:

5. Drug for patients with severe pain, caused by hypersecretion and acidity of gastric juice.

Rp:

6. Drug for chronic constipation, caused by colon low blood pressure.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. The patient was admitted to the hospital with the diagnosis: peptic ulcer of the duodenum bulbus. Analysis of his gastric juice revealed increased acidity. Choose the agent which decreases the secretory ability of gastric glands due to blockade of H_2-histaminic receptors.
   A. *Panitidinum
   B. Extract of belladonna
   C. Atropinum
   D. Methacinum
   E. Platyphytlinum

2. A 25 year-old man, suffering from peptic ulcer of the stomach, has been treated with omeprasole. In 3 weeks the ulcer was healed. What mechanism of action does this drug produce?
   A. * Blockade of H^+-K^+-ANP-ase (the proton pump)
   B. Blockade of M-cholinoceptors
   C. Blockade of synthesis of Gastrin
   D. Blockade of H^+-K^+-ANP ase
   E. Blockade of H_1 histaminic receptors

3. Patient who had been suffering from chronic gastritis was treated with an antacidic drug, after introduction of which he felt better however at the same time he experienced bloating of the stomach together with eructation. Indicate the drug which might cause this side effect.
   A. *Natrii hydrocarbonas
   B. Magnesu trisilicate
   C. Magnesii oxydum
   D. Almagel
   E Aluminii hydroxydum

4. Indicate the drug to stimulate appetite, mechanism of action of which is associated with irritation of the mucus membrane of the oral cavity, that leads to reflex excitation of the hunger center in the hypothalamus.
   A. *Absinthium tincture
   B. Phepranonum
   C. Desopimonum
   D. Fenfluramine
   E. Insulin

5. Indicate the drug which increases appetite due to decrease of glucose concentration in the blood
   A. *Insulin
   B. Mazindolum
   C. Fenfluramine
   D. Absinthium tincture
   E. Phepranonum

6. A 32 year old patient who had been suffering from the ulcer of the duodenal bulb was treated with Farmotidin which caused him to feel better. Indicate the mechanism of action of this agent.
   A. *Blockade of H2-histaminic receptors
   B. Inhibition of gastrin release
   C. Suppression of the function of the gastric mucosal cells
   D. Decrease of release of hydrochloric acid
   E. Decrease of pepsin release

7. A patient suffering from chronic hypoacidic gastritis with remained secretory function requires administration of an agent which is physiological stimulant of the gastric glands. Indicate this agent
   A. *Carbonaceous mineral water
   B. Pepsin
   C. Histamine
   D. Diluted hydrochloric acid
   E. Natural gastric juice

8. A patient with essential hypertension was treated for a long period of time with preparations containing reserpin. During last 2-3 months he started to suffer from pains in the region of stomach, heartburn and nausea. The diagnosis of hyperacidic gastritis was made after the clinical examination. Indicate the

group of drugs which possesses etiotropic curative action in this case.
A. *M-cholinoblockers
B. Astringent agents
C. Antiacidic agents
D. Inhibitors of proton pump
E. H_2-histamine receptors blockers

9. Indicate the remedy increasing bile secretion:
A. *Oxaphenamidum
B. Apomorphine
C. Cimetidine
D. Almagel
E. No-Spa (drotaverine)

10. Indicate the agent which stimulates contraction of gall bladder smooth muscle and causes evacuation of bile into the intestine?
A. *Magnesium sulfate in enteral introduction
B. Magnesium sulfate in parenteral introduction
C. Dehydrocholic acid
D. Legaion (silimar in)
E. No-Spa (drotaverine)

11. Indicate the agent which may be used in an attack of biliary colic to relax smooth muscles?
A. *Platyphyllinum
B. Paracetamolum
C. Analginum (metamizole)
D. Pentazocine
E. Morphine

12. A 40 years old patient was admitted to the hospital with the biliary colic attack. What agent should be administered in this case?
A. *No-spa (drotaverine)
B. Almagel
C Pancreatin
D. Contrycal (aprotinine)
E. Metoclopramide

13. Indicate the drug from the group of myotropic spasmolytics which is suitable to eliminate pain in intestinal colic
A. *Papaverine
B. Neostigmine (proserinum)
C. Piridostigmine
D. Pilocarpine
E. Prazosine

14. Indicate a cholagogue agent used for treatment of chronic cholecystitis
A. *Allocnolum
B. Absinthium (sagebrush) tincture
C. Metoclopramide
D. Almagel
E. Plathyphyllin

15. Specify an agent from the group of hepatoprotectors which restores normal structure and function of hepatocytes, used in different liver deseases.
A. * Essentiale
B. Tetracycline
C. Cholenzymum
D. Tocopherol acetate
E. Allocholum

16. Indicate the drug, which is used in chronic pancreatitis, accompanied by enzymes insufficiency, for improvement of digestion processes.
A. *Festalum
B. Pepsin
C Acidin-pepsinum
D. Natural gastric Juice
E. Diluted nydrocnloric acid

17. Why is contrycal (aprotinine) used in the case of acute pancreatitis?
A. *It inactivates trypsin which causes autolysis of pancreas
B. It opens Oddies sphincter
C. It reduces the activity of hyaluronidase
D. It impairs secretion of trypsinogen
E. It oppresses secretion of bile

18. Indicate an anti-enzymatic agent inhibiting activity of trypsin, kallikrein and fibrinolysis
A. *Contrycal (aprotinine)
B. Cholenzymum
E. Pancreatin
D. Pancreozymin
E. Festal

19. A 37-year-old man was admitted to the surgical department with the symptoms of pancreatitis: vomiting, diarrhea, bradycardia, hypotension, weakness, dehydration. What medicine should be used first of all?
A. *Contrycal
B. Etaperazine
C. No-spa
D. Platyphylline
E. Ephedrine

20. A patient with acute condition of duodenal ulcer was admitted to the hospital. Gastric juice analysis has shown increase of secretory and acid-producing function of stomach Choose a medication that will reduce secretory function due to blockade of H2-receptors:
A. Atropine
++B. Ranitidine
C. Platyphyllin
D. Methacin
E. Belladonna bell extraction

21 An elderly patient has chronic constipations induced by large intestine hypotonia. What drug should be administered?
A. Atropine
B. Sodium sulphate
C. Novocaine amide
D. Castor oil
+E. Bisacodyl

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №6. Drugs affecting the functions of peripheral executive systems and organs		

Pharmacology of blood circulation. Antihypertensive and hypertensive drugs. Antihyperlipidemic drugs. Angioprotectors

The list of basic terms in the topic

Term	Definiton
Antihypertensive (hypotensive)	Medications of reducing systemic blood pressure. Used for the treatment and prevention of hypertension, as well as other pathological conditions involving spasm of peripheral vessels.
Hypertensive (hypertensive) crisis	The sudden rise in blood pressure requiring immediate reduce it to prevent damage to target organs (heart, brain, kidneys)
Hypertension Medications	Medications that cause the increase of systemic blood pressure. Used with arterial hypotensive states
Atherosclerosis	Chronic degenerative and proliferative process of the arterial wall, which is accompanied by the accumulation of lipids in the arterial wall, plaque formation, decreased elasticity and impaired perfusion
Antisclerotic(antihyperlipidemic, hypolipidemic) funds	Medications, which hinder or promote regression of atherosclerosis in the body
Antioxidants	Medications that inhibit free radical oxidation of lipids
Angioprotectors	Medications that improve microcirculation, reduce vascular permeability, reduce the swelling of blood vessels, and improve metabolic processes in the vessel wall.

Individual work

Theoretical questions:

1. Factors that are contributing the development of hypertension.
2. Classification of antihypertensive drugs on the point of the application:

I. Neurotropic:
- The central action:
sedatives - ***bromides, drugs Motherwort and Valerian, Magnesium Sulfate; tranquilizers - Sibazon;***
hypnotics - ***Phenobarbital;***
stimulants of the central α2-adrenoceptors - ***Clonidine, Methyldopa;***
- Peripheral actions:
ganglionic - ***Hexamethonium benzosulfonate, Pentamin, Trepirium iodide;***
sympatholytic - ***Reserpine, Raunatin, Oktadin;***
α1-blockers - ***Prazosin, Doxazosin, Terazosin;***
β-blockers - ***Inderal (propranolol), Atenolol, Talinolol, Metoprolol;***
α-β-blockers - ***Labetalol, Carvedilol.***
II. Myotropic (peripheral vasodilators):
Papaverine Hydrochloride, Drotaverine (No-spa) Dibazol Apressin (Hydralazine), Sodium Nitroprusside, Pentoxifylline (Trental), Magnesium Sulfate.
III. Calcium antagonists (calcium channel blockers) - ***Nifedipine, Amlodipine.***
IV. Activators of potassium channels - ***Minoxidil, Nicorandil.***
V. Drugs, which are affecting the renin-angiotensin system:

- ACE inhibitors - ***Captopril (Capoten), Enalapril (Ranitek), Lisinopril;***
- Blockers, angiotensin-II - ***Losartan.***

VI. Drugs, which are regulating water-salt metabolism (diuretics) - ***Furosemide, Hydrochlorthiazide, Spironolactone, Indapamide (Arifon).***

The main group (WHO recommendations):

diuretics, β-blockers, ACE inhibitors, calcium channel blockers, α1-blockers, angiotensin II receptor blockers.

An additional group:

central α2-adrenergic agonists, sympatholytic, peripheral vasodilators.

3. Comparative characteristics of drugs of reduced groups, the rate of hypotensive effect, possible side effects, prevention and elimination.
4. Principles of combinations of antihypertensive drugs. Combination of antihypertensives ***(Papazol, Adelfan, Sinepres, Brinerdin, Kristepin, Renitec etc.).***
5. Medical assistance in hypertensive crisis ***(Magnesium Sulfate, Furosemide, Clonidine, Pentamin, Chlorpromazine, etc.).***
6. Hypertensive agents. Classification of mechanism of action:

I. Medications,which are stimulating the vasomotor center (analeptics - ***Caffeine Kordiamin***).

II. Medications of tonic CNS and cardiovascular system (adaptogens ***- Tincture and Liquid Extract of Ginseng, Rhodiola rosea, Siberian Ginseng, Schisandra, Pantocrin***).

III. Medications of peripheral vasoconstriction and cardiac effects:

- Stimulators of α-and β-adrenergic receptors, dopamine receptors and blood vessels of the heart (***Epinephrine hydrochloride, Ephedrine hydrochloride, Dopamine***);
- A-adrenergic stimulants (***Norepinephrine gidrotartrat, Mezaton***);
- Gormons (***Vasopressin, Prednisolone***);
- Cardiac facilities (***Strophanthin, Korglikon, Dobutamine***).

7. Features of the application of hypertensive patients with arterial hypotension, shock of different etiology, acute cardiac and vascular disease.
8. The concept of antiatherosclerotic vehicles and their classification according to the mechanism of action.
9. Pharmacodynamics, comparative characteristics of lipid-lowering drugs,cholesterol absorption inhibitors (***Cholestyramine, Polisponin***). Pharmacokinetics.Indications. Contraindications. Side effects.
10. Pharmacodynamics, comparative characteristics of lipid-lowering drugs synthesis inhibitors and transport of cholesterol in the body (statins: ***Lovastatin, Simvastatin, Fluvastatin, Probucol***). Pharmacokinetics.Indications. Side effects. Contraindications.
11. Pharmacodynamics, comparative characteristics of stimulating the metabolism medications and excretion of cholesterol from the body (***Essentiale,Lipostabil***). Pharmacokinetics. Indications, side effects. Contraindications.
12. Agents, which selectively reduce the level of triglycerides in the body. Pharmacology of fibric acid derivatives (fibrates) ***Fenofibrate***. ***Nicotinic acid***. Mechanism of action. Indications. Side effects. Contraindications.
13. Antioxidants direct ***(Tocopherol Acetate (Vitamin E)), Ascorbic Acid (Vitamin C)*** and indirect ***(Methionine, Glutamic Acid).*** Pharmacodynamics, comparative characteristics. Pharmacokinetics. Indications, side effects. Contraindications and clinical uses.
14. Angioprotectors ***(Parmidin, Etamsylate sodium quercetin).*** Mechanism of action. Indications. Side effects. Contraindications.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. Mezaton
2. Prazosin
3. Noradrenaline hydrotartrate
4. Inderal
5. Atenolol
6. Clonidine
7. **Drotaverine hydrochloride***
8. **Losartan***
9. **Enalapril***
10. **Lovastatin***
11. **Lisinopril***
12. **Dibazol***
13. Amlodipine
14. **Magnesium sulphate***

Note: * – drugs for filling in the table

TASKS FOR A EXTRACURRICULAR WORK

Fill in the table:

The drug, the dosage and the form	*Mechanism of action*	*The main indications for assignment*	*Side effect and contraindications*

Prescribe as a recipe:

1. Enalapril.

Rp:

2. Amlodipine.

Rp:

3. Losartan.

Rp:

4. Atenolol.

Rp:

5. Antihypertensive drug – calcium channel blocker.

Rp:

6. Drug to lower blood pressure, neurotropic.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. The patient suffering from arterial hypertension with hyperkinetic type of circulation and the high contents of renin, accompanied by stenocardia and sinus tachycardia has been treating for 10 years. Indicate the group of drugs that should be administered in this situation.

A. * Beta-adrenoblockers
B. Drugs of nitroglycerine
C. Alfa-adrenoblockers
D. Sympatholytics
E. Ganglioblockers

2. A 45 year old patient, who had been suffering from idiopathic hypertension, was treated by an antihypertensive drug. After 4 days his arterial pressure decreased, but he complained of sleepiness and psychological suppresion. With which drug was the patient treated?

A * Clophelinum
B. Prazozinum
C. Captopril

D. Enalapril
E. Apressine

3. A patient who had been suffering from hypertonic disease had been treated for a long time with the drug from the group of Rauwolf alkaloids and began to complain of heartburn, pain in the epigastrial area and bad mood. Indicate the drug which caused these complications.
A. *Reserpinum
B. Octadinum
C. Clophelinum
D. Papaverinum
E. Dlbazolum

4. A patient who had been suffering from arterial hypertension had taken a hypotensive drug, but in an hour his blood pressure increased and 2 hours after it decreased. Indicate this antihypertensive agent.
A *Octadinum
B. Prazosinum
C. Captoprii
D. Anaprilinum
E. Nifedipinum

5. A patient had been suffering from hypertonic disease accompanied by chronic bronchitis with asthmatical component. Indicate the drug which is contraindicated due to it's action on the bronchi.
A *Anaprillinum
B. Captopril
C. Prazosinum
D. Nifedipine
E. Dichlothiazidum

6. A doctor has administered to a patient clonidine (clophelinum) for elimination of hypertensive crisis. What class of hypotensive drugs does the named agent belong to?
A * Central neurotropic
B. Peripheral neurotropic
C. Diuretics
D. Drugs affecting the renin-angiotensin system
E. Myotropic (vasotropic) hypotensive agents

7. A patient with hypertensive disease caused by raised sympathoadrenal system activity requires administration of a drug reducing neurogenic tone of vessels. What is the most suitable agent to be administered?
A. *Clophelinum
B. Losartane
C. Verapamil
D. Hydrochlorthiazide
E. Apressinum (hydralazine)

8. Hypertensive crisis characterized by sharp headache, dizziness, hyperemia of face, pains in the region of heart, rapid pulse, arterial pressure of 220/110 mm Hg has developed in a patient suffering from essential hypertension during the visit to the dentist. What agent is it necessary to introduce to the patient?
A. *Clophelinum (clonidine)
B. Pinlenum fpempidine)
C. Timolol
D. Moxonidine
E. Anaprilinum fpropranolol)

9. Indicate the antihypertensive agent which can cause such side-effects as dryness in the mouth, constipation and retention of water in the organism
A. Clophelinum (clonidine)
B. Coraiaminum (nikethamide)
C. Verapamil
D. *Anaprilinum fpropranolol)
E. Nifedipine

10. Stable arterial hypertension arose in the patient who had been suffering from chronic glomerulonephritis. Indicate the most effective group of drugs to treat this patient.
A. *Angiotensin converting enzyme inhibitors
B. Ganglion blockers
C. α-adrenoblockers
D. Myotropic spasmolytics
E. Calcium antagonists

11 A patient with essential hypertension was admitted to the cardiological department. In order to lower arterial pressure a doctor prescribed a drug that blocks β_1 and β_2-adrenoreceptors. What drug is it?
A. Prednisolone
+B. Propranolol
C. Proserin
D. Celecoxib
E. Indometacin

12 A patient with essential hypertension has been prescribed captopril. What is its mechanism of action?
A. Peripheral vasodilatating effect
B. α-adrenoreceptor block
+C. Inhibition of angiotensin-converting enzyme activity
D. Angiotensin II receptor block
E. β-adrenoreceptor block

13 For relief of hypertensive crisis a doctor administered a patient a drug that apart from antihypertensive effect has also sedative, spasmolytic and anticonvulsive effect. The drug was taken parenterally. When it is taken enterally it acts as a laxative and cholagogue. What drug was administered?
A. Reserpine
B. Dibasolum
C. No-spa
+D. Magnesium sulfate
E. Apressin

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №6. Drugs affecting the functions of peripheral executive systems and organs		

Pharmacology of the coronary and cerebral blood flow. Antianginal and cerebrovascular drugs

The list of basic terms in the topic

Term	Definition
Antianginal drugs	Medications, which are used in the failure of the coronary circulation. Used to treat coronary heart disease (prevention and relief of angina)
Antioxidants	Medications that increase resistance to hypoxia and myocardial ischemia by inhibition of lipid peroxidation
Medications, which influence on cerebral blood flow	- Drugs that widen blood vessels of the brain, increasing the delivery of oxygen and nutrients to the tissues of the brain, normalize metabolism.
Migraine	- A disease that attacks occur intermittently sided throbbing pain, often accompanied by nausea, vomiting, visual and auditory disturbances, photophobia, paresthesia, skeletal muscle weakness and other symptoms. Seizures can be repeated for many years. The duration of each priyatupa 4-72 hours

Individual work

Theoretical questions:

1. Principles of normalization of energy supply infarction in coronary artery disease.
2. Classification of antianginal agents by the mechanism of action.

I. Medications,which are reducing myocardial oxygen demand and increasing oxygen delivery to the myocardium:
- Organic nitrates:
a) Nitroglycerin and long-acting drugs ***(Sustak, Nitrong);***
b) long-acting nitrates ***(Nitrosorbid, Isosorbide mononitrate);***
- Calcium channel blockers ***(Verapamil, Nifedipine, Amlodipine);***
- Potassium channel activators ***(Nicorandil);***
- Other drugs ***(Amiodarone, Molsidomine).***
II. Medications, which are reducing myocardial oxygen demand:
- B-blockers ***(Inderal, Atenolol, Metoprolol).***
III. Medications that increase oxygen delivery to the myocardium:
- Coronarodilatator of myotropic action***(Dipyridamole, Papaverine, Drotaverine (No-spa));***
- Medications of reflex action to eliminate coronary spasm ***(Validol).***
IV. Medications that increase resistance of myocardial hypoxia:
- Energy supplying Medications ***(Trimetazidine, ATP-long);***
- Antihypoxants ***(Emoxipin);***
- Anabolic agents ***(Riboxin, Retabolil).***

3. Mechanisms of action, comparative pharmacological characteristics, side effects, indications and contraindications for the use of drugs in each group. The concept of the syndrome of "steal."
4. Classification of antianginal agents for use:

I. Drugs for the relief of acute attacks of angina ***(Validol, Nitroglycerin, etc.);***

II. Drugs to prevent strokes and treat coronary artery disease (nitrates, β-blockers, vasodilators, etc.).

5. The principles of the treatment of myocardial infarction (application for narcosis, narcotic and non-narcotic analgesics, antiarrhythmic medications, cardiac glycosides, anticoagulants, fibrinolytics, etc.), anti-oxidants.
6. Essential drugs for the prevention and removal of migraine (blockers, tranquilizers, vasodilators, nootropic, narcotic analgesics, protivogistaminnye).
7. The use of serotonin receptor agonist for the treatment of migraine ***(Sumatriptan).***

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Nitroglycerin***
2. **Sustak***
3. Nitrosorbid
4. Nifedipine
5. **Amlodipine***
6. **Atenolol***
7. Cinnarizine
8. **Pentoxifylline***
9. **Sumatriptan***
10. **Vinpocetine***
11. **Nicergoline***
12. **Trimetazidin***

Note: * – drugs for filling in the table

TASKS FOR A EXTRACURRICULAR WORK

Fill in the table:

The drug, the dosage and the form	*mechanism of action*	*The main indications for assignment*	*Side effect it and contraindications*

Prescribe as a recipe:

1. Nitroglycerine.

Rp:

2. Sustak.

Rp:

3. Sumatriptan.

Rp:

4. Nicergoline.

Rp:

5. Drug for increasing of myocardial energy.

Rp:

6. Drug of prolonged action from group of nitrates for coronary artery disease treatment.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. Determine an antianginal agent by its pharmacological effect. It insignificantly improves coronary circulation (especially in subendocardial layers), but the main cause of elimination of stenocardia is dilation of peripheral veins and arteries, that leads to decrease of cardiac work and myocardial oxygen demand. Besides, it oppresses the central links of cardiostimulating reflexes.

A. * Nitroglycerine
B. Phenihydinum
C Amiodaronum
D. Validolum
E. Anaplilinum

2. A patient who had been suffering from stenocardia accompanied by cardiac arrhythmia (paroxysmal tachycardia) and arterial hypertension was admitted to the hospital. Specify antianginal drug and the group which it belongs to, which should be administered taking into account the patient's diseases.

A. *β-adrenoblocker - anaprilinum
B. Organic nitrate - nitroglycerinum
C. Myotropic spasmolytic agent – No-spa
D. Calcium antagonist - nifedipin
E. Potassium channel activator nicorandil

3. Indicate the nitroglycerin's drug with prolonged action

A. *Sustac
B. Validolum
C. Amylnitrite
D. Natrium nitroprussid
E. Dipiridamolum

4. Indicate the drug which exerts antianginal action because of decrease of oxygen demand and increase of oxygen delivery to the myocardium.

A. *Nitroglycerinum
B. Anaprilinum
C. Dipiridamolum
D. Talinololum
E. Carbocromenum

5. Indicate the state which requires administration of nitroglycerine

A. *An attack of stenocardia
B. Acute cardiac failure
C Hypertensive crisis
D. Chronic cardiac insufficiency
E. Endarteritis obliterans

6. Indicate the mechanism of action of nitroglycerine

A. * Release of NO groups which activate guanylyl cyclase
B. Blockade of calcium channels
C. Blockade of adenosine receptors
D. Activation ol adenylyl cyclase
E. Inhibition of phosphodiesterase

7. A patient with ischemic heart disease complains of worsening of his state that is caused by overdosage of antianginal agent. What group of drugs can cause this state and it is known that concentration of methemoglobin in patient's blood is increased?

A. *Organic nitrates
B. Beta-adrenoblockers
C. Blockators of calcium channels
D. Activators of potassium channels
E. Myotropic coronary dilators

8. After sublingual introduction of nitroglycerine its maximal concentration in blood is developed in:

A. * 4-5minutes
B. 15minutes
C. 1 minute
D. 30 minutes
E. 1 hour

9. Why are the tablets of nitroglycerine introduced sublingually only?

A. *The substance is being considerably destroyed during its first passage through the liver
B. The substance is badly absorbed in the gastrointestinal tract
C The 'substance operates reflexly from oral cavity receptors
D. The substance is destroyed under the action of gastric Juice
E. It causes less side-effects in such way of introduction

10. Determine an antianginal agent according to its pharmacological effects: dilating coronary arteries it increases myocardial blood supply, dilating peripheral veins it decreases myocardial preload, dilating peripheral arteries it decrease myocardial postload, besides it oppresses the central links of coronaroconstrictive and cardiostimulatory reflexes:

A. *Nitroglycerine
B. Fenigidinum
C. Amiodarone
D. Validolum
E. Anaprilinum

11. Introduction of an antianginal drug to a patient with stenocardia caused improvement of patient's state and also arterial hypotension, tachycardia and throbbing headache. Indicate this drug.

A. *Nitroglycerine
B. Carbocromen
C. Dipyridamole
D. Mildronate
E. Verapamil

12. A 50 years old patient has suffered from angina pectoris for several months. As a rule he has successfully used a tablet of validolum during the attack but last 2 weeks this remedy hasn't been effective. What drug should be administered to the patient for elimination of the attack?

A. * Nitroglycerine
B. Nifedipine
C Verapamil
D. Anaprilinum (propranolol)
E. Isosorbide mononitrate

13. The calcium channels of cardiomyocytes have been blocked on an isolated rabbit's heart. What changes in the heart's activity can happen as a result?

A. *Decrease rate and force of heart beat
B. Heart stops in systole
C. Decrease of heart beat rate
D. Decrease force of the contraction
E. Heart stops in diastole

14. The patient who had been treated with a vitamin drug for the prophylaxis of brain vessel constriction complained of unpleasant sensations: blushing of upper part of the body, vertigo, flushing of blood to the head. Which drug exerts this effect

A. * Nicotinic acid
B. Tocopherol acetate
C. Riboflavin
D. Thiamini bromidum
E. Calcium pangamate

15. A patient suffering from atherosclerosis is treated with lovastatinum 0,04 g PO before sleep. Why is this drug administered once a day and before sleep?

A. *Cholesterol is synthesized only at night
B. Development of sleepiness in the action of the drug.
C. In the evening the drug is better absorbed.
D. The cataboiism of a cholesterol goes mainly at night.
E. The cholesterol is excreted from an organism mainly at night

16. A patient admitted to the neurology department with complaints of severe headache, nausea, vomiting, feeling of numbness and weakness of the right arm, disorders of speech. BP – 220/130 mm Hg. During 15 years he had been suffering from arterial hypertension. After the examination the following diagnosis was made: ischemia of the left hemisphere due to vascular spasm and impairment of venous outflow. Specify the drug which is the most preferable for the improvement of cerebral blood supply due to decrease of hypercoagulation.

A. *Xanthinoli nicotinas
B. Sydnophenum
C. Coffetnum
D. Meridilum
E. Aminalonum

17. A patient admitted to a hospital with complaints of decrease of memory, feeling of "noise" in the head. The diagnosis which had established after examination was atherosclerosis of brain blood vessels. Indicate the agent which can be administered to the patient.

A. *Clofibratum
B. Euphyllinum
C Dibazolum
D. Nimodipin
E. Minoxidilum

18. A 58 year old woman suffered from cerebral atherosclerosis. The complex therapy administered by the physician included vitamins E and C. Indicate the role of these drugs in the treatment of atherosclerosis.

A. *Inhibition of lipids' peroxidation
B. increase of release of the pituitary gonadotropic hormones
C. Decrease of release of glucocorticoids in adrenal cortex
D. Activation of the antitoxic function of the liver
E. Improvement of coronary circulation

19. A patient was admitted to the clinic of nervous diseases with increased arterial pressure (220/130 mm Hg). It was diagnosed that he had ischemia of the left hemisphere of the brain as a result of vessel spasm and impairment of venous outflow. Choose the preparation from the listed ones which is preferable for improvement of brain blood supply and which removes hypercoagulation in an acute period of the illness:

A. * Xantinol nicotinate
B. Caffeine (coffeinum)
C. Meridilum (methylpnenidate)
D. Aminalonum (gamma-aminobutyric acid)
E. Sydnophenum (pheprosidine)

20. Indicate the main effect of Piracetam

A. * Improves memory and cognition
B. Decreases the integrating processes in the brain
C. Slows down synthesis of GABA in the brain
D. Reduces resistance of the brain tissue to hypoxia
E. increases brain necessity in oxygen

21. A patient was admitted to the neurological department complaining of memory impairment and decrease of intellectual capacity after the car crash head trauma. Offer the remedy for improvement of metabolism in the brain:
A. * Pyracetam (Nootropil)
B. Nifedipinum
C. Sydnocarbum
D. Caffeine (coffeinum)
E. Analginum (metamizole)

22. What class of lipoproteins is the most atherogenic?
A. * Low density lipoproteins
B. Chylomicrons
C. High density lipoproteins
D. Very low density lipoproteins
E. Intermediate density lipoproteins

23. Indicate the principle of the antiatherosclerotic action of Lovastati-num
A. *Oppression of endogenous cholesterol synthesis in the liver
B. Inhibition of peroxide radicals formation
C. Infringement of exogenous cholesterol absorption
D. Inhibition of lipolysis in fatty tissue
E. Prevention or penetration of atherogenic lipoproteins in tunica intima of vessels

24. A patient with atherosclerosis of vessels was treated with one of the hypolipidemic drugs which reduces cholesterol synthesis due to inhibition of enzyme 3-hydroxy-3-methylglutaryl-coenzyme A reductase. Indicate the drug
A. * Lovastatinum
B. Cholestyramine
C. Clofibrate
D. Nicotinic acid
E. Probucol

25. Among special hypolipidemic agents the most effective ones are those which block synthesis of endogenous cholesterol in the liver. What drug from listed below has such mechanism of action?
A. *Lovastatinum
B. Clofibrate
C. Cholestyramine
D. Parmidinum
E. Probucol

26. A patient has family hypercholesterolemia. Indicate the drug which may be used due to ability to inhibit the main enzyme of cholesterol synthesis?
A. * Lovastatinum
B. Colestipol
C. Cholestyramine
D. Nicotinic acid
E. Probucol

27. Indicate the hypolipidemic agent which may be used in atherosclerosis of brain arteries
A. *Lovastatinum
B. Cinnarizine
C. Pyracetam
D. Tocopherol acetate
E. Ascorbinic acid

28. Specify the principle of antihy-perlipidemic action of lovastatinum.
A. *Inhibition of synthesis of endogenous cholesterol in the liver
B. Impairment of creation of superoxide radicals
C. Impairment of absorption of cholesterol in the intestine
D. Impairment of lipolysis in the fatty tissue
E. Impairment of binding of atherogenous lipoproteins with endotheliocytes

29. Being at a dentist a patient had an attack of stenocardia. What drug from the nitrate group should be applied in this case?
A. Menthol
B. Validol
++*C. Nitroglycerine
D. Erinit
E. Talinolole

30 A patient has coronary heart diseas E. For its treatment he was prescribed an antianginal drug that activates guanylate cyclase and accumulates cyclic guanosine monophosphate in the miocardium cells. What drug is it?
A. Panangine
B. Dipiridamol
C. Validol
+D. Isosorbide mononitrate
E. Verapamil

31 A 60-year-old patient consulted a doctor about retrosternal pain arising immediately after physical exercis E. He was prescribed nitroglycerin. The medication relieved retrosternal pain but the patient got acute headach E. What is the likely mechanism of this side effect?
A. Reduced accumulation of calcium ions
B. Inhibited formation of mediators in brain
C. α-adrenoreceptor block
D. Phosphodiesterase block
+E. Intracranial pressure rise

32 A 60-year-old patient consulted a doctor about retrosternal pain arising immediately after physical exercis e. He was prescribed nitroglycerin. The medication relieved retrosternal pain but the patient got acute headach e. What is the likely mechanism of this side effect?
A. α-adrenoreceptor block
B. Reduced accumulation of calcium ions
C. Intracranial pressure rise
+D. Phosphodiesterase block
E. Inhibited formation of mediators in brain

33 A patient with ischemic heart disease has been administered an anti-anginal drug that reduces the myocardial oxygen consumption and improves blood supply of myocardium. What drug is it?
A. Propranolol
B. Retabolil
C. Promedol
+D. Nitroglycerine
E. Validol

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №6. Drugs affecting the functions of peripheral executive systems and organs		
Cardiotonic and antiarrhythmic drugs		

The list of basic terms in the topic

Term	Definition
Cardiotonics	Drugs that increase the power and heart rate (aglycosidic cardiotonics)
Cardiac glycosides	Drugs (glycoside),which are used for the treatment of acute and chronic heart failure
Antiarrhythmic drugs	Drugs for treatment of tachy- or bradyarrhythmias

Individual work

Theoretical questions:

1. General characteristics and classification of cardiac drugs.
2. Sources of cardiac glycosides. Features of the chemical structure of cardiac glycosides.
3. Mechanisms of action of both systolic and diastolic cardiac glycosides.
4. Pharmacological effects of cardiac glycosides.
5. Comparative characteristics of the main drugs of cardiac glycosides ***(Strophanthin, Corglicon, Digoxin, Digitoxin, Adonis infusion).***
6. Indications and clinical uses of cardiac glycosides.
7. Side effects of cardiac glycosides. Acute and chronic intoxication by cardiac glycosides. Principles of first aid in case of intoxication.
8. Pharmacological characteristics aglycosidic cardiotonic ***(Adrenalin, Dobutamine, Dopamine).***
9. Classification of antiarrhythmic drugs by the mechanism of action and indications.
10. Pharmacokinetics and pharmacodynamics of blockers of Na+-channels (I class). Comparative characteristics of the group IA ***(Quinidine sulfate, Procainamide, Aymalin)***, IB ***(Phenytoin, Lidocaine),*** IS ***(Etatsizin, Propafenone (Ritmilen)).*** Indications.
11. Pharmacological characterization of β-blockers (Class II). Indications. Comparative characteristics of drugs ***(Propranolol, Metoprolol, Atenolol).***
12. Pharmacokinetics and pharmacodynamics of potassium channel blockers (class III). Amiodarone. Application in clinical practice.
13. Pharmacological characteristics of blockers of Ca2 + channels (Class VI). Comparative characteristics of drugs ***(Verapamil, Diltiazem).*** Indications.
14. The mechanism of action of antiarrhythmic drugs potassium ***(Potassium chloride, Panangin, Asparkam).*** Use in clinical practice.
15. The value of the M-cholinergic antagonists ***(Atropine)*** and agonists in the treatment of cardiac arrhythmias.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. Strophanthin
2. **Corglicon***
3. **Digoxin***
4. **Procainamide***
5. **Lidocaine***
6. **Amiodarone***
7. **Potassium chloride***
8. Levosimendan
9. **Unitiol***

Note: * – drugs for filling in the table

TASKS FOR A EXTRACURRICULAR WORK

Fill in the table:

The drug, dosage and the form	*Mechanism of action*	*The main indications forassignment*	*Side effects and contraindications*

Prescribe as a recipe:

1. Digoxin.

Rp:

2. Procainamide.

Rp:

3. Amiodarone.

Rp:

4. Unitiol.

Rp:

5. Cardiac glycoside in acute heart failure.

Rp:

6. Drug for urgent assistance with atrial paroxysmal tachycardia.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. In a clinic, the patient complained of unpleasant sensations in the heart region, and attacks of weakness and loss of consciousness. Inspection of the patient's electrocardiogram had revealed the presence of II degree atrioventricular block. Specify a drug which should be used in this situation.

A. * Isadrinum
B. Novocainamide
C. Nitroglycerine
D. Stropnanthin
E. Anaplilinum

2. A patient with pulmonary edema caused by acute left ventricular insufficiency was treated with cardiac glycoside. In 10-15 min, his condition improved and maximal effect - was in 1-1,5 hours, after that the action gradually decreased. What drug has been injected?

A. * Strophanthin
B. Digoxin
C. Celanidum
D. Digltoxin
E. Adonisidum

3. A patient who had been suffering from heart insufficiency was treated with digoxinum. He took diuretic Dichlothiazidum without the doctor's knowledge and after 2 days he felt worse and was obliged to address this matter to the doctor. Doctor administered several drugs to improve patient's state and among these drugs was Unithiolum. Indicate the mechanism of action of this agent

A. *It has got free sulfhydril groups which bind to the molecules of digoxinum
B. Promotes excretion of calcium ions from the organism
C. Promotes retention of potassium ions in the organism
D. Decrease oxygen demand of the myocardium
E. Creates complexes with calcium ions

4. Indicate the mechanism of anti arrhythmic action of quinidine sulphate

A. *Blockade of sodium channels of the cardiomyocyte membranes
B. Blockade of calcium channels of the cardiomyocyte membranes
C. Blockade of β-adrenoceptors of the myocardium
D. Blockade of α- and β-adrenoceptors of the myocardium
E. Blockade of M-cholinoreceptors of the myocardium

5. Specify the mechanism of anti arrhythmical action of verapamil

A. *Blockade of calcium channels of the cardiomyocyte membranes
B. Blockade of sodium channels of the cardiomyocyte membranes
C. Blockade of β-adrenoceptors of the myocardium
D Blockade of α- and β-adrenoceptors of the myocardium
E. Blockade of M-cholinoreceptors of the myocardium

6. Specify the cardiac glycoside which posseses the fastest onset of the action.

A. *Strophanthin
B. Celanidum (lanatoside)
C. Digitoxin
D. Digoxinum
E. Adonisidum

7. What effect of cardiac glycosides is of greatest importance?

A. *Increase of myocardium contractility
B. Increase of myocardium excitability
C. Decrease of myocardium automatism
D. Decrease of myocardium conductivity
E. Increase of diuresis and elimination of edemas

8. Indicate the mechanism of cardiotonic action of glycosides

A. *Inhibition of Na-K-ATPase of cardiomyocyte membranes
B. Excitation of B-adrenoceptors of myocardium
C Activation of calcium channels of cardiomyocyte membranes
D Oppression of phosphodiesterase of cardiomyocytes
E. Activation of potassium channels of cardiomyocytes

9. Indicate the group of drugs which is the most expedient for treatment of ciliary arrhythmia?

A. *Cardiac glycosides
B. M -cholinoblockers
C. Na-channels blockers
D. Beta-adrenomimetics
E. Alph-adrenoblockers

10. Indicate the group of drugs, overdosage of which is accompanied by the following signs: nausea, vomiting, diarrhea, infringement of heart activity (extrasystoles, delay of atrioventricular conductivity), headache, vision impairment (xanthopsia, diplopia).

A. * Cardiac glycosides
B. Organic nitrates
C Ca-channels blockers
D. Beta-adrenoblockers
E. Angiotensin converting enzyme inhibitors

11. Why do strophanthin and corglycon possess fast action after the introduction into the organism?

A. * They have low affinity to plasma proteins
B. They have high molecular weight
C. They have low molecular weight
D. They have high affinity to plasma proteins
E. They have short half-life period

12. Indicate the mechanism of action of Verapamil

A * Blockade of calcium channels
B. Inhibition of Na-K-ATPase
C Activation of beta-adrenoceptors
D. Activation of M-cholinoceptors
E. Blockade of beta-adrenoceptors

13. A patient suffers from allergic reaction to iodine. Indicate an antiarrhythmic agent, which is absolutely contraindicated to him.

A. *Amiodarone
B. Verapamil
C. Novocainamidum (procainamide)
D. Ornidum (bretytium)
E. Quinidine sulfate

14. It is necessary to appoint an anti-arrhythmic agent to a patient with ciliary arrhythmia accompanying by bronchial

asthma. What drug from listed below is contraindicated to this patient?

A. *Anaprilinum (propranolol)
B. Verapamil
C. Aimalin
D. Digoxine
E. Novocainamidum (procainamide)

15. A patient has lengthening of P-Q interval on the electrocardiogram under the treatment with an antiarrhythmic drug. What agent could cause it?

A. *Atenolol
B. Prazosin
C. Atropine
D. Lidocaine
E. Plathyphyllin

16. Indicate the group of drugs which is used for treatment of atrioventricular blockade

A. * M-cholinoblockers
B. Ca-channels blockers
C. Local anaesthetics
D. Beta-adrenoblockers
E. Potassium containing remedies

17. A patient suffers from bradyarrhythmia caused by hypertension. What drug should be administered?

++*A. Platyphyllin hydrotartate
B. Clonidine
C. Papaverine hydrochloride
D. Methyldopa
E. Reserpine

18. A patient has acute cardiac insufficiency resulting from essential hypertension. What drug is the most appropriate in this case?

A. Cardiovalene
++*B. Corglycon
C. Caffeine
D. Digoxin
E. Cordiamin

19. A patient in a cardiological department has arrhythmia doctor administered him amyodaron. What is the main mechanism of amyodaron's antiarrhythmic action?

A. It inhibits choline-receptors
B. It activates serotonin receptors
C. It alters myocardium susceptibility to the acetylcholine
D. It stimulates histamine receptors
++*E. it blocks mostly potassium channels

20 A patient suffers from chronic left-ventricular insufficiency. What drug should be prescribed?

A. Vinpocetine
+B. Digoxin
C. Pyracetam
D. Bemegride
E. Etimizol

21 A patient with ventricular arrhythmia was admitted to the cardiological department. What drug should be administered?

A. Amlodipine
B. Drotaverine
C. Proserin
+D. Amiodarone
E. Aminazine

22 A 65-year-old patient with chronic heart failure has been taking digitoxin in self-administered dosages for a long tim E. She was admitted to the hospital for general health aggravation, arrhythmia, nausea, reduced diuresis, insomni A. What is the primary action to be taken?

A. To administer digoxin
B. To give an intravenous injection of calcium gluconate solution
C. To administer strophanthine intravenously
D. To reduce digitoxin dosage
+E. To withhold digitoxin

23 A patient with acute heart failure refractory to cardiac glycosides was given an injection of dobutamine. What is the mechanism of action of this drug?

+A. Inhibition of phosphodiesterase activity
B. Complexation with membrane phospholipids
C. Inhibition of K^+, Na^+- ATPase
D. Stimulation of β-1-adrenergic receptors
E. Increase of n.vagus tonus

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №6. Drugs affecting the functions of peripheral executive systems and organs		

Diuretics. Drugs for treatment of gout. Uterine drugs and contraceptives

The list of basic terms in the topic

Term	Definiton
Diuretics (diuretics)	Drugs that can increase daily urine output, reduce the liquid content in tissues and serous cavities of the body
Forced diuresis	The method of detoxifying the body, including the water load, the introduction of osmotic diuretics or saluretics and replace electrolytes infusion
Uricosuric (arthrifuge) drugs	Drugs that inhibit the formation of uric acid or contribute to its removal from the body, is used to treat gout
Uterotonics	Drugs that increase the tone and contractile activity of the myometrium
Tocolytics	Drugs that reduce the tone and contractile activity of the myometrium

Individual work

Theoretical questions:

1. Basic physiological principles of the regulation of water-salt metabolism and the possibility of pharmacological correction. Diuretics and their classification according to the location and mechanism of action, by the activity.
2. Pharmacokinetics and pharmacodynamics of saluretics (saltdriving drugs) - ***Furosemide, Hydrochlorothiazide, Clopamid, Ethacrynic acid;*** osmotic diuretics ***(Mannitol, Urea).*** Indications and clinical uses, side effects and their prevention. The concept of forced diuresis.
3. Comparative pharmacological characteristics of potassium-sparing drugs spironolactone and triamterene. Mechanisms of action, indications, side effects.
4. Features and application of medications that enhance renal blood flow ***(Theophylline, Minophylline, Xantinole nicotinate, Pentoxifylline).***
5. Preparations of medicinal plants that have a diuretic effect: ***herb Horsetail, Bearberry leaves, leaves Ortosifona, Lespenefril.*** The principle of the combined using of diuretics.
6. Pharmacological correction of purine metabolism disorders in the body. Classification of arthrifuge (uricosuric) by the mechanism of action.
7. Comparative pharmacological characteristics of arthrifuge drugs ***(Allopurinol, Etamid, Urolesan, Urodan).***
8. Classification of drugs affecting the tone and contractile activity of the myometrium.
9. Pharmacological characteristics of medications that stimulate the contractile activity of the myometrium: drugs prostaglandins (Dinoprostu, Dinoprostone), hormones ***(Oxytocin, Estrone, Estradiol dipropionate),*** calcium supplementation ***(Calcium chloride),*** anticholinesterase agents ***(Neostigmine).***
10. The medications areused to stop uterine bleeding: alkaloids uterine horns ***(Ergometrine maleate).*** Indications and contraindications. Side effects, acute and chronic poisoning, aid for poisoning. Features of the small uterine medications ***(shepherd's purse herb, leaf barberry).***

11. Medications that lower tone and contractile activity of the myometrium, relax the cervix: ***Atropine sulphate, Fenoterol, Drotaverine (No-spa), Magnesium Sulfate, Tocopherol acetate, Progesterone***. Indications and clinical uses, side effects.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Spironolactone***
2. Indopamid
3. **Furosemide***
4. **Hydrochlorothiazide***
5. Mannitol
6. Allopurinol
7. Urolesan
8. **Dinoprostone***
9. **Oxytocin***
10. **Ergometrine maleate***
11. **Progesterone***

Note: * – drugs for filling in the table

TASKS FOR A EXTRACURRICULAR WORK

Fill in the table:

The drug, dosage and the form	*mechanism of action*	*The main indications forassignment*	*Side effects and contraindications*

Prescribe as a recipe:

1. Furosemide.

Rp:

2. Hydrochlorothiazide.

Rp:

3. Oxytocin.

Rp:

4. Ergometrine maleate.

Rp:

5. Drug for treatment of gout.

Rp:

6. Diuretic with hyperaldosteronism.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1.The diuretic agent in dosage 0,025 g 2 times a day had been prescribed to the patient at the beginning stage of idiopathic hypertension. In 7-8 days, the arterial pressure had slightly decreased, but he began to complain of pain in the heart region, muscle weakness, and tremor. The analysis of blood has revealed hypokalemia. Which from the listed drugs may cause this side effect

A. * Hydrochlorthiazide
B. Spironolactonum
C Triamterenum
D. Amilorid
E. Mannit

2. A 45 year old woman had referred to her gynaecologist with complaints of menorrhagia. The doctor had administered ergometrinum, which helped the woman. Specify the main effect of the drug.

A. * Produces spastic contraction of the myometrium
B. Accelerates process of coagulation
C Oppresses proliferation of the endometrium cells
D Produces vasoconstriction endotheliocytes
E. Produces rhythmic contractions of the myometrium

3. A patient had taken celanidum for long time due to chronic heart failure. The physician administered to him dichlothiazidum to eliminate leg edemas. Which drug should be taken together with the diuretic to prevent hypokalemia?

A. *Kalii chloridum
B. Calcii chloridum
C. Unithiolum
D. Natrii sulfas
E. Magnii sulfas

4. A patient has been treated for a long time with cardiac glycoside digoxinum in connection with congestive heart failure. Now the patient's state is stable, but there are remaining edemas on the legs and face. What diuretic should be taken to avoid side-effects caused by simultaneous administration of cardiac glycosides and diuretics?

A. *Spironolactonum
B. Oxodolinum
C. Dlchlothiazidum
D. Diacarbum
E. Cyclomethiazidum

5. 1 ml of an agent causing contraction of the myometrium was introduced intramuscularly to a woman after abortion. In a few minutes she began to complain of headache. AP -160/100 mm Hg. Earlier she had initial stage of arterial hypertension. Choose among the following drugs which is preferred in this case, taking into account the woman had inclination to arterial hypertension

A. *Oxytocin
B. Pituitrinum
C. Serotoninl adlpinas
D. Hyphitocinum
E. Mammophysinum

6. The usage of dichlotiazide, etacrinic acid and furosemide did not cause marked diuretic effect in the patient with marked peripheral edemas. The aldosterone level in the blood is increased. Indicate which medicine should be prescribed:

A. *Spironolactone
B. Mannit
C. Amilorid
D. Clopamid
E. Urea

7. A doctor administered Allopurinol to a 26-year-old man with the symptoms of gout. What pharmacological action of Allopurinol ensures therapeutical effect?

A. *Inhibition of uric acid synthesis
B. Increase of uric acid excretion
C. Inhibition of leucocyte migration into the joint
D. Analgesic effect
E. Antinflammatory effect

8. Indicate the diuretic agent which should be used to treat pulmonary edema

A. *Furosemide
B. Hydrochlorthiazide
C. Triamteren
D. Spironolactone
E. Acetazolamide (diacarbum)

9. A patient was admitted to the intensive care unit after taking a large dose of Phenobarbitalum with the purpose of suicide. Investigation of the patient revealed respiratory olic acidosis. What drug should be used for the correction of acid-base state?

A * Trisaminum
B. Sodium chloride
C. Calcium chloride
D. Ammonium chloride
E. Potassium chloride

10. During treatment of the patient with digitoxin, extrasystoles, muscle weakness, diarrhea, vomiting, and impairment of vision developed. What drugs should be used to eliminate these signs of intoxication?

A. * Drugs of potassium
B. Drugs of calcium
C. Iron preparations
D. Drugs of sodium
E. Drugs of magnesium

11. What agent acts as magnesium ion's antagonist and is used in overdosage of parenteral introduction of magnesium sulphatis?

A. *Calcium
B. Potassium
C. Sodium
D. Iron
E. Bromine

12. Specify the drug which eliminate both intra- and extracellular acidosis.

A. *Trisaminum
B. Natrii hydrocarbonas
C. Natrii lactas
D. Ammonii chioridum
E. Natrii hydroxydum

13. Specify the drug of first choice to be administered in a 7-year old child with multiple caries.

A. *Calcii glycerophosphas
B. Calcii gluconas
C. Calcii chloridurn
D. Calcii hydroxydum
E. Calmecinum

14. The worker who several days ago started working in factory, was addressed to the doctor with complaints of headache, nausea. Due to excessive diaphoresis he drank nearly 5 liters of tap water per day. What drug will promptly and effectively eliminate the specified signs and normalize state of the worker?

A. * Sodium chloride
B. Decamevitum
C Aspirin (acetylsalicylic acid)
D. Analginum (methamizole)
E. Pentalginum

15. Ketoacidosis and dyspnoe are observed in a patient with non-compensated diabetes mellitus. Which drug should be used for normalization of patient's state?

A. *Sodium hydrocarbonate
B. Naloxone
C. Bemegride
D. Pananginum
E. Ammonium chloride

16. It is necessary to eliminate ketoacidosis in the patient with sugar diabetes complicated by hyperglycemic coma. What solution, being the intracellular buffer, can be administered?

A. * Trisamine (trometamol)
B. Solution of Sodium hydrocarbonate
C. Solution of Sodium lactate
D. Neohemodesum
E. Ringer's solution

17. The patient suffering from ollagenosis has been treated for a long time by Prednisolone in a dose of 30 mg per day. Recently he has started to complain of painful convulsions of skeletal muscles of lower extremities. What agent may be used or improvement of patient's state?

A * Panangin
B. Ergocatciferol
C. Calcitonin
D Diazepam
E. Aminazine (chlorpromazine)

18. The patient was admitted to the hospital with signs of dehydration. The doctor has immediately administered him intravenous infusion of Sodium chloride. At what situation is necessary to use this drug?

A. *Cholera
B. Toxicosis of pregnancy
C. Osteoporosis
D. Edemas
E. Arthritis

19. Convulsions and laryngospasm has developed in a patient with hypoparathyrosis. Laboratory examination revealed significant decrease of calcium ions concentration in the blood and slight elevation of pH. Which drug should be introduced for correction of metabolic alkalosis?

A. *Ammonium chloride
B. Trisamine
C. Magnesium oxide
D. Aluminium hydroxide
E. Sodium hydrocarbonate

20. Which of the plasma substitutes listed below circulates in the blood for a long time?

A. * Rheopolyglucinum
B. 5% glucose solution
C. 0.9% solution of Sodium chloride
D. Ringer-Locke solution
E. Polydesum

21. A patient with edemata was prescribed a K*-retaining diuretic - aldosterone antagonist. What drug is it?

++*A. Spironolactone
B. Procainamide hydrochloride
C. Clonidine
D. Digoxin
E. Alopurinole

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №7. Chemotherapeutic drugs		

Antiseptics and disinfectants. Sulfonamides. Fluoroquinolones

The list of basic terms in the topic

Term	Definiton
Antimicrobials	Drugs that kills microorganisms or inhibits their growth. Antimicrobial medicines can be grouped according to the microorganisms they act primarily against. For example, antibacterials (commonly known as antibiotics) are used against bacteria and antifungals are used against fungi. They can also be classed according to their function. Antimicrobials that kill microbes are called microbicidal; those that merely inhibit their growth are called microbiostatic.
Antiseptics	Antimicrobial substances that are applied to living tissue/skin to reduce the possibility of infection, sepsis, or putrefaction. Antiseptics are generally distinguished from antibiotics by the latter's ability to be transported through the lymphatic system to destroy bacteria within the body.
Disinfectants	Antimicrobial substances that are applied to non-living objects to destroy microorganisms that are living on the objects. Disinfectants work by destroying the cell wall of microbes or interfering with the metabolism.
Sulfonamides (sulfa drugs)	Synthetic antimicrobial agents that contain the sulfonamide group. In bacteria, antibacterial sulfonamides act as competitive inhibitors of the enzyme dihydropteroate synthetase, an enzyme involved in folate synthesis. Sulfonamides are therefore bacteriostatic and inhibit growth and multiplication of bacteria, but do not kill them. Humans, in contrast to bacteria, acquire folate (vitamin B_9) through the diet.
Derivatives of 8-hydroxyquinoline	Synthetic antimicrobial agents that contain oxyquinolinic ring and posess antibacterial, antiparasitic and antifungal activity.
Nitrofurans	Class of drugs typically used as antiseptics, antibiotics, antiprotozoal or antifungal agents. The defining structural component is a furan ring with a nitro group.
Fluoroquinolones	Family of synthetic broad-spectrum antibacterial drugs which have a fluorine atom attached to the central ring system, typically at the 6-position or C-7 position. Fluoroquinolones exert their antibacterial effect by preventing bacterial DNA from unwinding and duplicating

Individual work

Theoretical questions:

1. General characteristics of antimicrobial agents. Disinfectants, antiseptics and chemotherapeutic drugs. Requirements for modern antiseptics.
2. Classification of antiseptics and disinfectants depending on chemical structure. Factors affecting antimicrobial activity of the drugs.
3. Pharmacology of inorganic antiseptics and disinfectants. Mechanism of action of halogenated compounds: ***Chloramine, Chlorhexidine, Iodine alcoholic solution, Lugol's iodine, Ioddicerine, Iodinole***. Indications and clinical uses, side effects.
4. Mechanism of action, indications and clinical uses of oxidants: ***Hydrogen peroxide, Potassium permanganate***. Dependence of pharmacological effect on concentration of the drug.
5. Antiseptics and disinfectants – acids and alkalis: ***Salicylic acid, Boric acid, Ammonia solution***.
6. Mechanism of action of metallic salts (pre-resorptive, resorptive). Factors that determine the antimicrobial activity of the drugs. Schmiedeberg sequence. Indications and clinical uses of **silver, lead, bismuth, copper**, and **zinc**-containing

drugs. Side effects of metallic salts.

7. Pharmacology of organic antiseptics and disinfectants. Aromatic compounds. Mechanism of action of phenolic antiseptics: ***Phenol, Resorcinol, Birch tar, Balsamic liniment Wishnievsky, Ichthyol.*** Side effects. Acute poisoning by phenol, treatment.
8. Mechanism of antimicrobial action of dyes. Pharmacological characteristics of ***Brilliant green, Methylene blue, Ethacridine lactate [Rivanol]***. Indications and clinical uses.
9. Aliphatic compounds. Pharmacokinetics and pharmacodynamics of ***Formaldehyde***. Side effects. Mechanism of antimicrobial action of ***Ethyl alcohol***.
10. Pharmacology of surfactants (quaternary ammonium compounds). Mechanism of action, indications and clinical uses of detergents: ***Aethonium, Decamethoxin, Miramistin.***
11. Herbal antiseptics: ***Calendula tincture, Chlorophyllipt.***
12. Definition and classification of chemotherapeutic drugs. General principles of chemotherapy.
13. Sulfonamides (sulfa drugs). definition, mechanism and spectrum of antimicrobial action.
14. Indications and contraindications for use of sulfonamides. Side effects and their prevention.
15. Classification of sulfonamides depending on the duration of action:
    - short-acting – ***Streptocide [Sulfanilamide], Sulfadimidine [Sulfadimezine], Phthalylsulfathiazole [Phthalazole], Sulfacetamide [Sulfacyl sodium], Sulfaethidole [Etazole];***
    - intermediate-acting – ***Sulfamethoxazole;***
    - long-acting – ***Sulfadimethoxine, Sulfamethoxypyridazine [Sulfapyridazine];***
    - ultralong-acting – ***Sulfalene****.*
16. Combinations with sulfonamides: ***Trimethoprim / sulfamethoxazole [Co-trimoxazole, Biseptol, Bactrim], Sulfasalazine [Salazopyridazine]****.*
17. Mechanism of action and antimicrobial spectrum of nitrofurans. Indications, contraindications and side effects of ***Nitrofural [Furacilin], Furazolidone, Furazidin [Furagin]****.*
18. Mechanism and spectrum of antimicrobial action, indications, contraindications, side effects of derivatives of 8-hydroxyquinoline ***Nitroxoline, Chlorquinaldol****.*
19. Mechanism and spectrum of antimicrobial action, indications, contraindications and side effects of fluoroquinolones ***Ofloxacin [Zanocin]*, *Ciprofloxacin [Ciprinol].***

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. Zinc phosphate
2. Potassium permanganate
3. Ethacridine lactate
4. **Chlorhexidine bigluconate***
5. **Miramistin***
6. **Hydrogen peroxide***
7. Nitrofural [Furacilin]
8. **Iodine solution***
9. Salicylic acid
10. Ofloxacin
11. **Ciprofloxacin***
12. Furazolidone
13. **Co-trimoxazole***
14. **Sulfadimetoxine***

Note: * – drugs for filling in the table

TASKS FOR A EXTRACURRICULAR WORK

Fill in the table:

The drug, dosage and the form	*Mechanism of action*	*The main indications forassignment*	*Side effects and contraindications*

Prescribe as a recipe:

1. Brilliant green.

Rp:

2. Hydrogen peroxide.

Rp:

3. Co-trimoxazole.

Rp:

4. Chlorhexidine bigluconate.

Rp:

5. Sulfonamide.

Rp:

6. Fluoroquinolone for treatment of urinary tract infection.

Rp:

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. The patient addressed to the doctor in relation with trauma of the foot. The foot was bandaged with a dirty gauze bandage, impregnated with purulent discharges. Attempt to take off a bandage for survey and processings of a wound invoked an acute pain as the bandage had stuck to wound surface. Choose an antiseptic which will facilitate taking off of a bandage and will mechanically clear a wound of mud and pus.
   A. * Hydrogen peroxide
   B. Aethacridinum lactate
   C. Aethonium
   P. Potassium permanganate
   E. Furacilinum
2. The patient addressed to the doctor with complaints of pustular pimples on the skin of the face. In bacteriological analysis of contents of pustules staphylococcus aureus was found and the diagnosis of staphylococcal pyodermia was given. Choose the most efficient drug from the listed antiseptics for local use in pustular pimples.
   A.* Brilliant green
   B. Ethyl alcohol
   C. Chlorhexidinum
   P. Potassium permanganate
   E. Aethacridinum lactate
3. A patient addressed to r ophthalmologist with complaints of eye discomfort, discharge of purulent exudate, disorders of vision. Specify the antiseptic available for rinsing of the eyes.
   A. *Silver nitrate
   B. Lugol's solution
   C Potassium permanganate
   P. Salicylic acid
   E. Ammonium solution
4. In a patient with varicose dilation of veins the trophic ulcer of the leg developed. The bacteriological examination of the ulcer discharge revealed Staphylococcus infection. For the local treatment of the ulcer an antiseptic in the form of ointment from the group of detergents was administered. Specify it.
   A. *Ethonium
   B. Brilliant green
   C Furacil/inum
   D. Potassium permanganate
   E. Ethacridini iactas
5. Which acid possesses the properties of an antiseptic?
   A. *Boric acid
   B. Nicotinic acid
   C. Folic acid
   D. Ascorbic acid
   E. Dehydrocholic acid
6. Specify the antiseptic which is used for disinfection of operation field and surgeon's hands.
   A. *70% solution of ethyl alcohol
   B. Furacilinum
   C. Ethonium
   D. Potassium permanganate
   E. 95% solution of ethyl alcohol

7. Determine the following drug: it contains an halogen, exerts antimicrobial and deodorizing action, is used for disinfection of non-metal instruments, as an antiseptic - for processing of hands
A.*Chloraminum
B. Hydregen peroxide
C. Formaldehyde
D. Phenol
E. Resorcinum

9. A patient was admitted into the emergency department in relation with acute poisoning - by mistake he drank mercury dichloride solution. The patient complained of severe pain in the oral cavity, along the esophagus and in the epigastric area, hypersalivation, fatigue, tachycardia. Specify the agent which would neutralize the absorbed mercury binding to it.
A. *5% solution of unithiolum intramuscularly
B. Methylene blue with 5% glucose solution intravenously solution of sodium
C. 4% solution of sodium carbonate intravenously
D. 2% solution of sodium nitrite intravenously
E. 2% solution of furosemide

10. All antiseptics possess ail following properties except:
A *Selective antimicrobic action
B. Versatile antimicrobic action
C. Bactericidal action
D. Highly toxic for human
E. Are not introduced parenterally

11. Chloramine possesses all following effects, except:
A. *Antiallergical
B. Deodorization
C. Antiseptic
D. Spermicidal
E. Fading

12. Formaldehyde solution is used for disinfection of non-metallic surgical tools. Indicate the correct name of group of formaldehyde:
A. * Aliphatic agents
B. Aromatic agents
C. Spirits
D. Halogen-maintained agents
E. Detergents

13. 70% solution of aethyl spirit was used by a surgeon for cleaning his hands before operation. Explain the mechanism of action of the antiseptic drug:
A. *Protein dehydration of microbes protoplasm
B. Blockade of sulfhydryl groups of enzymes
C. Oxidation of organic components of microbes 'protoplasm
D. Interaction with aminogroups of protoplasm proteins of microbes
E. Interaction with hydroxilic groups of microbes enzymes

14. A doctor used 5% spirituous solution of iodine for cleaning of operation field. Indicate its mechanism of action:
A. *Interaction with amino groups of microbes 'proteins that disposes to their denaturation
B. Dehydration protoplasm's proteins
C. Bound to enzymes' sulfhydric groups
D. Formation of albuminates
E. inhibition of dehydrogenase

15. A female suffers from varicose veins dilatation of lower extremity which is complicated by ulceration on ankle. The ulcer is accompanied by local hyperemia and itching around and discharges pus with staphylococci. An antiseptic ointment from the group of detergents was administered for treatment. After treatment all of the symptoms are diminished. Indicate the drug:
A. * Ethonium
B. Furacilhium fnitrofuran)
C Viride nitens (brilliant green)
D. Aethacrydine lactate
E. Potassium permanganate

16. The doctor administered Sulfadimezinum in tablets to the patient with bacterial infection, and advised to take the drug with alkaline mineral water. Indicate the purpose of the given reference.
A. * For prophylaxis of crystallization of acety/ated derivants of the drug in renal tubules
B. For prolongation of action
C For reducing of the irritative action on the stomach
D. For neutralization of HCl of a gastric juice
E. For shift of blood pH in the alkaline side

17. A 37 year-old patient was admitted to an infectious diseases hospital with the diagnosis of dysentery. Indicate the drug which should be appointed to the patient?
A. * Ciprofloxacin
B. Erythromycin
C. Oxacillinum
D. Phenylsalicylate
E. Imodium

18. Specify the sulfonamide drug which is poorly absorbed in the intestine and is used for the treatment of intestinal infections.
A. *Phthalazolum
B. Ethazolum
C. Sulfadimethoxinum
D. Sulfadimezinum
E. Sulfacylum-natrium

19. Specify the sulfonamide agent for the treatment of conjunctivitis.
A. *Sulfacylum-natrium
B. Phthalazolum
C. Urosulfanum
D. Sulfadimezinum
E. Biseptoium

20. Specify the combined sulfonamide agent.
A. *Biseptolum
B. Ethazolum
C. Sulfacylum-natrium
D. Sulfadimethoxinum
E. Streptocidum

21. A patient visited a physician with complaints of painful and frequent urination, pain in the lower part of the back. After laboratory and bacteriologic examination of the urine (it revealed gram-positive cocci, Proteus, acute cystitis and urethritis were diagnosed. Specify the agent that should be administered taking into account the localization of its action.
A. *Nitroxlinum
B. Ethazolum
C. Biseptoium
D. Sulfadimezinum
E. Furasolidonum

22. Specify the antimicrobial drug from the group of 8-oxiquinolirte derivatives.
A. *Nitroxolinum
B. Biseptoium
C. Nalidixic acid
D. Ciprofloxacinum
E. Furaginum

23. Specify the antimicrobial drug from the group of nitrofurans.
A. *Furaginum
B. Biseptoium
C Nalidixic acid
D. Nitroxolinum
E. Ciprofloxacinum

24. Specify the antimicrobal drug from the group of fluoroquinolones.
A. *Ciprofloxacinum
B. Biseptoium
C. Nalidixic acid
D. Nitroxolinum
E. Furaginum

25. During examination in out-patient department a physician identified pneumonia and- prescribed in-patient treatment by ampicillin and cefalexin. However, the patient started treatment at home with the same antibiotics, dosage and timing prescribed by the doctor. Within three days the sick person felt better, fever and cough reduced. The treatment was discontinued and the patient turned back to work. Next day he/she felt much worse, fever and cough were developed again, that is why the patient had to be examined by the physician, indicate please which principle of chemotherapy was disobeyed by the patient:
A. *Duration of treatment
B. Combined usage of agents
C. The earliest chemotherapy beginning
D. Effective agent choice based on clinical and bacteriological diagnosis
E. Optimal selection of dosage, timing and introduction ways of agent

26. Patient with pneumonia was treated by injections of antibiotic. Determine the type of chemotherapy:

A. *Causal treatment
B. Substitute treatment
C. Preventive treatment
D. Symptomatic treatment
E. Pathogenic treatment

27. Duration of sulfonamide agents' activity depends on:
A. *Affiliate activity with proteins of blood or/and reabsorption in renal canaliculi
B. Aptitude of enterohepatic circulation
C. Speed of absorption in GIT
D. Level and speed of metabolic biotransformation in liver
E. All named above

28. After antimicrobial treatment of pneumonia within 8 days patient developed painful urination, pain in kidneys area, the urine has brown. Indicate the drugs group that used in the case:
A. *Sulfonlamide
B. Lincomycin
C. B- lactam antibiotic
D. Aminoglycosides
E. Cephaiosporines

29. After long-term treatment by antibiotics at the in-patient department a patient developed dyspeptic syndrome. Investigation of stool revealed diminished amount of Bifidobacterium and Bacillus coli. What is the reason of present illness?
A. *Disbacteriosis
B. Enteric colibacillosis
C. Pseudomembranous enterocolitis
D. Toxic action of the agents
E. Acquisition of nosocomial infection

30. Indicate an antibacterial agent from the group of fluoroquinolone:
A. *Ciprofloxacin
B. Nalidix acid
C. Nitroxolin
D. Furosemide
E. Biceptol

31. Formaldehyde solution was applied for disinfection of nonmetallic instruments of surgical department What chemical series does this antiseptic preparation belong to?
A. Halogenated compounds
B. Aromatic series
++C. Aliphatic series
D. Alcohols
E. Detergents

32. For the preparation of the burned skin surface of a patient a certain medication was applied. Its antiseptic properties are provided by free oxygen released in presence of organic substances. What medication is it?
A. Chlorhexidine
B. Furacillin
C. Sodium hydrocarbonate
++*D. Potassium permanganate
E. Alcoholic iodine solution

33. It is required to disinfect equipment in a dental room. Choose a preparation without disagreeable odour and colouring power:
A. Chloride lime
B. Carbolic acid solution
C. Ethacrydine lactate
D. Formalin
++*E. Chlorhexidine bigluconate

34. For the purpose of disinfection of non-metallic surgical instruments the formaldehyde solution was used. What group does this anticeptic preparation belong to according to its chemical structure?
A. Aromatics
B. Alcohols
++*C. Aliphatics
D. Detergents
E. Halogenated compounds

35 A patient suffering form stomatitis was prescribed oral rinsing. Which antiseptic from the oxidant group is the most suitable for this purpose?
+A. Potassium permanganate
B. Chloramine
C. Alcoholic iodine solution
D. Boric acid
E. Ethyl alcohol

36 Oral mucosa of a patient was treated with hydrogen peroxide. Instead of foaming, the blood turned brown. That is possible in case of reduced concentration of the following enzyme:
A. Acetyltransferase
B. Glucose-6-phosphate dehydrogenase
+C. Catalase
D. Methemoglobin reductase
E. Pseudocholinesterase

37 Certain infections caused by bacteria are treated with sulphanilamides that block the synthesis of bacterial growth factor. What is the mechanism of these drugs action?
A. They are allosteric enzyme inhibitors
+B. They are antivitamins of p-aminobenzoic acid
C. They are involved in redox processes
D. They are allosteric enzymes

38 Mother of a 10-year-old boy with purulent gingivitis consulted a dentist about the possibility of gingivitis treatment with fluoroquinolone drugs. The doctor gave a negative answer explaining it by the fact that fluoroquinolones:
A. Have cauterizing effect on the mucous membranes
B. Provoke gingival haemorrhage
+C. Damage the cartilage tissue in children
D. Provoke loss of calcium from bones and teeth
E. Damage dentin

39 A patient has been diagnosed with sepsis. It was decided to treat him with a drug from the fluoroquinolone group. Specify this drug:
+A. Ciprofloxacin
B. Cephalexin
C. Cefpirome
D. Ampicillin
E. Metronidazole

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №7. Chemotherapeutic drugs		

Antibiotics I and II (β-lactams, aminoglycosides, macrolides, tetracyclines, chloramphenicol)

The list of basic terms in the topic

Term	Definiton
Antibiotics (antibacterial drugs)	Drugs that inhibit bacterial growth or kill bacteria. Antibacterials are divided into two broad groups according to their biological effect on microorganisms: bactericidal agents kill bacteria, and bacteriostatic agents slow down or stall bacterial growth.
Classes of antibiotics	Antibacterial drugs are commonly classified based on their mechanism of action, chemical structure, or spectrum of activity. Most target bacterial functions or growth processes. Those that target the bacterial cell wall (penicillins and cephalosporins) or the cell membrane (polymyxins), or interfere with essential bacterial enzymes (rifamycins, quinolones, and sulfonamides) have bactericidal activities. Those that target protein synthesis (macrolides, lincosamides and tetracyclines) are usually bacteriostatic (with the exception of bactericidal aminoglycosides). Further categorization is based on their target specificity. "Narrow-spectrum" antibacterial antibiotics target specific types of bacteria, such as Gram-negative or Gram-positive bacteria, whereas broad-spectrum antibiotics affect a wide range of bacteria.
Antibiotic resistance	Form of drug resistance whereby some (or, less commonly, all) sub-populations of a microorganism, usually a bacterial species, are able to survive after exposure to one or more antibiotics; pathogens resistant to multiple antibiotics are considered multidrug resistant (MDR) or, more colloquially, superbugs. Microbes, rather than people, develop resistance to antibiotics.
β-lactam antibiotics (**beta-lactam antibiotics**)	Broad class of antibiotics, consisting of als that contains a β-lactam ring in their molecular structures. This includes penicillin derivatives (penams), cephalosporins (cephems), monobactams, and carbapenems. Most β-lactam antibiotics work by inhibiting cell wall biosynthesis in the bacterial organism and are the most widely used group of antibiotics.
Aminoglycosides	Antibiotics that are composed of amino-modified sugars.
Macrolides	Group of antibiotics whose activity stems from the presence of a macrolide ring, a large macrocyclic lactone ring. These rings are usually 14-, 15-, or 16-membered.
Tetracyclines	Group of closely related compounds that, as the name implies, consist of four fused rings with a system of conjugated double bonds.

Individual work

Theoretical questions:

1. General characteristics of antibiotics. Spectrum of antibacterial activity. History of discovery and introduction of antibiotics into medical practice. Principles of antibiotic therapy.
2. Classification of antibiotics by mechanism action and antibacterial spectrum.
3. Penicillins. Classification. Antibacterial spectrum, mechanism and duration of action. Routes of administration. Pharmacological characteristics of natural drugs: ***Benzylpenicillin sodium, Benzylpenicillin potassium, Benzathine benzylpenicillin [Bicillin-1], Bicillin-3, Bicillin-5***. Semisynthetic penicillins: ***Oxacillin, Ampicillin, Amoxicillin, Ampicillin / Oxacillin [Ampiox]***. Comparative characteristics of drugs, indications and contraindications, side effects and toxicity. Anaphylactic shock to penicillins, prevention and treatment.
4. Principles and objectives of penicillin combination with β-lactamase inhibitors: clavulanic acid ***(Co-Amoxiclav, Augmentin)*** and sulbactam ***(Unasyn)***.

5. Cephalosporins. Classification of drugs according to generations and routes of administration. Indications and clinical uses. Comparative characteristics of cephalosporins ***(Cefazolin, Cefalexin, Cefuroxime, Cefotaxime, Ceftriaxone, Cefepime, Cefpirome).*** Side effects.
6. Pharmacological characteristics of carbapenems ***(Meropenem)*** and monobactams ***(Aztreonam).*** Mechanism of action, antibacterial spectrum, indications and clinical uses, side effects.
7. Pharmacological characteristics of macrolides ***(Erythromycin, Clarithromycin, Azithromycin)***. Mechanism of action, antibacterial spectrum, indications and clinical uses, side effects.
8. Pharmacology of aminoglycosides ***(Streptomycin, Gentamicin, Amikacin)***. Comparative characteristics, mechanism of action, antibacterial spectrum, indications and contraindications, side effects and their prevention.
9. Tetracyclines: natural ***(Tetracycline),*** semisynthetic ***(Doxycycline [Vibramycin], Methacycline [Rondomycin]).*** Mechanism and spectrum of antimicrobial action. Indications and contraindications, side effects and their prevention.
10. Pharmacological characteristics of ***Chloramphenicol [Laevomycetin].*** Mechanism of action, antibacterial spectrum, indications and clinical uses, side effects.
11. Cyclic polypeptides (polymyxins): ***Gramicidin S, Polymyxin M, Polymyxin B***. Mechanism of action, antibacterial spectrum, indications and clinical uses, side effects.
12. ***Rifampicin [Rifampin]***. Mechanism of action, antibacterial spectrum, indications and clinical uses, side effects.
13. Lincosamides. Pharmacokinetics and pharmacodynamics of ***Lincomycin, Clindamycin***. Indications and clinical uses, side effects.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Benzylpenicillin sodium***
2. **Bicillin-5***
3. Amoxicillin
4. **Co-Amoxicillin (Amoxiclav)***
5. Cefazolin
6. **Ceftriaxone***
7. Azithromycin
8. **Doxycycline hydrochloride***
9. **Gentamicin sulfate***
10. **Amikacin sulfate***
11. Chloramphenicol
12. Lincomycin sulfate

Note: * – drugs for filling in the table

TASK FOR AN EXTRACURRICULAR WORK

Fill in the table:

Drug and dosage form	*Mechanism of action*	*Indications and clinical uses*	*Adverse effects and contraindications*

Prescribe the drugs:

1. Benzylpenicillin sodium.

Rp:

2. Bicillin-5.

Rp:

3. Ceftriaxone.

Rp:

4. Azithromycin.

Rp:

5. Amikacin sulfate.

Rp:

6. Drug for treatment of pneumonia in case of allergy to penicillins.

Rp:

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

DATE		Module 2
Unit №7. Chemotherapeutic drugs		

Antifungal, antiviral, antimycobacterial, antiprotozoal, anthelmintic and anticancer drugs. The final class «Chemotherapeutic drugs»

The list of basic terms in the topic

Term	Definiton
Antifungal drugs	Drugs that are used to treat infections caused by fungi (mycoses) and to prevent the development of fungal infections in patients with weakened immune systems. There are several classes of drugs typically used to treat fungal infections: polyenes, azoles, allylamines, and echinocandins.
Antiviral drugs	Drugs that are used specifically for treating viral infections. Most of the antiviral drugs now available are designed to help deal with HIV, herpes viruses, the hepatitis B and C viruses, and influenza A and B viruses.
Antimycobacterial drugs	Drugs that are used in the treatment of diseases caused by members of the Mycobacterium genus, including tuberculosis (TB) and leprosy.
Antiprotozoal drugs	Drugs that are used to treat a variety of diseases caused by protozoa (amebiasis, malaria, trypanosomiasis, leishmaniasis, toxoplasmosis, giardiasis).
Anthelmintic drugs	Drugs that expel parasitic worms or helminths (nematodes, trematodes, and cestodes) from the body, by either stunning or killing them. They may also be called vermifuges (stunning) or vermicides (killing).
Chemotherapy	Treatment of cancer with one or more cytotoxic anti-neoplastic drugs (chemotherapeutic agents) as part of a standardized regimen. Traditional chemotherapeutic agents act by killing cells that divide rapidly, one of the main properties of most cancer cells. This means that chemotherapy also harms cells that divide rapidly under normal circumstances: cells in the bone marrow,digestive tract, and hair follicles.

Individual work

Theoretical questions:

1. Antifungal (antimycotic) drugs: antibiotics ***(Griseofulvin, Nystatin, Amphotericin B)***, synthetic drugs – azoles ***(Clotrimazole, Ketoconazole [Nizoral], Itraconazole, Fluconazole)***, other drugs ***(Terbinafine, Dequalinium chloride [Decaminum])***. Pharmacological characteristics, mechanism of action, indications and clinical uses, side effects.
2. Antiviral drugs. Classification by clinical uses. Pharmacological characteristics of drugs used for treatment and prevention of influenza ***(Rimantadine, Oxolin***), herpes ***(Acyclovir [Zovirax]),*** HIV infection ***Zidovudine [Azidothymidine]***. Pharmacology of interferons ***(Human leukocyte interferon, Laferon, Reaferon)*** and interferon inducers ***(Amixin)***.
3. Classification of antiprotozoal drugs.
4. Antimalarial drugs. Basic principles of prevention and treatment of malaria. Classification of antimalarial drugs. Mechanism of action. Pharmacological characteristics ***Chingamine, Chloridine, Primaquine, Quinine***. Indications and contraindications, side effects. Combined antimalarial drugs: ***Pyrimethamine / Sulfadoxine [Fansidar]***.
5. Drugs used to treat trichomoniasis. Pharmacokinetics and pharmacodynamics of ***Metronidazole***. Indications and clinical uses, side effects. ***Tinidazole, Ornidazole, Furazolidone*** in treatment of trichomoniasis.

6. Drugs for treatment of chlamydia infection. Pharmacological characteristics of ***Macrolides, Doxycycline, Metronidazole***.
7. Drugs for treatment of giardiasis.
8. Classification of antiamebic drugs. Pharmacological characteristics of ***Metronidazole, Doxycycline, Chingamine, Emetine***.
9. Drugs for treatment of toxoplasmosis . Pharmacological characteristics of ***Chloridine, Chingamine, Sulfonamides***.
10. Antihelminthic drugs. Classification. Peculiarities of administration in different types of helminthiasis.
11. Pharmacological characteristics of drugs used for treatment of intestinal helminthiasis ***(Mebendazole, Albendazole, Levamisole, Pyrantel, Piperazine adipate)***. Indications and clinical uses, side effects.
12. Drugs used for extraintestinal helminthiasis ***(Praziquantel, Chloxyl, Ditrazine citrate)***. Indications and clinical uses, side effects.
13. Basic principles of antitubercular drugs administration.
14. Classification of antitubercular drugs: high-efficacy drugs (group 1): ***Rifampicin, Isoniazid***; moderate-efficacy drugs (group 2): ***Ethambutol, Ethionamide, Streptomycin, Kanamycin, Amikacin, Cycloserine, Pyrazinamide***; low-efficacy drugs (group 3): ***Sodium paraaminosalicylate***.
15. Clinical classification of antitubercular drugs: first-line drugs ***(Isoniazid, Rifampicin, Ethambutol, Pyrazinamide)*** and second-line drugs ***(Ethionamide, Cycloserine, Sodium paraaminosalicylate, Ofloxacin, Kanamycin, Streptomycin, Amikacin)***.
16. Pharmacokinetics and pharmacodynamics of isonicotinic acid derivatives ***(Isoniazid, Ftivazid)***. Side effects of long-term administration, their prevention.
17. Antibiotics for treatment of tuberculosis ***(Rifampicin, Streptomycin, Kanamycin, Amikacin, Cycloserine)***. Indications and contraindications, side effects and their prevention.
18. Pharmacological characteristics of other drugs: ***Ethionamide, Ethambutol, Ofloxacin, Sodium paraaminosalicylate***. Side effects, their prevention.
19. Basic principles of chemotherapy (treatment of cancer).
20. Classification, general characteristics, indications and clinical uses of anticancer drugs.
21. Pharmacology of alkylating agents ***(Sarcolysin, Busulfan [Myelosan])***, antimetabolites ***(Methotrexate, 6-Mercaptopurine, 5-Fluorouracil***), anthracycline antibiotics ***(Doxorubicin)***, alkaloids ***(Vincristine, Vinblastine)***, antiestrogens ***(Tamoxifen)***, antiandrogens ***(Flutamide)***, glucocorticoids ***(Prednisone, Dexamethasone)***.

THE LIST OF DRUGS FOR COMPULSORY STUDY:

1. **Nystatin***
2. **Terbinafine***
3. **Itraconazole***
4. **Acyclovir***
5. **Isoniazid***
6. **Rifampicin***
7. Pyrazinamide
8. Ethambutol
9. **Metronidazole***
10. Mebendazole
11. Pyrantel
12. Methotrexate
13. Mercaptopurine
14. **Doxorubicin***

Note: * – drugs for filling in the table

TASK FOR AN EXTRACURRICULAR WORK

Fill in the table:

Drug and dosage form	*Mechanism of action*	*Indications and clinical uses*	*Adverse effects and contraindications*

Prescribe the drugs:

1. Itraconazole.

Rp:

2. Nystatine.

Rp:

3. Acyclovir.

Rp:

4. Doxorubicin.

Rp:

5. Isoniazid.

Rp:

6. Metronidazole.

TESTS TO PREPARE FOR THE PRACTICAL CLASSES:

1. The patient with the diagnosis of cholera was admitted to the infection diseases hospital. Specify a group of antibiotics of the first choice for treatment of this disease
   A. *Tetracyclines
   B. Aminoglycosides
   C. Penicillins
   D. Macrolids
   E. Cephalosporines

2. A patient started to complaint of worsening of audition after treatment with antibiotic because of purulent complication after the surgical operation. Specify the group of antibiotics which posses ototoxic activity.
   A. * Aminoglycosides
   B Penicillins
   C. Tetracyclines
   D. Polymyxins
   E. Macrolids

3. A patient was delivered to the surgical department with anaerobic gangrene. Specify the antibiotic of first choice for the treatment of this infection.
   A. *Benzylpenicillinum natrium
   B. Tetracyclinum
   C. Clindamycinum
   D. Cefazolinum
   E. Chloramphenicol

4. Specify the main antibiotic for the treatment of diphtheria.
   A. *Erythromycinum
   B. Laevomycetinum
   C. Cefazolinum
   D. Gentamycinum
   E. Tetracyclinum

5. A woman addressed to a dentist with complaints of teeth destruction in her little child. It was revealed that during pregnancy the woman took antibiotics. Specify the group of antibiotics that could cause these side-effects.
   A. *Tetracyclines
   B. Macrolides
   C. Penicillins
   D. Cephalosporins
   E. Aminoglycosides

6. An antibiotic was administered to a patient suffering from abdominal typhoid. Soon there was general improvement, but on the 2nd week after the treatment the patient had elevation of body temperature, signs of tonsillitis, and rashes on mucous membranes of lips & nose. In laboratory examination of discharges, Candida fungi were found. The blood analysis revealed leukopenia and agranulocytosis. Which antibiotic could cause these complications?
   A. *Laevomycetinum
   B. Tetracyclinum
   C. Polymyxins
   D. Gentamycinum
   E. Cefazolinum

7. Specify the group of antibiotics whose mechanism of action is connected with inhibition of synthesis of bacterial ceil wall.
   A. *Penicillins
   B. Macrolides
   C. Tetracyclines
   D. Aminoglycosides
   E. Lincosamides

8. Specify the most typical side-effect of penicillins.
   A. *Allergic reactions
   B. Agranulocytosis
   C. Anemia
   D. Decrease of audition
   E. Hepatotoxic influence

9. Specify the antibiotic from the group of semisynthetic penicillins.
   A. *Ampiciilinum
   B. Phenoxymethylpenici/linum
   C. Benzylpenicillinum natrium

D. Benzylpenicillinum kalium
E. Benzylpenicillinum novocainum

10. Specify the group of antibiot ics whose mechanism of action involves inhibition of protein synthesis by microorganisms.
A. *Tetracyclines
B. Penicillins
C. Cephalosporins
D. Monobactams
E. Polymyxins

11. In the treatment with wide-spectrum antibiotics some complicaions, including candidiasis may occur. Specify the agent for the treatment of candidiasis.
A. *Ketoconazole
B Amphotericinum B
C. Griseofulvinum
D. Gramicidinum
E. Undecinum

12. A patient with dermatomycosis took antifungal agent which was able to be accumulated within the cells producing keratin (skin, nails, hairs), in several clays the patient visited the physician complaining of headache, desorientation. Specify the appointed antibiotic.
A. *Griseofulvinum
B. Levorinum
C. Amphotericinum B
D. Mycogeptinum
E. Nystatinum

13. After long-term treatment with tetracyclinum a patient was hospitalized in relation, with aphthous stomatitis. During laboratory examination the Candida fungi were identified. Specify the agent available for the treatment of candidiasis.
A. *Nystatinum
B. Furazolidonum
C. Griseofuivinum
D. Amicazolum
E. Cefalexinum

14. Indicate a drug group which oppresses synthesis of cell membrane components:
A. *Penicillines
B. Tetracyclines
C. Aminoglycosides
D. Lincosamides
E. Macrolides

15. Drug with β-lactam ring was prescribed to a patient with streptococci gums inflammation. Indicate this drug:
A. *BenzylpeniciHin
B. Rifampicine
C. Erythromycin
D. Streptomycin sulfate
E. Laevomycetine

16. A patient was admitted to a hospital with diagnosis: gaseous gangrene. Drugs for its treatment are divided on two groups: basic and reserve. Indicate the basic antibiotic:
A. *Benzylpenicillin natrium
B. Tetracycline
C. Laevomycetine
D. Clindamycin
E. Cefazolin

17. Cephalosporines possess following properties, except:
A. *Detergent activity
B. Mechanism of action linked to infringement of microbe s membrane synthesis
C. Bactericidal activity
D. Distinguished from penicillines by higher persistence toward β-lactamase
E. Distinguished from penicillines by spectrum of antimicrobial activity

18. 56-years old male was admitted to a hospital with pneumonia. It is known he suffers from hay fever and seasonal vasomotor rhinitis. What drug should be administered in the case?
A. *Cefazolin
B. Benzylpenicillin
C. Bicillin
D. Oxacillin
E. Ampiciliin

19. 14-years old boy developed acute pneumonia in low lobe of the right lung. The agent in sputum analysis was resistant to penicillin. Choose the drug for treatment in this case:
A. Gentamycin
B. Laevomycetine
C. Streptomycin
D. Tetracycline
E. *Cefazolin

20. Determine drug by following: it oppresses of protein synthesis by microbes ribosomes because of inhibition of peptidtranslocase, belongs to reserve macrolide, causes side effects relatively seldom.
A. *Erythromycin
B. Sygmamycin
C. Tetraolean
D. Azithromycin
E. Tetracycline

21. Determine drug with wide spectrum of antibiotic activity, a basic antibiotic agent of treatment enteric fever and other salmonellosises and possesses following side effects: oppresses of bone marrow activity, disbacteriosis and dyspeptic disorders:
A. *Laevomycetine
B. Phthalazolum
C. Benzylpenicillin natrium
D. Neomycin sulfate
E. Tetracycline

22. Which drug is used for treatment of enteric fever?
A. *Laevomycetine
B. Ampicillin
C .Cefalexin
D. Benzylpenicillin
E. Erythromycin

23. A patient with diminished hearing has severe bacillary infection. Which drug group is contradicted to the patient?
A. *Aminoglycosides
B. Peniciltines
C. Cephalosporines
D. Tetracyclines
E. Rifampicines

24. Patient with acute appendicitis, was admitted to a surgical department. Appendectomy was performed. During ten days after operation patient received an antibiotic. After a while lowering of hearing were revealed. Indicate drug group with the same side effects:
A. *Aminoglycosides
B. Tetracyclines
C. Polymyxines
D. Macrolides
E. Penicillines

25. Determine the drug for treatment infections of bones that able to penetrate to bone tissue and bone marrow:
A *Lincomycin
B. Benzylpenicillin
C. Bicitlin-3
D. Gentamycin
E. Synthomycinum

26. An antibiotic with ability to penetrate to bones tissue was prescribed to 30 years old patient with osteomyelitis. After three weeks of using it the patient felt much better. Determine the drug:
A. Lincomycin
B. Bicilline-3
C. Benzylpenicillin
D. Polymixine M
E. Ampicillin

27. Deteirmine drug for treatment of candidiasis:
A. *Nystatin
B. Kanamycin
C. Tetracycline
D. Erythromycin
E. Benzylpenicillin

28. Considerable number of Candida albicans was revealed on cytological investigation of smear of 25 years-old woman with exacerbation of chronicle vaginitis. Which drug should be prescribed?
A. *Nystatin
B. Amphotericine
C. Miconazole

D. Clotrimazole
E. Metronidazole

29. A patient with diagnosed streptococcal bronchopneumonia after treatment with an antibiotic suffers from allergic symptoms. Determine the drug:
A. *Benzylpenicillin-natrium (penicillin G sodium)
B. Tetracycline
C. Gentamycin
D. Laevomycetineum (chloramphenicol)
E. Doxicycline

30. Infectious agent determined by lab tests is known to be sensitive to third generation cephalosporins. Choose the drug for treatment:
A. Cefazolin
B. Cefalexin
C Cefalotin
D. *Cephtriaxone
E. Cefaloridin

31. A patient with bacterial pneumonia was treated by the erythromycin which acts on microbes by interaction with their free 50S subunits of ribosomes. What process does this drug block?
A. DNA synthesis
B. RNA synthesis
C. "Proteins' synthesis
D. Lyposynthesis
E. Polysaccharides' synthesis

32. The patient who had been suffering from tuberculosis was treated with Isoniazidum. After a while the patient began to complaint of muscle weekness, decrease of skin sensitivity, impairment of vision and motor discoordination. Indicate the vitamin's drug which should be administered to eliminate the specified phenomena?
A. * Pyridoxin (B6)
B. Retinol (A)
C. Ergocalciterol (D)
D. Cyanocobatamin (B12)
E. Ascorbinic acid (C)

33. Indicate the drug which is used for intranasal dropping with the purpose of prophylaxis of infuenza.
A. * Interferon
B. Remantadinum
C. Ampicillinum
D. Aciclovir
E. Paracetamolum

34. Specify the antibiotic available for the treatment of tuberculosis.
A.*Rifampicinum
B. Tetracyclinum
C. Ampici/linum
D. Erythromycinum
E. Lincomycinum

35. Specify the antituberculous agent which inhibits synthesis of mycolic acids by Mycobacterium tuberculosis.
A. *Isoniazidum
B. Ethambutolum
C. Streptomycinum
D. Cycloserinum
E. PAS

36. Indicate the most effective synthetic antituberculous drug.
A. Kanamycinum
B. Streptomycinum
C. Rifampicinum
D. PAS
E. *Isoniazidum

37. A patient, 60 years old had been treated for tuberculosis for a long time. Recently he began to omplain of decrease in audition, which drug should be contraindicated?
A. *Streptomycinum
B. Ftivazidum
C Ethambutolum
D. Isoniazidum
E. Rifampicinum

40. Drugs of which group must be administered first of all to a girl 1.5 years old in relation with acute herpetic, stomatitis during rash period?
A. *Antiviral agents
B. Antiallergic agents
C. Antibiotics

32. An antibiotic for treatment of enteric fever was administered to a patient. Clinical recovery was achieved, but within 2 weeks the patient developed symptoms of quinsy, fever, rashes at mucous membranes of lips and nose. Blood test revealed diminished amount of WBC and granulocytopenia. Choose an antibiotic which can cause these side effects:
A. Tetracycline
B. *Laevomycetinum (chloramphenicol)
C. Polymyxine M sulfate
D. Cefazoline
E. Gentamycine

38. Tetracycline was administered PO for treatment of acute purulent sinusitis. What antimycotic drug should be administered to a patient to prevent candidiasis?
A. Griseofulvin
B. Levamisole
C. Furazolidone
D. Ciprofloxacin
E. *Nystatin

39. After taking tetracycline for a long period of time, patient developed candidiasis of mucous membranes of mouth. Which drug should be used for treatment?
A. *Nystatin
B. Griseofulvin
C. Nitrofungine
D. Nitroxoffne
E. Furadon/ne
D. Antiseptics
E. Keratoplasty

41. Specify the agent which could be used for the prevention of influenza during epidemic period.
A. *Remantadinum
B. Biseptolum
C. Ampicillinum
D. Anaiginum
E. Paracetamolum

42. In the newborn department of a hospital there was sudden increase of acute respiratory disease caused by venous types of viruses. To prevent spread of the infection it was recommended to use human leukocytic interferons. Specify the available way of introduction in this case.
A. *Intranasal
B. Subcutaneous.
C Intramuscular
D. Peroral
E. Inhaled.

43. A woman 25 years old was hospitalized for treatment of syphilis. Specify one of the main antibiotics for treatment of this disease.
A. *Benzylpenicillinum natrium
B Erythromycinum
C. Tetracyclinum
D. Lincomycinum
E. Vancomycinum

44. A 35-year-old man under the treatment for pulmonary tuberculosis suffers acute pain of the right big toe, accompanied by swelling and slight fever. The gouty arthritis was diagnosed and high serum uric acid level was found. Which of the following antituberculos drug is known for causing high uric acid levels?
A. *Pyrasinamide
B. Cycloserine
C. Rifampicine
D. Thioacetazone
E. Aminosalicylic acid

45. Patient has inherited of acetyl-transferase insufficiency. Which drugs can cause severe intoxication in this case?
A. *Hydrazids of isonicotinic acid
B. Barbiturates
C. Antibiotics-tetracyc/ines
D. β-adrenoblockers
E. Nitrates

46. Which antituberculous drug from the following oppresses transcription DNA to RNA?
A. *Rifampicine
B. Isoniazid
C. Streptomycin
D. Ethionamide
E. PAS

47. Patient with leprosies developed hypopigmentic rash with absence of perception in its location. An antibiotic that is the basic antituberculous agent was prescribed. Indicate this drug:
A. *Rifampicine
B. Amoxicillin
C. Erythromycin
D. Nitroxoli
E. Cefazolin

48. After treatment of patient suffering from tuberculosis, his vision worsened rapidly, visual fields were narrowed. Determine the drug which caused these side effects:
A *Ethambutol
B. Isoniazid
C. Kanamycin sulfate
D. Ethionamide
E. Rifampicine

49. 60-Years old male, with diagnosed tuberculosis long time ago, timely receives antituberculous treatment. He developed the blood. Indicate the agent that is able to cause these side effects?
A. *Zidovudine
B. Sackvinovir
C. Acilovir
D. Valaciclovir
E. Remantadine

50. 19-Years old patient with primary syphilis receives complex treatment by benzylpenicillin natrium. What is its mechanism of action?
A. *Blockade of murein synthesis in cell walls
B. Blockade of protein synthesis in cytoplasm
C. Blockade of tiotic groups of enzymes
D. Blockade of RNA synthesis
E. Blockade of DNA synthesis

51. A patient has been suffering from tuberculosis associated with intracellular location of mycobacterium for a long period of time. What drug must be included in complex treatment?
A. Rifampicine
B. *Isoniazid
C. Ethambutol
D. Ethionamide
E. Natrium paraaminosalicilate

52. A patient known to be treated of pulmonary tuberculosis noticed that his lachrymal liquid and urine became red. What drug is able to develop such side effect?
A. *Rifampicine
B. Isoniazid
C. Ethionamide
D. Streptomycin sulfas
E. Ethambutol

53. 39-years-old patient with pulmonary tuberculosis received effective complex treatment composed of 3 antituberculous agents including Steptomycin sulfate. What is its mechanism of action?
A. *Blockade of proteins synthesis
B. PABA anti-metabolite
C. Blockade of RNA synthesis
D. Inhibition of DNA replication
F. Inhibition of mycolic acids synthesis

54. A patient with primary syphilis has allergy to benzylpenicillin. What drug can be prescribed in the case?
A. *Erythromycin
B. Amoxicillin
C. Amoxiclav
D. Carbenicillin
E. Lincomycin

55. 25-years old woman was admitted to a hospital with diagnosed syphilis. Indicate the main antibiotic for her treatment:
A. *Benzylpenicillin natrium (penicillin G sodium)
B. Tetracycline
C. Lincomycin
D. Vancomycin
E. Erythromycin

56. After treatment by antituberculous drugs during three month, a patient developed daltonism, reduced ability to distinguish red and green colors. Which antituberculous agent can cause this side effect?
A *Ethambutol
B. Streptomycin
C. PAS
D. Rifampicine
E. Cycloserine

57. Determine drug for AIDS treatment with following mechanism of action: it is able to be phosphorilizated in cells and transformed to triphosphate, and then it inhibits viral transcriptase and impede of DNA synthesis from viral RNA.
A. *Zidovudine
B. Saquinavir
C. Indinavir
D. Ritonavir
E. Virasept

59. A female patient addressed to gynecologist with complaints of undant discharges from vagina with pleasant smell. After bacteriological vestigation the diagnosis of trichmo-•sis has been given. Specify the ug which should be administered.
A. * Metronidazolum (Trichopolum)
B. Sulfadimezinum
C. Chingaminum
D. Chloridinum
E. Monomycinum

60. Mother addressed to the pediatrician with the child who complained of strong itch in the region around the anus, pain intensified at night. After investigation of feaces the diagnosis of enterobiasis was given. Indicate the drug which should be administered.
A. *Levamisolum
B. Trichlorophenum
C. Phenasalum
D. Ditrazinum
E. Aminoacrichinum

61. Indicate the antimalarial agent which is active against paraerythrocytic forms of Plasmodium.
A *Primachinum
B Chingaminum
C. Galochinum
D. Hydroxychlorochinum
E. Aminoacrichinum

62. Specify the drug which is used in amebiasis of any localization of pathological process.
A. *Metronidazolum (Trichopolum)
B. Chingaminum
C. Emetinum hydrochloridum
D. Chiniophonum
E. Tetracyciinum

63. A patient visited a physician with complaints of bowel dysfunction. After laboratory examination the diagnosis of lambliasis was made. Specify the drug that should be used.
A. *Metronidazolum (Trichopolum)
B. Tetracycilinum
C. Trichomonacid
D. Monomycinun
E. Chingaminum

64. During summer vacations a student from tropical country developed tertian malaria. After recovery he turned back to Ukraine for study extension. In January an exacerbation was developed, it is known from past history of disease that drug acting on paraerythrocytic plasmodium malariae for prevention of relapse was not prescribed. Indicate the drug:
A. Chingaminum
B. Halochin
C. Hydroxychloroquine
D. Amodiaquine
E. *Primaquine

65. Patient addressed to a physician to get a drug for prevention of malaria. Indicate the drug:
A. *Primaquine
B. Clotrimazole
C. Mebendazole
D. Furazolidone
E. Fenasal

66. What is the mechanism of anthelmintic action of levamisole?
A. *Oppression ot succinate dehydrogenase, ATPase
B. Oppression of MAO
C. DNA synthesis damage
D. Cholinesterase activation

E. Oppression of N-acetyltransferase

67. A drug is administered for prevention and treatment of malaria, treatment of amebiasis and diseases of connective tissue. Indicate the drug.
A. *Chingaminum (chloroquine)
B. Tetracycline
C. Metronidazole
D. Erythromycinum
E. Quinine

68. A drug was administered to a patient with ascaridosis. It is known to have influence on immune system, and is used as immunological modulator. Indicate the drug!
A. *Levamisole
B. Piperazine
C. Pyrantel
D. Phenasaium (niclosamide)
E. Praziquantel

69. A patient complaints of nausea, vomiting, loss of appetite. After investigation of stool ascaridosis was revealed. A drug with immune modulation activity was prescribed for single usage. Indicate the drug:
A. *Levamisole
B. Mebendazole
C. Pyrantel
D. Naphtamonum

70. E. Piperazine The antitumoral agent from the group of antimetabolites (antagonists of folic acid) was administered to the patient with acute leucosis. Indicate this drug.
A. *Methotrexatum
B. Fluorouracil
C. Myelosanum
D. . Mercaptopurine
E. Hexestrolum

71. Determine a drug for treatment of lympholeukosis:
A. *Embichinum
B. Phthoruracilum
C. Depostat
D. Diethylstilbestrol
E. Phenobolinum

72. A drug belongs to the group of anti-metabolites being an antagonis causes impairment of purines' synthesis, and thus lead to diminishing of nucleic acids' synthesis. Determine the drug:
A. *Methotrexate
B. Mercaptopurine
C. Phthoruracilum (fluorouracil)
D. Cytarabine
E. Cispiatine

73. Antitumoral drug from the group of antimetabolites is used for treatment of leucosis of children and cancer of adults. Determine the drug:
A. *Methotrexate
B. Sarcolysinum
C. Colchamine
D. Rubomycin
E. Prednisolonum

74. A patient with streptococcal gingival infection was prescribed a medication that contains beta-lactam ring in its structure. What preparation belongs to this group?
A. Erythromycin
B. Chloramphenicol
++C. Benzylpenicillin
D. Rifampicin
E. Streptomicin sulfate

75 A patient with streptococcal infection of gums was prescribed a drug that contained beta-lactam ring in its structur E. Which drug relates to this group?
A. Rifampicin
B. Erythromycin
+C. Benzylpenicillin
D. Streptomycin sulfate
E. Chloramphenicol

76 A patient suffering from syphilis was prescribed a drug the action of which based upon disturbed generation of murein leading to death of the causative agent. What drug is it?
A. Bijochinol
B. Azithromycin
C. Doxycycline hydrochloride
D. Ciprofloxacin
+E. Benzylpenicillin sodium salt

77 An infectious patient manifests sensibilization to penicillin. Which of the following antibiotics is the safest to be applied in this case?
A. Ampicillin
B. Oxacillin
+C. Erythromycin
D. Amoxicillin
E. Bicillin

78 A 30-year-old patient with pneumonia has been administered a 3-day course of an antibiotic from the group of azalides that has bactericidal effect, prolonged action, the ability to bind to phagocytic cells and accumulate in the infection foci. What drug has been administered?
+A. Azithromycin
B. Isoniazid
C. Ciprofloxacin
D. Erythromycin
E. Benzylpenicillin sodium salt

79. A patient is ill with herpetic stomatitis provoked by immunosuppression. What preparation introduced intravenously, internally and locally can provide antiviral and immunopotentiating effect?
++*A. Acyclovir
B. Remantadinum
C. Amoxicillin
D. Methisazonum
E. Levamisole

80 A patient consulted a dentis about a lesion of his oral mucos A. He was diagnosed with herpetic stomatitis. Which of the following drugs will have an effect on etiotropic factor?
A. Levamisole
+B. Acyclovir
C. Furacilinum
D. Paracetamol
E. Dimedrol

81 A patient with herpetic stomatitis was prescribed acyclovir for topical application. What is its mechanism of action?
A. It inhibits virus penetration into cells
B. It increases the resistance of macroorganism cells to the viruses
+C. It inhibits synthesis of nucleic acids of viruses
D. It inhibits virion assembly
E. It inhibits virus maturation

82 A patient who has been taking tetracycline for a long time has developed candidosis of mucous membranes. What drug shoul administered for its treatment?
A. Griseofulvin
B. Nitrofurantoin
+C. Itraconazole
D. Nitrofungin
E. Amphotericin

83. A 30 y.o. patient is diagnosed with amebic dysentery, this diagnosis was bacteriologically confirmed. Name the preparation for its treatment:
++*A. Metronidazole
B. Mebendazole
C. Itrakonazole
D. Furacillin
E. Acyclovir

84 A patient consulted a dentist about itching and burning in the oral cavity; high temperatur E. The patient was diagnosed with trichomonal gingivostomatitis. What drug should be chosen for his treatment?
+A. Metronidazole
B. Ampicillin
C. Nystatin
D. Doxycycline hydrochloride
E. Gentamicin sulfate

85 After the second abortion a 23-year-old woman has been diagnosed with toxoplasmosis. Which drug should be used for toxoplasmosis treatment?
+A. Co-trimoxazole
B. Mebendazole
C. Azidothimidine
D. Itraconazole
E. Acyclovir

86 In order to prevent wound infection associated with surgical procedures a patient was given a synthetic antiprotozoan drug with a high activity against Helicobacter pylori. Specify this drug:
A. Isoniazid
B. Acyclovir

+C. Metronidazole
D. Doxycycline hydrochloride
E. Chingamin

87 After 4 months of treatment for tuberculosis the patient began complaining of toes and fingers numbness, sensation of creeps. He was diagnosed with polyneuritis. What antituberculous drug might have caused these complications?
A. Ciprofloxacin
B. Alcohol iodine solution
C. Sodium salt of benzylpenicillin
+D. Isoniazid
E. Rifampicin

88 Following treatment with a highly-efficient anti-tuberculosis drug a 48-year-old female developed optic nerve neuritis, memory impairment, cramps. Which of these anti-TB drugs had the patient taken?
A. Kanamycin sulfate
B. PASA
+C. Isoniazid
D. Ethambutol
E. Rifampicin

89. Cyanide poisoning causes immediate death. What is the mechanism of cyanide effect at the molecular level?
A. They inactivate oxygen
B. They block succinate dehydrogenase
C. They bind substrates of tricarboxylic acid cycle
++D. They inhibit cytochromoxidase
E. They inhibit cytochrome B

90 A patient with chronic heart failure had been taking digitoxin for several months, during digitalization the following symptoms developed: headache, nausea, diarrhea, loss of appetite, impaired color vision, bradycardia. What antidote should be administered to reduce the intoxication symptoms?
+A. Unithiol
B. Naloxone
C. Atropine sulfate
D. Adrenalin hydrochloride
E. Prednisolone

References:

1. Chekman I.S., Gorchakova N.O., Panasenko N.I., Bekh P.O. Pharmacology. – Vinnytsya: Nova Knyha Publishers, 2006. – 384 p.
2. Bobyrov V.M., Devyatkina T.O., Vazhnicha O.M., Khristyuk V.M. Pharmacology: textbook. – Vinnytsya: Nova Knyha Publishers, 2010. – 520 p.
3. Stefanov O.V., Kucher V.G. Pharmacology with General Prescription: textbook for English-speaking students, 3rd edition. – Kyiv: Book-plus, 2011. – 336 p.
4. Lippincott's Illustrated Reviews: Pharmacology, 5th edition / Ed. Michelle A. Clark et al. – Philadelphia: Lippincott Williams & Wilkins, 2012. – 615 p.
5. Lectures on pharmacology.

Mark		**Teacher's signature:**
Number of points		

THE LIST OF DRUGS THAT STUDENT MUST TO KNOW HOW TO PRESCRIBE AS A RECIPE FOR THE FINAL LESSON (MODUL 1)

1. Novocainum - ampl. 0,25%, 0,5%, 1%, 2% - 1, 2, 5, 10, 20ml
2. Lidocainum hydrochloridum – ampl. 1%, 2%, 10% - 2, 10, 20ml
3. Articainum – ampl. 1%, 2% - 5, 20 ml
4. Anaesthesium – powder, ointment 5-10%; rectal suppository 0,1
5. Carbo activatus – powder, tablet 0,25; 0,5
6. Atropini sulfas – ampl. 0,1% - 1ml; eye drops 1%-10ml
7. Platyphyllini hydrotartras – ampl. 0,2% - 1ml
8. Ipratropii bromidum – aerozol. 15ml
9. Pirenzepinum – tablet 0,025; 0,05
10. Proserinum – ampl. 0,05% - 1ml, tablet 0,015
11. Galanthamini hydrobromidum – ampl. 0,1%; 0,25%; 0,5%; 1% - 1ml
12. Dipiroxinum – ampl. 15% - 1ml
13. Pilocarpini hydrochloridum – eye drops 1%, 2% - 5, 10 ml
14. Tubocurarini chloridum – ampl. 1% - 1,5 ml
15. Dithilinum – ampl. 2% - 5ml and 10ml
16. Pipecuronium bromidum – vial. 0,004 g
17. Adrenalini hydrochloridum – ampl. 0,1% - 1ml
18. Noradrenalini hydrotartras – ampl. 0,2% - 1 ml
19. Mesatonum – ampl. 1% - 1ml; powder 0,03
20. Anaprilinum – tablet 0,01 and 0,04
21. Atenololum – tablet 0,025, 0,05, 0,1
22. Metoprolol – tablet 0,05 and 0,1
23. Salbutamolum – aerosol 10,0
24. Prazosinum – tablet 0,001; 0,002; 0,005
25. Isadrinum – tablet 0,005
26. Aminasinum – ampl. 2,5% - 1, 2, 5 ml; dragee 0,025, 0,05, 0,1; tablet 0,01
27. Halopeidolum – tablet 0,0015, 0,005; ampl. 0,5% - 1ml.
28. Droperidolum – ampl. 0,25% - 5 ml
29. Clozepidum – tablet 0,025 –0,1; ampl 2,5% - 2ml
30. Chlorprothixenum – tablet 0,015, 0,05
31. Diazepam – tablet 0,005; 0,001; 0,002; ampl. 0,5% - 2ml
32. Phenazepamum – tablet 0,0005, 0,001
33. Gidazepamum – tablet 0,02, 0,05
34. Mezapamum – tablet 0,01
35. Tinctura Valerianae – vial 30ml
36. Ketamini hydrochloridum- ampl. 5% - 2ml and 10ml; 1% – 20ml
37. Natrii oxybutyras – ampl. 20% - 10ml
38. Thiopentalum natrium –vial. 0,5 g
39. Phenobarbitalum – tablet 0,005, 0,05, 0,1
40. Zolpidem – tablet 0,01
41. Zaleptonum – capsule 0,005
42. Zopiclonum – tablet 0,0075
43. Nitrazepamum – tablet .0,005
44. Natrii valproicium – tablet 0,1; 0,2; 0,5

45. Lamotriginum – tablet 0,025, 0,05, 0,1, 0,2
46. Carbomazepinum – tablet 0,1; 0,2; 0,4
47. Levodopa – tablet 0,25; 0,5
48. Nakom – tablets №100
49. Cyclodolum – tablet 0,001; 0,002; 0,005
50. Selegilini hydrochloridum – tablet 0,005
51. Morphini hydrochloridum – ampl. 1% - 1ml; tablet 0,01
52. Tramadolum - capsule 0,05; ampl. 5%, 10% - 1 ml; suppository 0,1
53. Promedolum – ampl 1% and 2% - 1ml; tablet 0,025
54. Buprenorphinum hydrocloridum – ampl. 0,03% - 1 ml
55. Naloxonum – ampl. 0,04% - 1 ml
56. Diclophenac-natrium – tablet 0,025; ampl. 2,5% - 3 ml
57. Paracetamolum – tablet 0,2
58. Acidum acetylsalicylicum – tablet 0,25, 0,5
59. Analginum – tablet 0,5; ampl. 50% - 2ml
60. Indometacinum – tablet 0,025; suppository 0,05; ointment 5%, 10%- 40,0
61. Piroxicamum – tablet 0,01; capsule 0,01, 0,02; suppository 0,02
62. Meloxicam – tablet 0,0075 and 0,015; suppository 0,015
63. Celecoxibum – capsul. 0,1; 0,2
64. Coffeini-natrii benzoas – ampl. 10% and 20% - 1 and 2 ml; powder; tablet 0,01, 0,02
65. Amitriptylinum – tablet 0,025; ampl. 1% 2 ml.
66. Fluoxetinum – capsule 0,02
67. Sertralinum – tablet 0,05, 0,1
68. Cordiaminum – ampl. 1 and 2 ml.
69. Pyracetam – tablet 0,2; capsule 0,4, 0,8, 1,2; ampl. 20% -5 ml
70. Aminalonum – tablet 0,25; capsule. 0,25
71. Cavintonum – tablet 0,005; ampl. about 2 ml (10g)
72. Phenibutum – tablet 0,25
73. Pycamilonum – tablet 0,02, 0,05
74. Cinnarizinum – tablet 0,025
75. Nicergolinum – tablet 0,005, 0,01, 0,03; vial. 0,004 g
76. Tinctura Ginsengi – vial. 50 ml
77. Extractum Eleutherococcus – vial. 50 ml

THE LIST OF DRUGS THAT STUDENT MUST TO KNOW HOW TO PRESCRIBE AS A RECIPE FOR THE FINAL LESSON (MODULE 2)

Prednisolonum – ampl. 3% - 1 and 2 ml; tablet 0,001 and 0,005; ointment 0,5% - 10,0 and 15,0.

Dexamethasonum — ampl. 0,4% - 1 ml; tablet 0,0005; ointment 0,5% - 10,0 and 15,0.

L-thyroxinum – tablet 0,000025; 0,00005; 0,000075; 0,0001; 0,000125 and 0,00025

Mercazolilum - tablet 0,005.

Actrapidum – ampl.- 40 U \ ml and 100 IU \ ml, 10 ml.

Glibenclamidum – tablet 0,0035 and 0,005.

Metforminum - tablet 0,85 and 0,5

Oxytocinum – ampl. - 1 ml and 2 ml

Progesteronum – ampl. 1% and 2,5% -1 ml (oil).

Glucosum — ampl. 40% - 10 and 20 ml.

Retabolilum –oil solution for injection 5% - 1 ml.

Acidum ascorbinicum – ampl. 5% and 10% - 1 and 2 ml; tablet 0,05 and 0,5

Tocopheroli acetas – ampl. 5%; 10% and 50% - 1 ml; capsule - 0,1; 0,2 and 0,4

Cyanocobalaminum – ampl. 0,02% and 0,05% - 1 ml

Acidum nicotinicum – ampl. 1% - 1 ml; tablet 0,05

Retinoli acetas – solution for internal use 3,44% - 10 ml; capsule - 0,15 and 0,3

Ergocalciferolum – oil solution 0,125% for internal use - 10 ml.

Lydasum – lyophilized powder ampl. 64

Calcii gluconas – ampl. 10% - 5 and 10 ml; tablet 0,5.

Thiamini chloridum — ampl. 2,5% and 5% - 1 ml; tablet 0,002

Pananginum — ampl. - 10 ml; tablet №50.

Ferrum Lek –ampl. - 2 ml; syrup 100 ml; tablet 0,1

Heparinum – ampl. 5 ml.

Protamini sulfas — ampl. 1% - 2 and 5 ml.

Acidum aminocapronicum – solution for infusion 5 % vial 100 ml.

Vikasolum – ampl. 1% - 1 ml; tablet 0,01

Nadroparinum calcium – ampl.in syringes - 2850 ME (0,3 ml); 3800ME (0,4 ml); 5700 (0,6 ml); 7600 ME (0,8 ml).

Fraxiparinum- ampl. 0,3 ml (2850 ME), ampl. 0,4 ml (3800 ME), ampl. 0,6 ml (5700 ME)

Alteplase - lyophilisate for preparing a solution for infiltration 0.05:vial

Dipyridamolum — ampl. 0,5% - 2 ml; tablet 0,075

Dimedrolum – ampl. 1% - 1 ml, tablet 0,05 and 0,1

Diazolinum - tablet 0,1; granule – 9 g; dragee 0,05 and 0,1

Loratadinum – tablet 0,01

Aethimizolum – tablet 0,1; ampl. 1% and 1,5% - 3 ml.

Libexinum – tablet 0,1

Acetylcysteinum – powder 3,0 (0,6 and 2,0 / 3,0); tablet 0,1; 0,2 and 0,6

Ambroxolum – syrup 3 and 6 mg\ml 100мл; tablet 0,03 and 0,075

Salbutamolum- aerosol 10 ml (100 mkg\dose).

Euphyuinum - powder; tablet 0,15; ampl. 2,4% - 10 ml; 24% - 1 ml

Beclometasoni dipropionas - dosed aerosol(1 dose - 50, 100 or 250 mkg).
Metoclopramidum – ampl.0,5% - 2 ml; tablet 0,01
Omeprazolum – capsule 0,01, 0,02 and 0,04г; tablet 0,02; lyophilic powder for solution for infusion 40 mg vials
Karsilum – dragee - 0,035
Contrycalum – vials 10000
Pirenzepinum — ampl. 10 mg - 2 ml; tablet 0,025
Ranitidinum – tablet 0,15 and 0,3
Almagelum – vials 170; 200 ml.
Contrykalum – vials 10000
Ondansetronum — ampl. 0,2% - 2 ml; tablet 0,004 and 0,008
Essentiale – capsule forte 0,3 g; ampl. 5ml.
Bisacodylum– dragee - 0,005 ; suppository - 0,01
Loperamidum – tablet 0,002; capsule 0,002
Drotaverini hydrochloridum – ampl.2% - 2 ml; tablet 0,04 and 0,060
Losartanum – tablet 0,0125; 0.025; 0,05
Enalaprilum – tablet 0,0025; 0,005; 0,01 and 0,020
Magnesii sulfas – ampl. 20% and 25% - 5 and 10 ml
Lisinoprilum — tablet - 0,005, 0,01, 0,02
Amlodipinum – tablet 0,005 and 0,01
Lovastatinum – tablet 0,01; 0,02 and 0,04
Pentoxyphillinum — ampl. 2% - 5 ml; tablet 0,1 and 0,2
Nitroglicerinum - 1 % alcoholic solution in vials - 5 ml; tablet 0,0005
Sustac forte – tablet 0,0026 and 0,0064
Amlodipinum – tablet 0,0025; 0,005 and 0,01
Atenololum – tablet 0,025, 0,05 and 0,1
Amiodaronum – ampl.5% - 3 ml: tablet 0,2
Sumatriptanum – tablet 0,05 and 0,1
Vinpocetinum – ampl. 0,5% - 2 ml; tablet 0,005 and 0,01
Nicergolinum – tablet 0,01
Trimetazidinum – tablet 0,02 and 0,035
Corgliconum – ampl. 0,06% - 1 ml; tablet - 0,0005
Novocainamidum – tablet 0,25 and 0,5; ampl. 10% - 5 ml; 10% solution in a vial
Digoxinum – ampl. 0,025% - 1 ml, tablet 0,0005 and 0,00025
Lidocainum hydrochloridum – ampl. 1%, 2%, 10% - 2, 10, 20 ml
Amiodaronum – ampl. 5% - 3 ml: tablet 0,2
Kalii chloridum - concentrate for preparing solution for infusion 75 mg/1 ml: бут. 100 ml or 200 ml; concentrate for preparing solution for infusion 400 mg/10 ml: ampl. 5 pc.
Dobutaminum — ampl. 5% - 5 ml, vial - 20 ml
Unithiolum — ampl. 5% - 5 ml.
Spironolactonum – tablet 0,025
Furosemidum– ampl. 1% - 2 ml; tablet 0,04
Hydrochlorothiazidum – tablet 0,025 and 0,1
Asparkamum – tablet №10; ampl. 5% - 5 ml.
Dinoprostum - tablet; sterile solution 5 mg/mlin ampl. - 1; 1,5; 4; 5 and 8 ml
Oxytocinum – ampl. 1 ml and 2 ml
Ergometrini maleas – tablet 0,0002 ; ampl. 0,02% -1 ml.
Progesteronum – oil solution for injection ampl. 1% and 2,5% - 1 ml.

Chlorhexidini bigluconatum – solution for external use 0,05% - 100 ml.

Myramistinum - solution 0,01% is distributed in vials - 50 ml, 200 ml; ointment 0,5% - 15, 30, 100,1000

Solutio Viride nitens – solution 1% - 10, 15, 20 and 25 ml.

Solutio lodi spirituosa – solution 5% - 10; 15; 20 and 25 ml

Hydrogenii peroxydi diluta – solution 3% - 25; 40; 50 and 100 ml.

Solutio Furacilini spirituosa – solution 0,02% - 200 and 400 ml

Ciprofloxacinum – tablet 0,25; 0,5 and 0,75; 0,2% solution in vial for infusion - 50 and 100 ml; ampl. 1% - 10 ml.

Co-trimoxazolum – tablet 0,12; 0,48 и 0,96 г.

Sulfadimethoxinum – tablet 0,5 г.

Furadoninum – tablet 12, 20, 30, 40, 50 pc.; powder for internal use

Benzylpenicillinum Natrium – vial 500 000 and 1000 000 units

Bicillinum-5 – vial 1 500 000 units

Amoksiklavum – tablet 0,625 and 1,0; vial - 0,6 and 1,2

Ceftriaxonum – lyophilized powder - 0,25; 0,5; 1,0 and 2,0

Azidothymidinum – tablet 0,3

Doxycyclini hydrochloridum – capsule - 0,1 and 0,2

Gentamycini sulfas — powder - 0,08 in vial; ampl. 4% - 1 and 2 ml; ointment 0,1% - 10 or 15 g; eye drops in tube-feed 0,3%

Amikacini sulfas – vial - 0,1; 0,25 and 0,5

Nystatinum – coated tablet — 250000 and 500000; candles and vaginal suppositories - 250000 and 500000; ointment in tubes containing 100000 of nystatin in 1

Itraconazolum – capsule - 0,1

Aciclovirum – tablet 0,2; 0,4 and 0,8; ointment 5% - 2,0 and 5,0; ophthalmic ointment 3% - 4,5

Azithromycinum – capsule - 0,125; 0,25 and 0,5

Isoniazidum – ampl. 10% - 5 ml; tablet 0,1; 0,2 and 0,3

Rifampicinum – capsule 0,05 and 0,15; ampl. 0,15 g like porous mass in package of 10 ampl.

Mebendazolum – tablet 0,1

Metronidazolum – tablet 0,2; 0,25 and 0,4; soup 0,15 and 0,3

Doxorubicinum – solution 0,2%, tablet 0,005; 0,01; 0,025 and 0,05

LIST OF QUESTIONS FOR THE FINAL LESSON

"Module-1. Drug recipe. General Pharmacology. Drugs that effect on nervouse synapses. Pharmacology of drugs that affect the peripheral and central nervous system

1. The methods used in pharmacology. Ways of drugs creating. International standards: GLP, GCP, GMP, GDP, GAP.
2. Definition the term "drug". Science about medicines: Pharmacy and Pharmacology. Types of drug therapy.
3. Routes of exposure the drug into the body, and their advantages and disadvantages. Comparative characteristics.
4. Pharmacodynamics of drug interactions as a stage and the body. The basic mechanisms of the pharmacological effect. Types of drugs action on the body.
5. The pharmacokinetics of drugs. Stages. Transport mechanisms of drugs across biological membranes.
6. Metabolism and excretion of drugs. Biotransformations.
7. The dependence effects of drugs on the chemical structure and the role of other factors that effect on the drug action on the body.
8. 8Phenomens that occur with repeated administration. Cumulation, its types. Tachyphylaxis. Tolerance.
9. Types of synergy: summation and potentiation. Direct and indirect synergies. Their use in medicine.
10. Types of antagonism: direct and indirect. The idea of unilateral and bilateral antagonism. Its use in emergency treatment.
11. Toxicology. Drug disease.
12. Pharmacology binders. Classification. Mechanisms of action and basic pharmacological effects. Application in medical practice.
13. Local anesthetic agents. Classification. Mechanism of action. Types of anesthesia. Comparative evaluation and selection of products for different types of anesthesia. Their use in the clinic. Resorptive effects of local anesthetics.
14. Anticholinesterase agents. Classification. Comparative characteristics of galantamine and neostigmine. Indications. Toxicological significance of organophosphorus compounds. Assistance measures for poisoning.
15. M-cholinoblockers. Classification. Mechanism of action and basic pharmacological effects. Use in emergency medicine and clinical practice. Acute poisoning and assistance measures Comparison of atropine sulfate and pirentsepina.
16. Muscle relaxants as representatives of N-cholino effecting drug. Definition. Classification. Comparison of the mechanisms of action of tubocurarine chloride and ditilina. Clinical use.
17. Pharmacology of the sympathetic-adrenal system. Adrenomimetics. Classification. Mechanism of action and pharmacokinetics of adrenaline. Application in the clinic. Beta-adrenomimetics as a medicine of emergency.
18. Antiadrenergic agents. Classification. Mechanisms of action and the main pharmacological effects of propranolol (Inderal), and reserpine. Application in medical practice. The concept of intrinsic sympathomimetic activity.
19. Neuroleptic (antipsychotic) medicines. Classification. Pharmacological properties. Application in the clinic. Complications. Features of the individual drugs (triftazin, Chlorprothixene, haloperidol).

20. Tranquilizers: Definition and classification. Mechanism of action anxiolytic benzodiazepine. The main pharmacological effects and indications for diazepam. Use in clinical practice. The concept of "daily" tranquilizers.
21. Hypnotics. Definition. Classification and mechanisms of hypnotic action. Comparative characteristics of nitrazepama and barbiturates. Indications for use (the main form of insomnia, requiring the use sleeping pills).
22. Antiepileptics. Definition. Classification and basic mechanisms of the antiepileptic effect. Comparative characteristics of sodium valproate and lamotrigine.
23. Antiparkinsonian agent. Definition. Classification and basic mechanisms of antiparkinsonian effect. Comparative characteristics of levodopa, selegiline and Trihexyphenidyl (Ciklodol).
24. Pharmacological regulation of pain. Classification of narcotic analgesics (NA). Analgesic mechanism of action and pharmacokinetics of morphine. Application in the clinic. Acute poisoning by NA. The concept of antagonists of narcotic analgesics.
25. Nonsteroidal anti-inflammatory drugs. Definition, classification anti cyclooxygenase activity and chemical structure. The main pharmacological effects of drugs. Application in clinical practice. Possible complications and reasons for their development. The concept of analgesic-antipyretic.
26. General anesthetics. Definition. Classification. Modern understanding the mechanisms of synaptic activity for narcosis. Comparative characteristics of ftorotane and nitrous oxide as a medicine of surgical anesthesia.
27. Non-inhaled general anesthetics. Definition. Classification. Comparative characteristics of thiopental sodium and ketamine hydrochloride. The advantages and disadvantages compared to inhaled anesthetics. Clinical application non-inhaledfor narcosis.
28. Drugs that stimulate central nervous system. Classification and mechanisms of action of drugs from the group of psychomotor stimulants. Pharmacological properties of caffeine sodium benzoate and its application. Pharmacology of analeptics and adaptogens.
29. Drugs that stimulant central nervous system. Classification and mechanisms of action of drugs from the group of antidepressants. Pharmacology of amitriptyline and its application. Comparative characteristics of amitriptyline and fluoxetine.
30. Nootropic drugs. Definition. Classification. Pharmacological properties drugs of neurometabolic ratsetams. Comparative characteristics of piracetam and vinpocetine.

LIST OF QUESTIONS TO THE FINAL LESSON

«MODULE II. Pharmaceutical drugs, affect the function of the executive bodies systems, metabolism, blood system and the immune system. Pharmacology of antimicrobial, antiviral, antiparasitic and antifungal medications»

1. Pharmacology of the respiratory system. General classification of drugs which affect the function of the respiratory system. Pharmacology respiratory analeptics, antitussives and decongestants. mechanism of action and comparative characteristics libeksin and codeine preparations. Clinical features of decongestants. Indications for use.
2. Pharmacological agents that affect the physiological processes in the bronchi. The detailed classification and mechanisms of action of drugs that regulate bronchial tone. Comparative characteristics of salbutamol and beclomethasone. Pharmacology expectorant drugs (expectorant). Comparative characteristics of ambroxol and preparations Althea.
3. Principles of drug regulation of appetite: the classification of drugs and mechanisms of action. Pharmacology orlistat. Tools used in any function of the gastric glands: classification, mechanisms of action. Comparative characteristics of ranitidine pirentsepina. Pharmacokinetics and destination omeprazole. Pharmacology gastroprotektorov.
4. Pharmacology vomiting and antiemetics. Classification and the main mechanisms of action. Comparative characteristics (especially the action, indications for use) of ondansetron and metoclopramide.
5. Cholagogue. Medications. Classification of the mechanism of action, indications for use. Pharmacology and hepatic holelitolitikov.
6. Ways of drug regulation of the excretory function of the pancreas. Mechanisms of action and indications for pancreatin and kontrikala.
7. Laxatives and antidiarrheals. Medications. Classification and mechanisms of purgative action. Features of the products containing antraglikozidy. Testimony. Pharmacology of antidiarrheal agents.
8. The principles of pharmacological regulation of vascular tone. Antihypertensives. Classification and the main mechanisms of action. Comparative characteristics of enalapril and losartan. Means, used for the relief of hypertensive crisis.
9. The principles of pharmacological regulation of the coronary and cerebral circulation. Antianginal drugs. Classification. Pharmacology of nitroglycerin. Comparative characteristics of nitroglycerine and atenolol. Pharmacology of trimetazidine (preductal). Cerebrovascular drugs: classification, the basic mechanisms of action. Comparative characteristics of vinpocetine and nicergoline. Pharmacology antimigrenoznyh funds.
10. Antiatherosclerotic agents. Medications. Classification by action on a specific link in the pathological process. Features and application of lovastatin.
11. Preparations of cardiac glycosides. Medications. Features of the chemical structure and pharmacokinetics. Classification by source of production. Mechanisms of action. Pharmacology neglikozidnyh cardiotonic. Use for first aid.

12. Antiarrhythmics. Classification. Comparative characteristics and features of antiarrhythmic action of amiodarone, lidocaine and verapamil.
13. Pharmacology of water and electrolyte balance. Diuretics. Classification. Basic mechanisms of diuretic action. Comparative characteristics of furosemide and spironolactone. Pharmacology of uricosuric agents.
14. The principles of pharmacological regulation of function of the myometrium. Classification. Comparative characteristics of oxytocin and ergometrine maleate dinoprostu. Indications for use.
15. Pharmacological regulation of the function of the thyroid gland. Thyroid and antithyroid drugs. Indications for use.
16. Glucocorticoid drugs, their synthetic analogues and antagonists. Mechanisms of action and the main pharmacological effects of glucocorticoids. Indications for use. Comparative characteristics of anti-inflammatory activity of prednisolone and aspirin.
17. Pancreatic Hormones and synthetic antidiabetic agents. Classification. Mechanisms of action. Comparative characteristics of Actrapid and glibenclamide.
18. Drugs sex hormones and their synthetic analogues and antagonists. Classification, mechanism of action, the main pharmacological effects. Pharmacology of hormonal contraceptives, and anabolic steroids. Use in medical practice.
19. Vitamin supplements. Classification. Pharmacology of ascorbic acid. The concept of multi-vitamin complex, especially the composition and effects on the body.
20. Preparations B vitamins Thiamine bromide, cyanocobalamin and pyridoxine. Mechanisms of action and basic pharmacological effects. Testimony.
21. Preparations of vitamin D and nicotinic acid. Mechanisms of action and basic pharmacological effects. Symptoms of hypervitaminosis D and assistance measures. Testimony.
22. Preparations of vitamins A and E. The mechanisms of action and the main pharmacological effects. Application in medical practice.
23. Means of regulating erythropoiesis. Classification. Mechanisms of action of drugs used in hypo-and hyperchromic anemia. The role of recombinant preparations of hematopoietic growth factors. Of combination therapy of anemia.
24. Pharmacology of drugs used for overactive coagulation processes. The main pharmacological effects of heparin and its application. Features of the low molecular weight heparin and alteplase.
25. Pharmacology haemostatics. Classification, mechanisms of action. Comparative characteristic and vikasola etamzilata (Dicynone). Application.
26. Antiseptics. Classification. Pharmacology of drugs of oxidants haloid, dyes and nitrofuran derivatives. Indications.
27. Sulfonamides. Classification. The mechanism of antibacterial action. The composition and characteristics of the effect of co-trimoxazole (biseptol). Complications and their prevention.
28. General principles of antibiotic therapy. Antibiotics: Medications and basic groups on the mechanism of action. The concept of primary and backup antibiotics. Pharmacology "antipseudomonal" antibiotics. The main complication of antibiotic therapy. Biosynthetic and semisynthetic penicillins: classification, mechanism of

action and antibacterial spectrum. Particularly the composition and actions of the "inhibitor-protected" penicillins. Indications for use.

29. Cephalosporins: Medications, classification, mechanism of action and antibacterial spectrum. Indications for use.
30. Carbapenems and monobactams. mechanism of action. Antibacterial spectrum. Advantages compared with other β-lactam antibiotics.
31. Macrolide antibiotic: Medications, classification, mechanism of action and antibacterial spectrum. Indications for use. Advantages in comparison with penicillin.
32. Aminoglycoside antibiotics: Medications, classification, mechanism of action and antibacterial spectrum. Pharmacokinetics. Complications. Indications for use.
33. Antibiotics tetracycline and chloramphenicol are: Medications, classification, mechanism of action and antibacterial spectrum. Complications. Indications for use.
34. Quinolones and fluoroquinolones. Classification. mechanism of action and antibacterial spectrum. Benefits. Possible complications. Indications for use.
35. Drugs used in fungal diseases. Classification. Mechanisms fungistatic and fungicidal activity. Application in medical practice. Comparative characteristics of nystatin and itraconazole.
36. Antituberculosis drugs. Medications. Classification and mechanisms of action of drugs used to treat tuberculosis. Comparative characteristics of isoniazid and rifampicin.
37. Antiviral drugs. Medications. Classification and mechanisms of action of drugs used for the treatment and prevention of viral diseases. Pharmacotherapy of HIV infection.
38. Antiprotozoal drugs. General classification. Major groups and mechanisms of action of drugs used to treat and prevent malaria and amoebiasis. Pharmacology metronidazole.
39. Allergy (desensitization) medicines. Classification. Mechanisms of action of antihistamines. Comparative characteristics of dimedrola and cromolyn sodium.
40. The principles of pharmacological therapy of acute poisoning. Antidotes. Features of the individual drugs.