REPUBLIC OF MOLDOVA MINISTRY OF HEALTH
STATE MEDICAL AND FARMACY UNIVERSITY
"NICOLAE TESTEMIȚANU"

METHODICAL INDICATIONS FOR PHARMACOLOGY LABORATORY WORKS

(Second edition, revised and supplemented)

Chisinau
2011

REPUBLIC OF MOLDOVA MINISTRY OF HEALTH
STATE MEDICAL AND FARMACY UNIVERSITY
"NICOLAE TESTEMIȚANU"

PHARMACOLOGY AND CLINICAL PHARMACOLOGY DEPARTMENT

METHODICAL INDICATIONS FOR PHARMACOLOGY LABORATORY WORKS

(Second edition, revised and supplemented)

Chisinau
Centrul Editorial-Poligrafic *Medicina*
2011

CZU: 615.03(076.5)
M 61

Approved by the Central Methodical Council of
SUMP *Nicolae Testemiţanu* nr.3 from 01.03.2005

Methodical indications for laboratory works in pharmacology were elaborated by the Pharmacology and Clinical Pharmacology Department's stuff in the following composition:

V. Ghicavîi	PhD in medicine, professor, Double State Prize Laureate
N. Bacinschi	MD, associate professor
N. Guţu	MD, associate professor
E. Stratu	MD, associate professor, head of the studies
V. Gavriluţa	MD, associate professor
I. Pogonea	MD, associate professor
T. Chiriac	assistant professor
I. Coreţchi	assistant professor

Are created for III[rd] year students, general medicine and pediatrics and elaborated according to the study programme at pharmacology

Translated by *I.Pogonea*

Description CIP of National Department of Book
Methodical indications for pharmacology laboratory works / State Medical and Pharmacy Univ. *"Nicolae Testemiţanu"*, Pharmacology and Clinical Pharmacology dep.; elab. V.Ghicavîi,N.Bacinschi, E. Guţu [et al.];transl.by O. Pogonea. - Ch.: C EP „Medicina" 2011.- 137 p.
100 ex.
ISBN978-9975-913-93-5

615.03(076.5)
M 61

ISBN 978-9975-913-93-5

INTRODUCTION

Methodological indications aim to systematize, unify and profile the teaching of pharmacology, and include 3 interrelated divisions.

The first division reflects the actuality of the topic, educational task and didactic aims, which are directed to show the learning necessity of the given topic. The second one shows all the main moments of morphology, physiology, biochemistry, pathological physiology and others, necessary for students for a better understanding and knowledge acquiring in pharmacology domain.

The third division includes questions for self-training, drug characteristics of the main pharmacological classes, questions on general and medical prescription.

Questions for self-training are composed and systematized are based on careful study of didactic and scientific literature of this domain, oriented to the necessities of clinical subjects and practical medicine. They correspond to the topic plan and contain a definite volume of concrete information.

Characteristics of the main drugs (in table form) of every pharmacological class concentrate students' attention on typical drug representatives of the respective pharmacological group, which are used more often in professional activity.

Questions on general prescription are intended for compulsory drugs in different medicinal forms. Medical prescription contributes to the formation of drug choosing skills for definite diseases and pathological states. In most of the cases, the attention is particularly paid to urgent cases or to the most typical pathological states.

Thus, methodical indications are intended for students' self-work organization during practical hours, for the formation and consolidation of general prescription skills and specialty literature usage skills.

GENERAL PRESCRIPTION. SOLID AND SOFT MEDICINAL FORMS

A. Actuality. In most of the cases the treatment of sick people of any profile needs prescription of drugs. Therefore, we need to know the prescription forms, which are stated by our country, and the methods of prescription of diverse medicinal forms, used in medical practice.

B. Educational task. Getting of students acquainted with prescription forms used in our country with Pharmacopoeia requirements to drugs (purity, storage and doxology of them).

C. Didactic aims

a) The sudents must **know**: the structure of prescription, notion of drug new materials, medicinal substance and medicinal forms; magistral and officinal prescription, according to the drug nomenclature; chemical, commercial, common international (CIN) and officinal (pharmacopoeia) names of drugs; Latin words and signs abbreviations used in prescriptions.

b) The students must **be able to**: prescribe correctly solid and soft medicinal forms, differentiate a correct prescription from the wrong ones.

D. Initial level of knowledge necessary for integration of allied disciplines.

Latin language. Noun declinations; used in prescription; main signs and abbreviations.

E. Questions for self training

1. The prescription. Prescription and prescription forms used at present. Doctor's seal. Words and auxiliary signs in prescription. Main abbreviations. Notion of posology (drug dosage). Storage of prescription forms.
2. State Pharmacopoeia. International Pharmacopoeia. Their contents and importance.
3. Drug. Storage and components.
4. Rules of drug prescription. Dose. Drug and nomenclature.
5. Medicinal raw materials, drug, medicinal forms and their classification.
6. Solid medicinal forms and their therapeutic importance.
7. Powders for internal use. Minimal, maximal and middle mass of dosed powders. Granules. Packages.
8. Capsules.

9. Powders for external use, their destination.
10. Tablets. Tablet varieties.
11. Dragee.
12. Pills.
13. Films.
14. Briquettes.
15. Species.
16. Other solid medicinal forms: caramels, pencils.
17. Soft medicinal forms and their usage.
18. Ointments. Ointment bases. Eye and nose ointments, rare ointment forms: lipsticks, creams, balsams, and gels.
19. Pastes.
20. Suppositories and their therapeutic importance.
21. Sticks.
22. Liniments.
23. Plasters.

F. Questions on general and medical prescription

Write out the following drugs using and concentrations given below:

a) Powders for internal use:

1. Rifampicin – 30 powders 150 mg each. Write out one powder 3 times daily.
2. 20 powders with Acetylsalicylic acid by 250 mg. One powder twice weekly.
3. Powders with Niclosamide by 2 g. for a single use.
4. 20 powders with Ascorbic acid by 50 mg and Rutoside by 20 mg. Administered by one powder twice daily.
5. 10 powders with Nicotinic acid by 50 mg. Administered by one powder 3 times daily.
6. 10 packages with Magurlit by 2 g of granules. Administered by one package per glass of fruit juice 3 times daily.
7. Granules with Urodan by 100 g. by one teaspoon of granules per glass of water 3 times daily.

b) Powders for external use.

1. "Galmanine" 50 g.
2. Sulfacetamide 10%-20,0.
3. Ethacrydine lactate 2,5%-10,0.

c) Capsules.

- ***with caps:***

1. 10 capsules with caps with Loperamide by 0,002 g. one capsule daily.
2. 20 capsules with caps with Doxycicline hydrochloride 50 mg. 2 capsules twice daily.
3. 20 capsules with caps of Pyracetam by 400 mg. To administer one capsule 3 times daily.

- ***for inhalations***

1. 10 capsules by 20 mg of Sodium chromoglycate. One capsule 4 times daily for inhalations.

- ***elastic***

1. 15 capsules with Castor/oil by 1 g. Administer 10 capsules at once as laxative.
2. 10 capsules with Fern extract by 500 mg. Administer 10 capsules at once as antihelmintic.

d) Tablets:

1. 15 tablets cu Isoniazide by 300 mg. To administer one tablet 3 times daily.
2. 20 tablets with Diphenhydramine by 10 mg. One tablet 2 times daily.
3. 30 tablets with Clonidine by 75 micrograms. One tablet 3 times daily.
4. 10 tablets with "Theophedrine". One tablet 3 times daily.
5. 10 tablets of "Tempalgin". Used in headache.

e) Dragee:

1. 10 dragees Chlorpromazine by 25 mg. One dragee 3 times daily.
2. Retinole acetate – 10 dragees by 1 mg. One dragee 3 times daily.
3. 21 dragees "Non-ovlon". One dragee daily.

f) Pills:

1. Ferrous lactate – 10 pills by 500 mg. One pill 3 times daily.

g) Films:

1. Pilocarpine hydrochloride – 10 films by 25 decimilligrams. One film 3 times daily put under the eye-lid.
2. "Nonoxinol-9" – 10 films. To administer intravaginally as contraceptive.

h) Ointments:

1. Oxoline – 0,25%-10 g.
2. Hydrocortizon – 1%-10 g.
3. Phthorocort – 15 g.

i) Pastes:

1. Zinc oxide – 25%-30 g.
2. Dermatol – 10%-15 g.
3. Phthorocort – 15 g.

j) Suppositories:

1. Procaine – 10 rectal suppositories by 100 mg. One suppository 3 times daily.
2. "Anusol" – 10 suppositories. One suppository 2 twice a day per rectum.
3. Metronidazole – 10 vaginal suppositories by 500 mg. One suppository twice daily.

GENERAL PRESCRIPTION (continuation)

Liquid and injectable medicinal forms

E. Questions for self training

1. Solutions for internal use. Methods of dosage and concentration calculation.
2. Solutions for external use. Methods of expression of their concentrations. Their types.
3. Suspensions. Difference between solutions and suspensions.
4. Drops for internal use. Calculation of their concentration.
5. Drops for external use (eye, ear, nose) solvents.
6. Injections. Main requirements for injectable forms.
7. Magistral injectable solutions (prepared in pharmacy). Prescription methods.
8. Injectable special forms: ampoules, bottles. Their prescription (solution, suspensions, lyphilizated.
9. Injectable drugs with special names.
10. Aqueous extractive solutions (decoction, infusion), alcoholic (tinctures, extracts), oily (medicinal oils).
11. Typified drugs. Their prescription.
12. Emulsions, syrups, aromatic waters, medicinal juices, mixtures, aerosols, medicinal organopreparations.

F. Questions on general prescription

Solutions for internal use

1. Calcium chloride. Single use dose – 75 centigrams. By one spoon 3 times daily.
2. Potassium acetate. Single use dose – one gram and a half. By one spoon 3 times daily.

Solutions for external use

- ***aqueous solutions***

1. Prosalen 0,1%-50 ml. Apply on affected portions of skin.
2. Nitrofural 1:5000 – 500 ml. For wound washing.

Solutions for internal use

1. Magnesium oxide 20%-150 ml. One spoon 3 times daily. Shake before use.
2. Co-trimoxazole 100 ml. Internally by 2 teaspoons times daily.

Drops for internal use

1. Potassium iodine 0,00025. 5 drops 3 times daily.
2. Atropine sulphate 0,0005. 10 drops 3 times daily, internally.

Drops for external use

- ***aqueous solutions***

1. Pilocarpine hydrochloride 1%-10 ml. Eye drops. 1 drop 7 times daily, in conjunctiva.

- ***alcoholic solutions***

1. Resorcine 0,25%-20 ml (in alcohol 25%) 100 ml internally 2 tea spoons twice daily.

Ear drops

- ***oily solutions***

1. Chlofosfole 5%-10 ml

- ***glycerolic solutions***

1. Phenol 5%-10 ml. ear drops.

Magistrial injectable solutions

1. Sodium salicilate 15%-50 ml. 10 ml intravenously.
2. Procaine 0,25%-500 ml. for infiltrate anaesthesia.
3. Glucose 5%-500 ml. Perfusable solution. Inject by slow intravenous perfusion during 3 hours.

Official injectable solutions

Ampoules

- ***aqueous injectable solutions***

1. Calcium chloride 10%-10 ml. 10 ml intravenously.

2. Lidocaine 10%-2 ml. 2 ml intramuscularly.

- oily injectable solutions

1. Hexestrol 0,1%-1 ml. 1ml intramuscularly.
2. Oxyprogesteroul caproate 12,5%-1 ml. By 1 ml intramuscularly 1 once weekly.

- aqueous injectable suspensions

1. Desoxycorticosterone trimethylacetate 2,5%-1 ml. 1 ml intramuscularly once in 2 weeks.

- oily injectable suspensions

1. Biochinol 100 ml. By 3 ml intramuscularly once in 3 days.

- powders in ampoules

1. Ethacrynic acid 0,005. To dissolve in 1 ml of sterile injectable water. By 1 ml i/m.
2. Vincristine 0,0005. To dissolve in 1 ml of injectable water. 1 ml once weekly.
3. Prednisolone hemisuccinate 0,025. To be dissolved in 5 ml of injectable water and inject intravenously.

Bottles

- aqueous solutions

1. Insulin 40 UA/ml. 5 UA subcutaneous by 3 times daily.

- suspensions

1. Cortisone acetate 2,5%-10 ml. 1 ml intramuscularly.

- sterile solutions

1. Aminocapronic acid 5%-100 ml.
2. Manitol 15%-400 ml.

- lyophilizated powders

1. Sodium Benzylpenicillin – 250000 UA. To dissolve in 2 ml of injectable water. 250000 UA intramuscularly 6 times daily.

Suspensions for external use

1. Dexamethasone 0,1%-10 ml. eye drops. One drop in both conjuctival sacs twice daily.

Emulsions

1. Bismuth subnitrate 3 g in 250 ml of oil. By 1 spoon 3 times daily.

Mixtures

1. Sodium benzoate 1 g, Bromhexine 1,5 g, syrup 45 ml – in volume of 250 ml. To administer 1 spoon 3 times daily during 5 days.

Syrups

1. Amoxicillin 28 g-200 ml. One teaspoon of syrup in every 6 hours

during 7 days.

Decoctions

1. Oak bark decoction 20,0-200 ml, for gargling.

Infusions

1. Chamomile flowers infusion 2 g/day for 4 days. One teaspoon 4 times daily internally.

Tinctures

1. Valerian tincture 30 ml. 30 drops 3 times daily.

Fluid extracts

1. Shepherd's purse 25 ml. By 25 drops 3 times daily.

Concluding session on topic:

GENERAL PRESCRIPTION

E. Questions for self training

1. Powders and their variations (for external use, for internal use, granulated).
2. Capsules.
3. Tablets, granules and pills.
4. Dragee.
5. Ointments and their variations.
6. Suppositories and other semisolid medicinal forms.
7. Solutions and variations (for internal use, for external use).
8. Solutions and emulsions.
9. Magistral injectable solutions.
10. Injectable medicinal forms and their special forms: ampoules and bottles (solutions, suspensions and lyophilizated powders).
11. Extractive solutions (aqueous and oily). Their derivatives.
12. Liniments.
13. Aerosols.

F. Questions on general prescription

Simple non dosed powders

1. Activated coal 100 g. To administer orally one teaspoon 3 times daily.

Compound non dosed powders

1. Calcium carbonate 100 g. Magnesium oxide 30 g. 1 teaspoon 3 times daily.

Simple dosed powders

1. Aminocapronic acid by 2 g. To administer orally 1 powder 3 times daily, for 4 days.

Compound dosed powders

1. Platiphylline hydrotartrate 5 mg. Internally 1 powder 3 times daily.
2. Riboflavine 1 mg with 20 mg of thiamine bromide. Internally 1 powder 3 times daily for 5 days.

Granulated powders

1. Oraza 100 g. Internally 1 teaspoon 3 times daily.

Powder for external use

1. Salicylic acid 2%-20 g. Externally. Apply on injured portion of the skin.**Capsules**
1. Rimfampicin 150 mg. Internally 1 capsule 2 times daily, for 7 days.

Tablets

1. Digitoxin 0,1 mg. Administer orally 1 tablet once a day.
2. "De-nol". Orally 2 tablets twice daily, before meals for 3 weeks.

Dragee

1. Chlorpromazine 25 mg. Internally by one dragee 3 times daily.

Ointments

1. Chinofone 10%-50,0. Externally.
2. Canamicin sulphate 1%-6 g. Introduce into conjunctival sac every 3-4 hours.

Paste

1. Zinc oxide 20%/50 g. Externally.
2. Fusidine 2%-15 g. Externally.

Cream

1. Flumethasone pivalate 0,2%-12 g. locally on the skin 2-3 times daily.

Suppositories

- rectal

1. Dermatol 0,2 g. Rectally one suppository twice daily.
2. Neo-Amisol

- vaginal

1. Nystatin 250000 UA. Intravaginally by 1 suppository 2 times daily.

Solutions for internal use

1. Sodium bromide, single use dose equal to 0,15 g. By one spoon 3 times daily.

Solutions for external use

- ***aqueous***

1. Nitrofural 1:1500-100 ml. For slurring of buccal mucosa.

- ***alcoholic***

1. Prosedan 0,1%-50 ml. For slurring.

- ***oily***

1. Camphor 10%-10 ml. For slurring.

Drops for internal use

- ***aqueous***

1. Tilidine 5%-10 ml. 10 drops twice daily.

- ***alcoholic***

1. Mentol 15%-10 ml. 5 drops per ¼ glass of water 3 times daily.

Drops for external use

- ***aqueous***

1. Pilocarpine hydrochloride 1%-10 ml. Eye drops.

- ***oily***

1. Benzocaine 10%-10 ml. Topic apply for anesthesia of mucousas.

- ***glycerolic***

1. Phenol 5%-5 ml. Ear drops.

- ***alcoholic***

1. Rezorcine 2%-5 ml. Ear drops.

Emulsions

1. Fish fat 20 ml. By a teaspoon 3 times daily.

Magistral injectable solutions

- ***aqueous***

1. Lidocaine 1%-50 ml. For trunk anesthesia (conducting).

Injectable forms of special types:

- ***ampoules***

1. Atropine sulphate 0,1%-1 ml (10 amp.). 1 ml subcutaneously.
2. Progesterone oily solution 1%-1 ml (20 amp.). 1 ml subcutaneously.
3. Ethacrynic acid 0,05 g (10 amp.). Dissolve before use in 1 ml o injectable water and administer intramuscularly.

Bottles

1. Heparin 5 ml (25000 UA) (10 bottles). By 2,5 ml 3 times daily i/m.
2. Sodium benzylpenicillin 5000 UA (10 bottles). Dissolve in injectabl water and administer i/m by 250000 UI 6 times daily.
3. Manitol 15%-400 ml (2 bottles). Intravenous perfusion by 40 drop per minute.
4.

Aqueous extractive solutions

- ***infusions***

1. Camomile flowers in dose for a single use equal to 1 g. By 1 spoon 3 times daily.

- ***decoctions***

1. Oak bark 20,0-200 ml. For gargling.

Alcoholic extractive solutions

- ***tinctures***

1. Valerian 30 ml. By 30 drops 3 times daily.

- ***fluid extracts***

1. Shepher purse 25 ml. By 25 drops 3 times daily.

Liniments

1. Methylsalicylate with sunflower oil in equal parts. For frictions.
2. Sintomycin 10%/200 ml. Apply on injured portions of skin.

Aerosols

- ***dosed***

1. Berotec 1 bottle (15 ml). for inhalations one dose in bronchial asthma, not more than 3 doses daily.

- ***non dosed***

1. Oxycyclosol 1 bottle. For spraying of infected wounds.

GENERAL PHARMACOLOGY

A. Actuality. General pharmacology studies basic laws of pharmacokinetics and pharmacodynamics of drugs, their interactions with organism. It is necessary for learning special pharmacology, for correct administration of treatment with minimal risk of appearance of side effects. Pharmacokinetics and pharmacodynamics laws are based on experimental and clinical researches of new drugs.

B. Educational task. Learning of basic laws of pharmacokinetics and pharmacodynamics (absorption, distribution, metabolism and excretion, interaction with pharmacoreceptors, dosage principles, its dependence on peculiarities of organism, drug interactions and side effects) for performing a qualitative and efficient pharmacotherapy.

C. Didactic aims

a) The students must **know**: parameters of pharmacokinetics, main principles of absorption, transport, distribution and excretion of drugs, interaction of exogenous ligands with pharmacoreceptors,

typical mechanisms of action, drug dosage principles, drug interactions, drug incompatibility, side effects and complications of pharmacotherapy.

b) The students must **be able to**: choose the most suitable way of administration while treating disease, choose drug dose according to its half life period, patient's age type of disease; prevent drug incompatibility and pharmacotherapy complications.

D. Initial level of knowledge necessary for integration of allied disciplines

General chemistry. Constant of the ionization of molecule (pKa). Calculation of proportion of ionizated form for different values of pH, using Henderson-Hasselbalch equation. Chemical reactions of oxidation, reduction, hydrolysis and conjugation. Notion of tensoactive substances: ionogenous, nonionogenous and amphoteric.

Bioorganic chemistry. Aminoacids. Proteins. Chemical mediators. Enzymes.

Molecular biology and human genetics. Cell membranes. Transmembrane transport. Genetic mutations.

Anatomy. Digestive system. Stomach its functions. Small intestine and its functions. Liver and biotransformation processes. Kidneys and their main functions.

Histology. Cell membranes and their structure. Receptive substrate on the postsynaptic membrane. Physico-chemical properties and molecular structure of cytoplasmatic membrane. Notion about physiological barriers (hemato-encephalic etc.).

Physiology. Biomembranes. Electrolytic pumps. Cell membrane transport. Blood circulation. Digestive tube. Digestion and absorption. Liver function. Liquids of organism and kidneys. Receptors. Biological rhythms.

Biochemistry. Structural organization of biological membranes. Biochemistry of alimentation and digestion. Substance transport in organism. Biochemistry of blood. Functional biochemistry of the liver and kidneys. Enzymes. Static repause polarization of the membrane.

Physiopathology. Membrane processes and their disorders. Disturbances of synaptic transmissions. Physiopathology of digestive system, blood, renal failure and pH-balance.

E. Questions for self training

1. Pharmacology, definition. Pharmacology as a subject. Its relation

with other subject. The importance of pharmacology for practical medicine. General and special pharmacology.

2. Notion of drugs. Their classification according to origin and systemic principle. Drug sources. Drug nomenclature.
3. Main stages of elaboration of new drugs, evaluation of their efficacy and inoffensivety.
4. Subdivisions of pharmacology (general and special). Fundamental and applicative branches of pharmacology. Pharmacogenetics.
5. Definition and brief characteristics of pharmacokinetics and pharmacodynamics. Main indexes of pharmacokinetics: bioaccesibility (bioavailability), plasmatic concentration, distribution volume, biological half-life period, clearance.
6. Characteristics of ways of administration. Classifications. Peculiarities of interal ways of administration (sublingual, oral, rectal). Notion about bioaccesibility. Peculiarities of injectable and non-injectable parenteral ways of administration (subcutaneous, intramuscularly, intravenous, inhalator, by electrophoresis etc.), Notion of transdermal therapeutic systems. Peculiarities of ways of administration in children.
7. Penetration of drugs through biological membranes. Factors that influence the permeability of membranes for drugs. Characteristics of biological barriers.
8. Drug absorption. Mechanisms of absorption. Factors which influence absorption of drugs. Interaction of drugs with meal components. Influence of food on drugs absorption and effect. The importance of pH and molecule ionization constant (pKa) in drug absorption. Henderson-Hasselbach equation for absorption of drugs with acid and basic character. Peculiarities of substance absorption in their combined administration. Peculiarities of drug absorption in children.
9. Drug distribution in organism (transport, distribution and deposition). Free and fixed fractions of drug in blood and tissues. Peculiarities of drug penetration through hemato-encephalic and placental barriers. Deposition of drugs in tissues. Peculiarities of drug distribution in children.
10. Biochemical transformation of drugs in organism. Main ways of metabolization. Peculiarities of biotransformation in children.
11. Pharmacogenetics. Implication of genetic factors in drug effects. Role of microsomal enzymes in processes of drug metabolization.

12. Enzymes that are not involved in microsomal biotransformation. Enzymopathies. Induction and suppression of microsomal enzymes of the liver. Main drugs which produce enzymatic induction and inhibition.
13. Notion about drug removal and excretion. General ways of drug excretion. Renal excretion, its peculiarities in newborns. Importance of urine pH for drug elimination. Hepatic and renal clearance. Drug elimination by digestive tube, lungs, skin, milk. Half/life, period of drug blood concentration and its importance. ("0" and "1" kinetic types).
14. Pharmacodynamics. Primary action of drugs. Interaction of drugs with their receptors. Typical mechanisms of drug action (mimetic, -lytic and alosteric). Modification of functional structure of DNA, RNA, membrane permeability an enzyme activity as typical mechanisms of drug action. Factors which influence pharmacodynamics of drugs. Local and systemic, direct and indirect, main and secondary, selective and nonselective, reversible and irreversible actions of drugs. Notion about placebo. Notion about receptors. Types and subtypes of receptors.
15. Notion about dose and its variations. Therapeutic doses (minimal, middle and maximal for a single use and for 24 hours, dose of attack, maintaining dose, cure dose). Toxic and lethal doses. Limits of therapeutic dose, therapeutic index and its importance. Graphic representation of dose-effect relation. Principles of drug dosage in children and old people. Biological standardization. Side effects caused by overdose (O.D).
16. Drugs and factors that influence on their action: gender, age, organism state, heredity, and biorhythms. Notion about Chronopharmacology, chronopharmacokinetics, chronopharmaco-dynamics. Principles of drug administration dependincy on biological rhythms.
17. Interaction of drugs. Synergism (direct, indirect, unilateral and bilateral, physiological, chemical, competitive). Indifference.
18. Phenomena that appear during repetitive drug administrations: sensibilization, tolerance, suspendation syndrome, habitforming,
19. tachyphylaxis, Rebound phenomenon, accumulation and its variations:

LOCAL ANESTHETICS.

Astringents, adsorbents, mucilaginous. And irritant drugs

A. Actuality. Local anesthetics are widely used for pain alleviation (in surgical interventions, stomatology, urology, gastroenterology, ophthalmology etc.). Mucilaginous and astringent drugs provide sensitive receptors protection from irritant agents. Adsorbents retain absorption of toxic substances intro organism (acute intoxication, bronchial asthma, diabetes mellitus, hemo- and lymphosorbtion etc.), while irritant have a revulsive effect.

B. Educational task. Study of pharmacological methods of local anesthesia, protection of sensitive receptors from action of different factors.

C. Didactic aims

a) The students must **know:** definition, principles of classification, mechanism of action, local anesthetics, action principle and usage of mucilaginous, astringent, adsorbent and irritant drugs.
b) The students must **be able to**: prescribe compulsory drugs from this class in all existent medicinal forms.

D. Initial level of knowledge necessary for integration of allied subjects

General surgery. Local anesthesia. Its forms (superficial, infiltrative, conductive or regional, spinal). Mechanism of revulsive action.

E. Questions for self training

1. Local anesthetics (procaine, tetracaine, lidocaine, benzocaine etc.). Classification. Types and methods of local anesthesia.
2. Localization and mechanism of action of local anesthetics. Comparative characteristics according to solubility, power and duration of action, toxicity. Principle of choice of anesthetics for different types of local anesthesia.
3. Indications of local anesthetics. Side effects. Acute and chronic intoxication with cocaine.
4. Pharmacokinetics of local anesthetics.
5. Astringent drugs (tanine, bismuth subnitrate, oak bask decoction). Classification. Principles of action. Indications.
6. Mucilaginous drugs (mucilage of starch). Principle of action. Usage.
7. Adsorbent drugs (medicinal coal). Principle of action. Indications.

Notion about hemosorbents.

8. Irritant drugs (ammonia solution, menthol, mustard plaster). Their action on skin and mucosa. Importance of reflexes caused by irritants. Repulsive effect. Indications.

F. Brief characteristics drugs

Down. Drug name. 1. Procaine. 2. Lidocaine. 3. Benzocaine. 4. Tetracaine. 5. Medicinal coal. 6. Mustard plasters. 7. Pyromecaine. 8. Trimecaine. 9.Bupivacaine.

Across. 1. Medicinal form. 2. Way of administrattion. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions for general and medical prescription

Write out the following drugs in all existent medicinal forms: 1. Procaine. 2. Lidocaine. 3. Benzocaine. 4. Mustard plasters. 5. Medicinal coal. 6. Tetracaine. 7. Pyromecaine. 8. Trimecaine. 9. Bupivacaine.

Administered drugs in (for): superficial anesthesia, rachidian anesthesia, epidural anesthesia, infiltrative anesthesia, conductive anesthesia, treatment of wounds and burns, medicinal edema with mucilaginous substance, treatment of myositis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

CHOLINOMIMETIC AND ANTICHOLINESTERASIC DRUGS

A. Actuality. Drug from these classes have a large use in ophthalmology, neurology, anesthesiology, gastroenterology, urology etc.

B. Educational task. Getting of students acquainted with principles of drugs from these classes and principles of their selection according to main indications, side effects and also measures of prophylaxis.

C. Didactic aims

a) The students must know: the main drugs from these groups, names, their general characteristics, classifications, mechanism of action, medicinal forms and ways of administration, doses, indications and contraindications, side effects.

b) The students must be able to: prescribe compulsory drugs from this group in different medicinal forms and in different diseases and pathological states.

D. Initial level of knowledge necessary for integration of allied disciplines

Human physiology. Efferent innervation. Efferent somatic way of excitation transmission. Ultrastructure of neuro-muscular synapse. Role of acetylcholine and acetylcholinesterase in this process. Postsynaptic potential of terminal membrane. Vegetative efferent way. Structural and functional peculiarities of the vegetative nervous system (sympathetic and parasympathetic). Mechanism of transmission of nervous impulse through vegetative ganglions. Mediators of vegetative nervous system (VNS), their characteristics. Adrenergic and cholinergic structures. Influence of VNS on innervated organs.

Biochemistry. Mediators of transmission of nervous impulse (acetylcholine, noradrenaline). Biogeneous amines and nervous system. The importance of dopamine in pathogenesis and treatment of Parkinson's disease.

Histology. Synapses, their role in transmission of nervous impulse through neuronal chain. Hysto-chemical structure and characteristics of synapse. Classification of synapses.

E. Questions for self training

1. The structure of cholinergic synapse. Phases of transmission of nervous impulse at synapse level. Metabolism of acetylcholine. Notion about cholinoreceptors, classifications (M and N). their localization in organism and functional importance.
2. Classification of drugs that act on cholinergic synapse.
3. Classification of cholinomimetics (parasympatheticomimetics).
4. Pharmacodynamics of M-cholinomimetics (pilocarpine, aceclidine). Their action on eye (pupil diameter, intraocular tension, accommodation), heart, smooth muscles of cavity organs (bronchi, digestive tube, urinary bladder etc.) secretion of glands (stomach, intestine, sweat etc.).
5. Indication and Contraindications of M-cholinomimetics. Their use in pediatrics and stomatology. Toxic action of muscarine (picture of intoxication with fly-agarics, measures of first aid).
6. N-cholinomimetics. Their physiological importance and toxic action. Action on receptors of sino-carotic zone, vegetative ganglions, medullosuprarenals. Indications. Usage of N-cholino-mimetics in fight with smoking.
7. Components of cigarette smoke and their action on organism.

Diseases caused by smoking. Active and passive smokers. Ways and methods of giving up smoking.

8. Anticholinesterasic drugs. Definition, classification, mechanism of action. Interaction with cholinesterase. Peculiarities of action of organophosphoric compounds. Main indications of anticholinesterasic drugs. Their usage in pediatrics and stomatology.
9. Side effects and toxic action of anticholinesterases. Clinical picture of intoxication, prophylaxis, measures of first aid. Usage of atropine, cholinesterase reactivators and human purificated cholinesterase in intoxication with organophosphoric compounds.
10. Cholinomimetics that stimulate intestinal peristalsis.

F. Brief characteristics of the main drugs

Down. Drug name. 1.Pilocarpine hydrochloride. 2. Aceclidine. 3. Cytiton. 4. Neostigmine. 5. Galanthamine bromhydrate. 6. Physostigmine salicylate. 7. Cizaprid. 8. Armine. 9. Trimedoxime. 10. Lobeline hydrochloride.

Across. 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription

Write out the following drugs in all medicinal forms: 1. Pilocarpine hydrochloride. 2. Aceclidine. 3. Cytiton. 4. Lobeline hydrochloride. 5. Neostigmine. 6. Galanthamine bromhydrate. 7. Physostigmine salicylate. 8. Armine. 9. Cizaprid. 10. Trimedoxime.

Administered drugs used in (for): glaucoma, atonia of urinary bladder, atonia of intestine, stimulation of respiration, myastenia, xerostomia, residual phenomena of poliomyelitis, residual phenomena of cerebral and peripheral nervous system traumas, radiological diagnostics of gastrointestinal tract.

H. Questions for self-training should be answered in written form while preparing for the lesson.

CHOLINOBLOCKERS (anticholinergic, cholinolytic, parasympatheticolytic drugs)

E. Questions for self training

1. Classification cholinoblockers.
2. Sources of M-cholinoblockers (antimuscarinics).

3. Classification M-cholinoblockers.
4. Action of M-cholinoblockers on cardiovascular and central nervous systems.
5. Action of M-cholinoblockers on tonus of bronchi, gastrointestinal tract, bile and urinary ducts.
6. Action of M-cholinoblockers on secretion of glands: sweat, gastric, intestinal and salivary.
7. Modifications of eye functions in administreting of M-cholino-blockers.
8. Clinical picture of intoxications with atropine and plants, containing this alkaloid. Measures of the first aid.
9. Main indications for administration of drugs from atropine group. Their usage in pediatrics and stomatology.
10. N-cholinoblockers (antimicotinic drugs). Classification.
11. Ganglion blockers. Classification according to chemical structure and duration of action. Localization and mechanism of action. Peculiarities of absorption according to chemical structure.
12. Action of ganglion blockers on cardiovascular system, digestive system and uterus.
13. Indications and contraindications of ganglion blockers.
14. Myorelaxants with peripheral action. Principles of classification. Mechanism of action of depolarizing, nondepolarizing and mixed myorelaxants.
15. Indications of myorelaxants. Side effects. Myorelaxant antagonists and principles of decurarization.
16. Central M- and N-cholinolytics. Mechanism of action. Usage.
17. Peripheral M- and N-cholinolytics. Action. Indication. Side effects.

F. Brief characteristics of compulsory drugs:

Down. Drug name. 1. Atropine sulphate. 2. Scopolamine bromhydrate. 3. Platyphylline hydrotartrate. 4. Benzohexomium. 5. Trepirium iodide. 6. Suxamethonium. 7. Mellictine. 8. Metocinium iodide. 9. Pirenzenzerpine. 10. Tubocurarine chloride. 11. Ipratropium bromide. 12. Trihexyphenidyl hydrochloride. 13. Adiphenine. 14. Trimethaphan.

Across. 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription

Write out the following drugs in all medicinal forms: 1. Atropine

sulphate. 2. Scopolamine bromhydrate. 3. Platyphylline hydrotartrate. 4.Benzohexonium. 5. Trepirium iodide. 6. Suxamethonium. 7. Mellictine. 8. Pirenzepine. 9. Metocinium iodide. 10. Tubocurarine chloride. 11. Trihexyphenidyl hydrochloride. 12. Adiphenine. 13. Ipra-tropium bromide. 14. Trimethaphan.

Administered drugs used in (for): intoxication with fly-agarics, intestinal spasm, ulcerous disease, research of eye bottom, premedication, prophylaxis of kinetosis, relaxation of skeletal muscles, intubation, hypertensive crisis, controlled hypotension.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ADRENOMIMETICS, ADRENOBLOCKERS AND SYMPATHETICOLYTICS. DOPAMINERGIC DRUGS

A. Actuality. VNS regulates basic life physiological processes by controlling the functions of internal organs and metabolic processes. Adrenergic and dopaminergic drugs have diverse pharmacological effects on VNS and are used regularly in pharmacotherapy.

B. Educational task. Getting of students aquatinted with possibilities of adrenergic and dopaminergic medication.

C. Didactic aims

a) The students must **know**: general characteristics of adrenomi-metics, adrenoblockers, sympatheticolytics and dopaminergic drugs, their sources and chemical structure, principles of classifications, medicinal forms and ways of administration of the main drugs, mechanism of action, indications and contraindi-cations, side effects, picture of acute and chronic intoxications with some drugs from these groups and the first aid.

b) The students must **be able to**: prescribe drugs from these groups in different diseases, and first of all in urgent situations.

D. Initial level of knowledge necessary for integration of allied subjects

Biochemistry. Mediators of nervous impulse in adrenergic and dopaminergic synapses (noradrenaline, dopamine). Structure, biosynthesis regulation of mediators, and their inactivation, action on metabolism of lipids, carbohydrates and proteins.

Histology. Sympathetic vegetative system, morphofunctional

peculiarities. The structure of adrenergic synapse.

Human physiology. Functions of sympathetic and parasympathetic vegetative systems. Their influence on innervated organs.

Physiopathology. Disturbances of neuron excitability and conductibility. Disturbances of synapse conductibility. Pathology of VNS.

E. Questions for self training

1. Adrenergic synapse. Types and subtypes of adrenergic receptors. Their localization. Effects of activation of adrenergic receptors in innervated and noninnervated by VNS tissues.
2. Principles of classification of adrenergic drugs according to: mechanism of action, chemical structure, and predominant type of action.
3. α-adrenomimetics (phenylephrine, ethylephrine, naphazoline, clonidine). Pharmacodynamics. Indications, contraindications. Side effects.
4. α-adrenomimetics (isoprenaline, dobutamine, salbutamol, fenoterol,). Classification. Pharmacodynamics. Indications. Contraindications. Side effects.
5. α-adrenomimetics (epinephrine, norepinephrine, dopamine, ephedrine). Pharmacodynamics. Indications. contraindications. Side effects.
6. α-adrenoblockers (phentolamine, prazosin, dehydroergotoxine, nicergoline). Classification. Pharmacodynamics. Indications. Contraindications. Side effects.
7. α-adrenoblockers (propranolol, oxprenolol, atenolol, acebutolol, pindolol, nebivolol). Classification. Pharmacodynamics. Indications. contraindications. Side effects.
8. α-adrenoblockers (labetalol). Pharmacodynamics. Indications, Contraindications. Side effects.
9. Sympatheticolytics (reserpine, guanethidine). Pharmacodynamics. Indications. Contraindications. Side effects.
10. D-receptors, their subtypes, and their localization. Effects of excitation of D-receptors. Dopaminergic drugs. Classification. Pharmacodynamics.

F. Brief characteristics of compulsory adrenergic drugs:

Down. Drug name. 1. Norepinephrine hydrotartrate. 2. Epinephrine hydrochloride. 3. Izoprenaline. 4. Salbutamol.

5. Dopamine. 6. Phentolamine. 7. Propranolol. 8. Reserpine. 9. Guanethidine. 10. Dihydroergotoxine. 11. Dobutamine. 12. Phenilephrine. 13. Prazosin. 14. Ephedrine hydrochloride. 15. Naphazoline.16. Atenolol. 17. Nebivolol.

Across. 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription

Write out the following drugs in all medicinal forms: 1. Norepinephrine hydrotartrate. 2. Izoprenaline. 3. Salbutamol. 4. Epinephrine hydrochloride. 5. Phentolamine. 6. Propranolol. 7. Reserpine. 8. Dobutamine. 9. Dobutamine. 10. Ephedrine hydrochloride. 11. Phenilephrine. 12. Naphazoline. 13. Dihydroergotoxine. 14. Atenolol. 15. Prazosin. 16. Guanethidine. 17. Nebivolol.

Administered drugs used in (for): arterial hypertension, anaphylactic shock, rhinitis, cardiogeneous shock, myocardial infarction, migraine, metrorrhage, acute insufficiency of cerebral circulation, pheochromocytoma, vascular spasms, arterial hypertension, angina pectoris, cardiac arrhythmias, hyperthyroidism, endarteritis, hypoglycemic coma, conjunctivitis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

Concluding session on topic:

DRUGS THAT INFLUENCE PERIPHERAL INNERVATION

A. Educational task. Consolidation of knowledge about pharmacodynamics of groups of drugs acting on peripheral innervation, choice of drugs according to indications, being aware of side effects, and measures of the first aid in case of over dosage.

B. Didactic aims

a) Students must **know**: pharmacological characteristics of these drug classes (pharmacokinetics and pharmacodynamics), main indications for administration, side effects and measures of the first aid in case of overdosage.

b) Students must **be able to**: prescribe compulsory drugs from this group, order them in different diseases and pathological states, and

first of all in urgent situations.

E. Questions for self training

1. Notions about cholinoreceptors, their classifications (M and N). their distribution in organism and physiological importance (effects of their excitation). Classification of substances that influence on cholinergic synapses.
2. Pharmacodynamics of M-cholinomimetics. Their effects on eye, smooth muscles of internal organs, secretion of exocrine glands. Indications. Intoxications. With muscarine, their treatment.
3. N-cholinomimetics. Physiological and toxic actions of nicotine. Influence of N-cholinomimetics on chemoreceptors of sinocarotic zone, vegetative ganglions and medullosuprarenals. Indications. Usage of N-cholinomimetics against smoking.
4. Anticholinesterases. Classification of action. Characteristics of interaction with cholinesterase. Effects, indications for administration. Peculiarities of effects of organophosphoric compounds. Clinics of intoxications and measures of the first aid. Peculiarities of usage of atropine. Usage of cholinesterase reactivators in intoxications with organophosphoric compounds. Cholinesterasic drugs.
5. M-cholinoblockers. Sources of atropine. Its effects on eye, cardiovascular system, tonus of bronchi, digestive tube smooth muscles, bile and urinary ducts, detrusor and sphincter of the urinary bladder, secretion of glands (gastric etc.). Peculiarities of action of M-cholinoblockers. Indications for their administration. Clinical picture of intoxication with plants, containing atropine, and its treatment.
6. Ganglion blockers. Classification, localization and mechanism of action. Their influence on cardiovascular system, digestive tube, myometrium. Indications, contraindications and side effects.
7. Myorelaxants with peripheral action. Classification and mechanism of action. Indications of administration. Possible complications. Myorelaxant antagonists and principles of decurarization. Myorelaxants for internal use. Indications.
8. Adrenomimetics. Stocking, elimination and regaining of mediators. Ways of indication of catecholamines. Enzymes participating in this process, and localization of their effect. Their classification and physiological importance (effects of α- and β-adrenoreceptors). Classification of substances acting on impulse transmission through the adrenergic synapses.

9. Adrenomimetics that stimulate predominantly peripheral α- and β-adrenoreceptors. Their influence on cardiovascular system, microcirculations organs containing smooth muscles, metabolism. Indications and contraindications. Complications.
10. Adrenomimetics that stimulate predominantly peripheral α-adrenoreceptors. Classification. Their influence on cardiovascular system, microcirculations. Indications. contraindications. Side effects.
11. Adrenomimetics that influence on α-adrenoreceptors. Classification. Influence on bronchi tonus, myometrium, vessels and heart activity. Peculiarities of action of α-adrenomimetics. Indications and contraindications. Side effects.
12. α-adrenoblockers. Classification. Pharmacodynamics. Main properties. Indications and contraindications. Side effects.
13. β-adrenoblockers. Classification. Mechanism of action. Effects. Indications. contraindications. Side effects.
14. α, β-adrenoblockers. Effects. Indications and contraindications.
15. Dopaminergic drugs. Pharmacodynamics.
16. Sympatheticolytics. Peculiarities of mechanism of action. Their influence on cardiovascular system, gastrointestinal tract, CNS and contents of catecholamines. Indications. Side effects.
17. Local anesthetics. Principles of classification. Mechanism of action. Comparative characteristics of drugs. Indications. Side effects. Pharmacokinetics.
18. Astringent drugs. Classification. Principles of action. Usage.
19. Adsorbent drugs. Principles of action. Usage.
20. Irritant drugs. Principles of action. Usage.
21. Mucilaginous drugs. Principles of action. Usage.

D. Questions on general and medical prescription

Write out the following drugs in all medicinal forms:

1. Pilocarpine hydrochloride. 2. Aceclidine. 3. Cytiton. 4. Neostigmine. 5. Galanthamine bromhydrate. 6. Paraoxon. 7. Atropine sulphate. 8. Scopolamine bromhydrate. 9. Platyphylline hydrotartrate. 10. Benzohexonium. 11. Triperium iodide. 12. Suxamethonium. 13. Mellictine. 14. Norepinephrine hydrotartrate. 15. Isoprenaline. 16. Salbutamol. 17. Epinephrine hydrochloride. 18. Phentolamine. 19. Propranolol. 20. Reserpine. 21. Procaine. 22. Benzocaine. 23. Lidocaine. 24. Armine. 25. Dopamine. 26. Phenylephrine. 27. Prazosin. 28. Dobutamine 29. Guanethidine. 30. Dihydroergotoxine. 31. Ephedrine hydrochloride.

32. Tetracaine. 33. Trimecaine. 34. Bupivacrine. 35. Physostigmine salicylate. 36. Metocinium iodide. 37. Pirenzerpine. 38. Ipratropium bromide. 39. Trihexyphenidyl hydrochloride. 40. Nebivolol. 41. Cizaprid. 42. Trimedoxime. 43. Lobeline hydrochloride.

Administered drugs used in (for): glaucoma, atonia of the intestine and urinary bladder, inhibition of the respiratory center, residual phenomena of poliomyelitis, gastric ulcer, bronchial asthma seizure, intoxication with fly-agarics, research of the eye bottom, relaxation of skeletal muscles during intubation, biliary colic, hypertensive crisis, acute hypotension, cardiac arrhythmia, hypoglycemic coma, arterial hypertension, anaphylactic shock, angina pectoris, pheochromocytoma, vascular spasms, infiltrative, peripheral and conjuctive anesthesia's, endarteritis, rhinitis, menace of spontaneous absorption, radiological diagnostics of gastrointestinal tract, conjunctivitis, controlled hypotension.

OPIOID AND NONOPIOID ANALGESICS

A. Actuality. Feeling of pain accompanies the majority of pathological processes and states. In some cases a person may support the pain, in other ones it makes the sick people feel discomfort, suffer and even have some pathological disturbances. And in these cases the pain needs to be removed. Treatment of pain is not only the removal of etiology, but also it is annihilation of symptoms by analgesics.

B. Educational task. To obtain the knowledge about calming or relieving of pain using drugs.

C. Didactic aims

a) The students must **know**: general characteristics of analgesics, their origin and chemical structure, principles of classification, medicinal forms and ways of administration of the main drugs from this class, mechanism of analgesic action, indications and contraindications, side effects, symptoms of acute and chronic intoxications with analgesics and measures of the first aid.

b) The students must **be able to**: prescribe analgesics and order then in different diseases accompanied by pain syndrome.

D. Initial level of knowledge necessary for integration of allied subjects

Human physiology. Biological importance of pain. Pain as an integral reaction of organism. Modern conceptions about reception of

nociceptive irritation. Ways of conduction of pain excitation. Central mechanisms of pain. Role of the cortex, subcortical formations of humoral factors in formation of reactions on pain.

Physiopathology. Role of the pain syndrome in development and evolution of pathological process. Role of central and peripheral mechanisms in formation of pain sensation. Notion about opioid receptors. Chemical mediators of pain and antinociceptive system. Endogenous and exogenous ligands of opioid receptors: enkephalines, endorphines, dinorphines.

E. Questions for self training

1. Analgesics. Principles of classification. Main peculiarities of opioid and nonopioid analgesics.
2. Opioid analgesics (morphine, omnopone, trimeperidine, fentanyl, pentazocine). Classification. Their influence on CNS. Mechanism of action of morphine analgesics. Indications. Side effects and contra-indications.
3. Influence of morphine on internal organs (respiratory system, cardio-vascular system, gastrointestinal tract).
4. Comparative characteristics of morphine and synthetic opioid analgesics. Notion about neuroleptanalgesy.
5. Acute intoxication with morphine and measures of the first aid in this situation. Habit-forming. Pharmacodependence. Narcomania. Ways of prophylaxis and principles of treatment.
6. Agonist-antagonists, antagonists of opioid analgetics (naloxone, nalophine, naltrexone). Principles of action. Usage.
7. Analgesic drugs with mixed mechanism of action (tramadol).
8. Nonopioid analgesics (acetylsalicylic acid, paracetamol). Classification. Mechanism of analgesic action. Indications for administration. Side effects. contraindications.
9. Peculiarities of antipyretic action of nonopioid analgesics.
10. Mechanism of antipyretic action. Indications.
11. Nonopioid analgesics with central action (clonidine, ketamine, diphenhydramine, amitriptyline, imizine, carbamazepine, valproic acid, baclofen, levomepromazine).
12. Peculiarities of action of opioid and nonopioid analgesics in children.

F. Brief characteristics of compulsory opioid and nonopioid analgesic drugs:

Down. Drug name. 1. Morphine hydrochloride. 2. Omnopone. 3. Trimeperidine. 4. Fentanyl. 5. Pentazocine. 6. Tilidine. 7. Acetylsalicylic acid. 8. Paracetamol. 9. Baralgine. 10. Naloxone. 11. Tramadol. 12. Naltrexone. 13. Ketorolac.

Across. 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and Contraindications. 6. Side effects.

G. Questions on general and medical prescription

Write out the following drugs in all medicinal forms: 1. Trimeperidine. 2. Morphine hydrochloride. 3. Omnopone. 4. Fentanyl. 5. Pentazocine. 6. Tilidine. 7.Acetylsalicylic acid. 8. Paracetamol. 9.Baralgine. 10.Naloxone. 11.Tramadol. 12.Naltrexone. 13. Ketorolac.

Administered drugs used in (for): myocardial infarction, trauma, headache calming, cholelithiasis, fever, neuralgia, myositis, acute dental ache, and pre- and post operation pains, cancer.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ETHANOL. HYPNOTICS. ANTICONVULSANTS. ANTIEPILEPTICS. ANTIPARKINSONS DRUGS

A. Actuality. Usage of ethanol in medicine needs deep knowledge of its effects on organism. Different problems are the interaction of ethanol with drugs. Treatment of insomnia implicates a deeper study of human physiology and role of hypnotics in its induction. Main requirements of these drugs states that they must produce a sleep, similar to physiological one. Solution of this problem gives us the possibility of an efficient treatment of insomnia without any side effects, that are usually characteristic and deep knowledge of anticonvulsive drugs.

B. Educational task. To obtain knowledge about hypnotic, anticonvulsive, antiepileptic, antiparkinsonics drugs and ethanol possibilities.

C. Didactic aims

a) The students must **know**: the absorption, distribution, metabolism of ethanol and its action on organs and systems. Usage of ethanol in therapeutics, principles of treatment in acute and chronic ethanol intoxication. Classification of hypnotic drugs, their mechanism of

action, influence on sleep, side effects and principles of administration.

b) The students must **be able to**: prescribe compulsory drugs from these groups in different medicinal forms in insomnias, convulsions.

D. Initial level of knowledge necessary for integration of allied subjects

Human physiology. Physiological sleep, its phases and levels. Sleep theories. Interaction of cerebral cortex, hypothalamus and reticular formation during the time of sleep and during the state of vigor. Dreams. Physiological processes and state of hypnoses.

E. Questions for self training

1. Hypnotic drugs. Principles of classification (according to the structure and duration of action).
2. Barbiturates. Classification according to the duration of action. Pharmacokinetics. Mechanism of action. Influence of the sleep structure. Indications. Side effects. Habitforming, medical dependence. Use peculiarities of barbiturates in children.
3. Benzodiazepines. Classification according to the duration of action, Mechanism of action, influence on sleep structure. Indications, side effects. Pharmacokinetics. Hypnotic nonbenzo-diazepines.
4. Aliphatic compounds. Their characteristics.
5. Other pharmacological drugs used as hypnotics.
6. Main principles of treatment of insomnia.
7. Acute and chronic intoxications with hypnotics. Principles of treatment. Medical dependence. Intoxication peculiarities with hypnotics in children.
8. Pharmacokinetics of ethanol.
9. Pharmacodynamics of ethanol (influence on CNS, VNS, digestive system, local, antiseptic and energetic actions). Indications.
10. Principles of treatment of acute ethanol intoxication and chronic alcoholism. Peculiarities of treatment of acute ethanol intoxication in children.
11. Interaction of ethanol with other drugs.
12. Anticonvulsive drugs of a large profile. Classification. Characteristics of groups. Usage peculiarities in pediatrics.
13. Antiepileptic drugs. Classification. Characteristics of groups.
14. Antiparkinson's drugs. Classification. Characteristics of groups.
15. Drugs used for increased counterction treatment (CNS myorelaxants).

16. Derivatives of cyclopirolone as hypnotics (zopiclone, zolpidem).

F. Brief characteristics of the main drugs:

Down. Drug name. 1. Phenobarbital. 2. Thiopental. 3. Diazepam. 4. Nitrazepam. 5. Phenytoin. 6. Levodopa. 7. Zopiclone. 8. Lamotrigine. 9. Selegeline. 10. Amantadine. 11. Trihexyphenidyl. 12. Oxazepam. 13. Carbamazepine. 14. Valproic acid. 15. Ethosuximide. 16. Bromocriptine. 17. Baclofen. 18.Ethanol. 19. Disulfiram.

Across. 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription

Write out the following drugs in all medicinal forms: 1. Phenobarbital. 2. Thiopental. 3. Diazepam. 4. Nitrazepam. 5. Phenytoin. 6. Levodopa. 7. Zopiclone. 8. Lamotrigine. 9.Selegeline. 10. Amantadine. 11. Trihexyphenidyl. 12. Oxazepam. 13. Carbama-zepine. 14. Valproic acid. 15. Ethosuximide. 16. Bromocriptine. 17. Baclofen. 18. Ethanol. 19. Disulfiram.

Administered drugs used in (for): sleep disorders, decreased duration of sleep, superficial sleep, convulsions of unknown genesis, major seizures of epilepsy, minor seizures of epilepsy, status epilepticus, myoclonic seizures, parkinson's disease (dopaminergic and anticholinergic drugs), alcoholism, intoxications with hypnotics, muscular rigidity.

H. Questions for self-training should be answered in written form while preparing for the lesson.

PSYCHOTROPIC DRUGS.

I. Neuroleptics, tranquilizers, anxiolytic drugs, lithium salts.

A. Actuality. Psycholeptics – it is a group of drugs that is characterized by the following pharmacodynamic properties: antipsychotic, anxiolytic, hypnotic, normothymic actions etc. These drugs have increased the efficacy of psychiatric treatment and are widely used in therapeutics, anesthesiology, neurology etc.

B. Educational task. Getting the students aquatinted with opportunities of treatment with psychotropic drugs.

C. Didactic aims

a) The students must **know**: general characteristics of psycholeptic

drugs, their origin and chemical structure, principles of classification, name, medicinal forms and ways of administration of the main drugs from this group, mechanism of action, indications and contraindications, side effects, symptoms of acute and chronic intoxications with some psychotropic drugs and their treatment.

b) The students must **be able to**: prescribe compulsory psycholeptic drugs in all existent medicinal forms and order anxiolytic drugs in concrete diseases and pathological states.

D. Initial level of knowledge necessary for integration of allied subjects

Human physiology. Reflex principle of CNS activity. Structure of CNS nervous, main properties of human VNS. Participation of lymbic system in regulation of activity of internal organs. CNS mediators (acetylcholine, noradrenaline, serotonin, glutamine, GABA, glycine).

Histology. Notions about cyto- and myeloarchitectonics of cerebral cortex. Analytic and synthetic activities of the brain. Gray matter of cerebral cortex. Structure of reticular formation.

Biochemistry. Chemical components of nervous tissue. Peculiarities of metabolism of energy, importance of aerobic glycolysis. Mediators of transmission of nervous impulses: acetylcholine, adrenaline, noradrenaline. Importance of transformations of glutamine, glutamic acid and GABA in nervous tissue.

Physiopathology. Physiopathology of subcortical centers of cerebral cord. Pathology peculiarities of limbic system.

E. Questions for self-training.

1. Psychotropic drugs. Classification. Psychosedatives (psycholeptics), psychostimulators (psychoanaleptics), psychodysleptics.
2. Neuroleptics (chlorpromazine, levomepromazine, perphenazine, droperidol, haloperidol, clozapine). Classification. Pharmacokinetic and pharmacodynamic properties. Comparative characteristics of neuroleptic drugs. Indications, contraindications, side effects. Usage peculiarities for children.
3. Tranquilizers (chlordiazepoxide, diazepam, phenazepam, mebicar, trimetazine meprobamate). Definition. Classification. Pharmacodynamics. Pharmacokinetics. Indications, contraindications, side effects. Usage peculiarities for children.
4. Sedative drugs (bromides, Leonurus, passion flower and valerian drugs). Definition. Classification. Pharmacokinetics. Pharmacodyna-

mics. Indications, contraindications. Side effects.

5. Lithium salts (lithium carbonate). Pharmacokinetics. Mechanism of action. Actions. Indications. Contraindications. Side effects.

F. Brief characteristics of compulsory drugs.

Down. Drug name. 1. Chlorpromazine. 2. Levomepromazine. 3.Perphenazine. 4.Droperidol. 5.Haloperidol. 6. Clozapine. 7. Sulpirid. 8. Diazepam. 9. Phenazepam. 10. Flumazenil. 11. Meprobamate. 12. Buspirone. 13. Sodium bromide. 14. Valerian extract. 15. Lithium carbonate.

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (Maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and Contraindications. 6. Side effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Chlorpromazine. 2. Levomepromazine. 3. Perphenazine. 4. Droperidol. 5. Haloperidol. 6. Clozapine. 7. Sulpirid. 8. Diazepam. 9. Phenazepam. 10. Flumazenil. 11. Meprobamate. 12. Buspirone. 13. Sodium bromide. 14. Valerian extract. 15. Lithium carbonate.

Administered drugs used in (for): schizophrenia, psychomotoric agitation, acute mania, neuroleptanalgesy, neurovegetative disorders, vomit, states of anxiety, convulsions, spastic states of skeletal muscles, insomnia, neuritis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

PSYCHOTROPIC DRUGS (continuation)

Ii. Antidepressant, psychostimulant, nootropic, general tonifying, adaptogeneous and analeptic drugs.

A. Actuality. Psychoanaleptic drugs include different drug classes with a wide spectrum of pharmacodynamic effects (timoleptic, timorectic, regenerating actions on cerebral metabolism, functions of endocrine system, more adequate and easier adaptation of organism to harmful factors etc.).

B. Questions for self training:

1. Antidepressant drugs (imipramine, amitriptyline, desipramine, phenelzine, moclobemide, amoxapine, meprotiline, trazodone, fluoxetine, pirlindol). Classification. Pharmacokinetics. Mechanism and

spectrum of action. Indications, contraindications. Side effects.

2. Psychostimulant drugs (amphetamine, methylphenidate, mezzocarb, caffeine, ethimizol). Classification. Mechanism and spectrum of action. Indications, contraindications. Side effects. Pharmacokinetics.
3. Nootropic medication (GABA, phenibut, pyritinol, nootropil, gamalon, meclophenoxate). Classification. Mechanism of action. Effects. Indications. Side effects. Pharmacokinetics.
4. General tonifying and adaptogeneous drugs (strychnine, securinine, securinine, fluid extract of rose Rhodiole, tincture of Chinese lemon, Ginseng, fluid extract of Eleutherococcus, prutocrin). Classification. Mechanism of action. Effects. Indications. Contraindications. Side effects. Pharmacokinetics.
5. Analeptic drugs (nikethamide, bemegride). Classification. Characteristics of groups.
6. Peculiarities of pharmacodynamics and pharmacokinetics of psychoanaleptic drugs in children.
7. Acute intoxication with psychoanaleptics and principles of treatment.

C. Brief characteristics of compulsory analeptic drugs.

Down. Drug name: 1. Imipramine. 2. Amitriptyline. 3. Phenelzine. 4. Pirlindol. 5. Moclobemide. 6. Mezocarb. 7. Caffeine. 8. Nootropil. 9. Hopatenic acid. 10. Ginseng. 11. Prutocrine. 12. Nialamide. 13. Pyritinol. 14. Maprotiline. 15. Nikethamide. 16. Fluoxetine..

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

D. Questions for general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Imipramine. 2. Amitriptyline. 3. Phenelzine. 4. Pirlindol. 5. Moclobemide. 6. Mezocarb. 7. Caffeine. 8. Nootropil. 9. Hopantenic acid. 10. Ginseng. 11. Pantocrine. 12. Nialamide.13. Pyritinol. 14. Maprotiline. 15. Nikethamide. 16. Fluoxetine. .

Administered drugs used in (for): depressive states, night enuresis, arterial hypertension, asthenia, depressions, oligophrenia, acute cerebral disturbances, chronic alcoholism.

E. Questions for self-training should be answered in written form while preparing for the lesson.

GENERAL ANESTHETICS

A. Actuality. The problem of pain relieving in surgical interventions concerns all doctors from ancient times. The discovery of general anesthetics had given the possibility to effectuate difficult operations and save many lives. In spite of that, this domain of medicine needs an intensive and deep study of new general anesthetics, which must correspond to the actual demands of surgery and anesthesiology.

B. Educational task: study of pharmacological properties of general anesthetics, possibilities of their usage in medical practice.

C. Didactic aims:

a) The students must **know**: definition, classification, mechanism of action, comparative characteristics, indications, contraindications, side effects of general anesthetics.

b) The students must **be able to**: prescribe the main general anesthetics in all possible medicinal forms, order general anesthetics according to surgical operation.

D. Initial level of knowledge necessary for integration of allied disciplines.

Human anatomy. Afferent ways of transmission of nervous impulses (exteroceptive, proprioceptive, interoceptive) and their destinations. Larynx, trachea, bronchi, lungs. Their structure.

Human physiology. Physiology of CNS. Mediators of CNS. Mechanisms of transmission of nervous impulses. Processes of excitation and inhibition of CNS. Reflexive activity of CNS.

General surgery. History of general anesthesia. Theories of general anesthesia. Phases of general anesthesia.

E. Questions for self training:

1. Definition and classification of general anesthetics.
2. Mechanism of action of general anesthetics.
3. Inhaled general anesthetics. Classification. Physical, chemical and pharmacological properties of volatile liquids and gases with anesthetic action. Index of anesthesia.
4. Influence of inhalted general anesthetics on phases and levels of general anesthesia.
5. Pharmacokinetics of inhalted general anesthetics.
6. Intravenous general anesthetics. Classification.
7. Influence of intravenous general anesthetics on phases and levels of general anesthesia. Indications. Side effects. Pharmacokinetics.

8. Concomitant usage of general anesthetics.

F. Brief characteristics of the main general anesthetics.

Down. Drug name: 1. Halothane. 2. Diethylic ether. 3. Thiopental. 4. Ketamine. 5. Oxybuthyrate. 6. Enflurane. 7. Isoflurane. 8. Nitrous oxide. 9. Propranidide.

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Halothane. 2. Diethylic ether. 3. Thiopental. 4 .Ketamine. 5. Oxybuthyrate. 6. Enflurane. 7. Isoflurane. 8. Nitrous oxide. 9.Propranidide.

Administered drugs used in (for): major surgical interventions of long-term period, surgical interventions of short-term period, acute myocardial infraction, initiation of anesthetic, convulsions, analgesic travail.

H. Questions for self-training should be answered in written form while preparing for the lesson.

Concluding session on topic:

DRUGS ACTING ON CNS

A. Questions for self training:

1. Hypnotic drugs. Principles of classification. Mechanism of action. Their action on the structure of sleeping. Indications. Side effects. Pharmacokinetics.
2. Anticonvulsive drugs with wide spectrum of action used in symptomatic therapy of convulsions. Classification. Characteristics.
3. Ethanol. Absorption, distribution, elimination. Action on CNS, VNS, digestive organs. Usage in medicine. Acute intoxication with alcohol. Treatment. Chronic alcoholism. Principles of treatment.
4. Neuroleptic drugs. Classification, mechanism and spectrum of action, indications, side effects.
5. Tranquilizers. Classification. Mechanism and spectrum of action, indications, side effects.
6. Nootropic drugs. Mechanism of action, effects, indications.
7. Opioid analgesics. Classification. Mechanism of action.

8. Influence of opioid analgesics on CNS and internal organs (respiratory system, VNS, digestive tube) indications. Contraindications. Side effects.
9. Acute intoxication with morphine. Treatment. Antagonists of opioid analgesics and their principle of action. Drugs dependence.
10. Non-opioid analgesics. Classification. Mechanism of action, indications, side effects.
11. Antidepressant drugs. Classification. Mechanism and spectrum of action. Indications. Side effects.
12. CNS stimulants. Classification. Mechanism and spectrum of action. Indications. Side effects.
13. Tonifying and adaptogeneous drugs. Classification. Mechanism of action. Effects. Indications.
14. General anesthetics. Classification.
15. Inhaled general anesthetics. Classification. Mechanism of action. Influence on phases and levels of general anesthesia. Usage. Side effects.
16. Intravenous general anesthetics. Classification. Mechanism of action. Influence on phases and levels of general anesthesia. Indications. Side effects.
17. Sedative drugs. Classification, principle of action, usage.
18. Antiepileptic drugs. Classification, mechanism of action, indications. Side effects.
19. Antiparkinson's drugs. Classification, mechanism of action, usage.
20. Normotimic drugs (used in treatment of bipolar disorders). Mechanisms of action, usage. Side effects.

B. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms:

1. Phenobarbital. 2. Barbital. 3. Pentobarbital. 4. Diazepam. 5. Nitrazepam. 6. Phenytoin. 7. Levodopa. 8. Phenazepam. 9. Morphine. 10. Trimetidine. 11. Acetylsalicylic acid. 12 .Baralgine. 13. Chlorpromazine. 14. Droperidol. 15. Nootropil. 16. Amitriptyline. 17. Caffeine. 18. Thiopental. 19. Ketamine. 20. Sodium oxybuthyrate. 21. Imipramine. 22. Moclobemide. 23. Fluoxetine. 24. Ginseng. 25. Nikethamide. 26. Pyritinol. 27. Halothan. 28. Propanidide. 29. Oxazepam. 30. Flumazenil.31.Valproic acid. 32.Carbamazepine. 33. Zopiclone. 34. Ethosuximide. 35. Amantadine. 36. Trihexyphenidyl. 37. Lamotrigine. 38. Selegeline. 39. Bromocriptine. 41. Levomepromazine.

42. Perphanazine. 43. Closapine. 44. Sulpirid. 45. Buspirone. 46. Lithium carbonate. 47. Sodium bromide. 48. Fentanyl. 49. Tramadol. 50. Tilidine. 51. Paracetamol. 52. Naloxone. 53. Naltrexone. 54. Phenelzine. 55. Baclofen. 56. Ketorolac.

Administered drugs used in (for): superficial sleeping, abolition of convulsions, fever, potentiation of general anesthesia, diminution of psychic and physical performances, headache, bile duct colic, acute myocardial infraction, state of neurosis with anxiety, maniac excitation, status epilepticus, alcoholic abstinence, vomiting, depression, Parkinson's disease, disorders of sleep instalation, decrease of duration, alcoholism, treatment of intoxication with hypnotic drugs, muscular rigidity.

TONICARDIAC AND CARDIOSTIMULANT DRUGS.

A. Actuality: Heart failure occupies a particular place in the structure of cardiovascular diseases. Since, mortality caused by heart failure overtakes by 7 times the general mortality of population, the importance of cardiotonic drugs had increased very much during the last two centuries.

B. Educational task: Getting of students acquainted with the main tonicardiac drugs used in treatment of heart failure, caused by myocardial dystrophy of diverse origin, with their side effects and toxic effects.

C. Didactic aims:

a) The students must **know:** the main tonicardiac drugs, their general characteristics, mechanism of action, medicinal forms, ways of administration, dosage regiment, indications, contraindications, side effects.

b) The students must **be able to:** prescribe compulsory tonicardiac and cardiostimulant drugs in all medicinal forms and administer them in different diseases and pathological stress.

D. Initial level of knowledge necessary for integration of allied disciplines.

Human physiology. Physiological characteristics of cardiac muscle (excitability, contractibility, conductibility). Atypical heart muscle and intracardiac nervous node. Classification and characteristics of the main regulatory actions: positive inotropic, negative chronotropic,

positive batmotropic, negative dromotropic and positive tonotropic. Characteristics of influence of sympathetic and parasympathetic nervous fibers on heart activity.

Physiopathology. Indexes of heart failure. Tonogenous and myogeneous dilation of the heart. Disorder of cardiac rhythm (automatism, excitability, contractility, conductibility of heart). Metabolic forms of heart failure. Myocardial hypertrophy, its types and mechanism of its development.

E. Questions for self training:

1. Classification of drugs used in heart failure.
2. Tonicardiac glycosides. Sources. History of study of tonicardiac glycosides (W.Whitering, E.V.Pelican, S.P.Botkin, I.P.Pavlov). Glycosides obtained from plants.
3. The influence of tonicardiac glycoside on the main functional indexes of the heart (positive inotropic, positive batmotropic, negative dromotropic, negative chromotropic, positive tonotropic actions and their mechanisms). Systolic and diastolic effects. Modifications of ECG.
4. Mechanism of cardiotonic effect of tonicardiac glycosides. Myocardial metabolic modifications, caused by tonicardiac glycosides. Comparison with cardiostimulant action of $\alpha_1\beta$-and β - adrenomimetics.
5. Mode of therapeutic action of tonicardiac glycosides in decompensated heart failure. Modification of the main indexes of systemic hemodynamics, CNS functions, kidneys, respiratory and digestive organs.
6. Peculiarities of pharmacodynamics and pharmacokinetics of digitoxin, digoxin and strophantine. Modification of pharmacodynamics of tonicardiac glycosides in simultaneous administration with other drugs. Principles of dosage of glycosides, phases of saturation and maintenance. Modes of saturation. Notion of elimination coefficient.
7. Main indications of tonicardiac glycosides. Selection principles in treatment of acute and chronic heart failure. Usage of tonicardiac glycosides in atrial flutter.
8. Semisynthetic tonicardiac glycosides (strophantine acetate, methyldigoxin). Intoxications with tonicardiac glycosides. Pathogenesis and symptomatology. Resistance to tonicardiac glycosides and principles of its overcoming.

9. Cardiostimulant drugs (sympatheticomimetics, glucagon etc.). comparative characteristics of cardiotonic and cardiostimulant drugs.
10. Peculiarities of action of tonicardiac glycosides in children.
11. Non-glycosidic cardiotonic drugs (amrinone, milrinone, sulmazol, phenoxymon). Mechanism of action, usage.
12. Indirect cardiotonic drugs (vasodilators and diuretics used in heart failure). Classification. Principle of action.

F. Brief characteristics of compulsory drugs:

Down. Drug name: 1. Strophantine. 2.Digitoxin. 3. Digoxin. 4. Adoniside. 5. Corglycon. 6. Amrinone.

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Strophantine. 2. Digitoxin. 3. Digoxin. 4. Adoniside. 5. Corglycon. 6. Amrinone.

Administered drugs used in (for): acute heart failure, chronic heart failure, decompensated cardiac activity, atrial flutter, intoxication with tonicardiac glycosides.

H. Questions for self-training should be answered in written form while preparing for the lesson.

DIURETICS. DRUGS USED FOR ELIMINATION OF RENAL CALCULI (antigouty drugs used in urolithiasis)

A. Actuality. Retention of salts and water in organism cruses hydration of tissues with formation of edema and accumulations liquid in cavities, phenomena that accompany renal diseases, cardiovascular insufficiency, some forms of liver pathology and urgent situations (acute intoxications, hypertensive crisis, cerebral edema etc.) at present in medical practice is being used a great number of drugs having diuretic action. Selection of the most efficient and inoffensive drug among them in every concrete case needs good knowledge of their mechanism of action, pharmacokinetics and pharmacodynamics.

B. Educational task: The study of pharmacology of diuretics and drugs that contribute to excretion of renal calculi; formation of skills of drug selection in different pathologies and correct prescribing of

prescriptions recording to indications.

C. Didactic aims:

a) The students must **know:** the definition and classification of the given group of drugs: their pharmacokinetics and pharmacodynamics, medicinal forms and ways of administration of the main drugs from this group, indications and Contraindications, side effects.

b) The students must **be able to:** prescribe diuretics, antigouty drugs and drugs used in urolithiasis in diverse medicinal forms and order them in dependence of pathology and patients age.

D. Initial level of knowledge necessary for integration of allied disciplines.

Human anatomy. Anatomy of kidneys.

Histology. The structure of nephron.

Human physiology. Main mechanism of urine formation. Acid/base equilibrium and electrolytic balance.

Biochemistry. Biochemistry of urine formation. Renal calculi. Their structure, mechanism of formation.

Physiopathology. Disturbance of hydro-electrolytic equilibrium. Pathogenesis of edema and its prophylaxis.

E. Questions for self-training.

1. Diuretic drugs. Principles of classification. Notion about saluretics.
2. Classification of diuretics by action localization in nephron, by duration and action potential.
3. Diuretics with predominant action on renal glomerulus. Xanthines (theophylline, aminophylline). Characteristics of diuretic action of xanthines. Indications.
4. Diuretics with predominant action on proximal convoluted tubule. Classification. Carbonianhydrase inhibitors (acetazolamide). Mechanism of action. Their role in elimination of different ions and metabolites out of effect. Indications. Complications.
5. Osmotic diuretics (manitol, carbamide). Mechanism of action. Their
6. role in elimination of ions and metabolites out of organism. Intensity and duration of drugs effect. Indications. Complications.
7. Diuretics with predominant influence on ascending loop of Henle (saluretics). Classification. Mechanism of action. Their role in elimination of different ions and metabolites. Indications. Complications.
8. Drugs having influence on cortical segment of the loop of Henle. Thiazides (hydrochlorthiazide, chlorothiazide, polithiazide, cyclo-

peanthiazide). Nouthiazides (chlorthalidone, clopamide). Mechanism of action. Their role in elimination of diverse ions. Indications. Side effects.

9. Drugs having influence on cortical and medullar segments of loop (Furosemide, ethacrynic acid). Mechanism of action. Their role in elimination of different ions. Indications. Side effects.
10. Diuretics influencing predominantly on distal convoluted tubules. Classification. Potassium-sparing diuretics. Competitive antagonists of aldosterone (triamterene, amiloride). Localization and mechanism of action. Their role elimination of different ions and metabolites out of organism. Intensity and duration of effect. Complications. Indications.
11. Comparative characteristics of diuretics according to the intensity and duration of action. Drug election in diverse states with liquid retention in the organism (chronic heart failure, insufficiency of the left ventricle, cirrhosis of the lever with ascetic, nephrotic syndrome, nephropathy of pregnant, chronic renal failure, cerebral edema, pulmonary edema).
12. Drug election in pathological states, when retention of liquid in organism doesn't occur (arterial hypertension, acute intoxications, diabetes insipidus, disturbance of the electrolytic equilibrium, glaucoma, epilepsy).
13. Antigouty drugs. Classification. Characteristics of groups.
14. Drugs used in urolithiasis. Classification of drugs that modify the pH of urine.

F. Brief characteristics of compulsory drugs:

Down. Drug name: 1. Hydrochlorothiayide. 2. Furosemide. 3. Triamterene. 4. Manitol. 5. Spironolactone. 6. Ethebenicide. 7. Sulfinpyrazone. 8. Allopurinol. 9. Cystenal. 10. Ammonium chloride.

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Hydrochlorothiazide. 2. Furosemide. 3. Triamterene. 4. Manitol. 5. Spironolactone. 6. Ethebenicide. 7. Sulphinpyrazone. 8. Allopurinol. 9.Cystenal. 10. Ammonium chloride.

Administered drugs used in (for): edema of cardiac genesis, renal failure, pulmonary edema, acute intoxication, hypertension

with hyperaldosteronism, cerebral edema, uricoihibition in gout, uricozuric in gout, renal colic, gout seizure, forced diuresis, arterial hypertension, glaucoma.

H. Questions for self-training should be answered in written form while preparing for the lesson.

SYSTEMIC VASODILATORS. (antihypertensive drugs)

A. Actuality. According to the data of the WHO, arterial hypertension occupies one of the first places among the diseases leading to invalidity and death. Prophylaxis and treatment of this pathology are possible only with the condition of a deep knowledge of antihypertensive drugs.

B. Educational task. Getting of students acquainted with compulsory anthypertensive drugs. Best selection of the most efficient ones for treatment of different forms of arterial hypertension.

C. Didactic aims:

a) The student must **know:** main antihypertensive drugs, their general characteristics, their names, classification, mechanism of action, medicinal forms and ways of administration, doses, indications and Contraindications, side effects.

b) The students must **be able to:** prescribe necessary drug and substitute it in case of necessity with other one, order vasodilators in different forms of arterial hypertension.

D. Initial level of knowledge necessary for integration of allied disciplines.

Human anatomy. Cardiovascular system (heart, arteries, veins and capillaries). Peculiarities of the structure. Arteries and veins of pulmonary and systemic circulations. Defects of magistral blood vessels.

Histology. Arteries. Classification. Structure of arteries of different types: muscular, muscular/elastic, elastic. Functional importance of the veins of muscular and nonmuscular types.

Human physiology. Arterial tension as a physiological constant of organism. Autoregulation of arterial tension. Tonic excitation of vasomotor centers (C.Bernard). Characteristics and peculiarities of baroreceptors of vascular system. Functional system of antoregulation of arterial tension (analysis of central and peripheral components). Afferent

and efferent influence of vasomotor centers. Vasomotor nerves (constrictors and dilators of blood vessels). Humoral influence on vascular tonus (adrenaline, vasopressin, rennin, angiotensin, histamine, quinines). Physiological bases of pathogenesis of arterial hypertension. Importance of capillary perfusion. Definition of cardiac output, microcirculation, vascular peripheral resistance, volume of circulating blood.

Biochemistry. Peculiarities of metabolism of smooth muscles.

Physiopathology. Disturbance of blood tension in case of lesion of receptors, centers and properties of the vascular wall. Pathogenesis of essential hypertension, symptomatic hypertension. Disturbances of topic blood circulation.

Propedeutics of internal diseases. Arterial hypertension. Notion about hypertension of the pulmonary circulation. AHT classification, clinical forms of AHT. Main principles of treatment.

E. Questions for self training:

1. Vasodilators. Classification (drugs that decrease sympathetic tonus on different levels, musculotropic substances, drugs that regulate water-salt metabolism, rennin-angiotensin-aldosterone system inhibitors).
2. Drugs that decrease sympathetic tonus on different levels. Classification.
   a) Substances with central action (clonidine, methyldopa). Peculiarities of their hypotensive action. Indications. Side effects and their prophylaxis.
   b) Ganglion blockers (hexamethonium, pempidine, trepirium iodide). Classification. Peculiarities of their antihypertensive action. Influence on systemic arterial tension. Indications. Complications, and their prophylaxis. Side effects.
   c) Blockers of sympathetic endings (Reserpine, guanethidine).
   d) Peculiarities of antihypertensive mechanism of action. Action on systemic arterial tension. Indications. Contraindications. Side effects and their prophylaxis.
   e) α-adrenoblochers. (phentolamine, prazosin, doxazosine). Classification. Peculiarities of mechanism of action. Neuroleptics with α-adrenoblocker action (droperidol, levomepromazine). Indications. Side effects.
   f) β-adrenoblockers (propranolol, oxprenolol). Classification.

Peculiarities, mechanism of action. Indications. Complications and their prophylaxis.

g) α, β-adrenoblochers (labetalol). Effects. Indications.

3. Drugs having action on smooth muscles of vessels (hydralazine, bendazol, sodium nitroprusside). Classification, peculiarities, mechanism of action. Indications. Complications.
4. Stimulators of potassium channels (diazoxide, minoxidil). Mechanism of action. Indications. Side effects.
5. Calcium antagonists (verapamil, nifedipine). Mechanism of action. Indications. Side effects.
6. Diuretics as antihypertensive drugs (hydrochlorothiazide, spironolactone, furosemide). Mechanism of action, indications. Complications.
7. Inhibitors of rennin-angiotensin-aldosterone system (captopril, losartan). Action mechanism. Indications. Side effects.
8. Comparative action characteristics of antihypertensive drugs on tonus of arteries and veins, resistance, cardiac output, frequency of cardiac contractions, volume of circulating blood, activity of rennin-angiotensin-aldosterone system and glomerular filtration.
9. Drugs used for removal of hypertensive attacks. Their characteristics.
10. Main principles of removal of hypertensive attacks.

F. Brief characteristics of main drugs:

Down. Drug name: 1. Clonidine. 2. Methyldopa. 3. Guanethidine. 4. Reserpine. 5. Azamethonium. 6. Propranolol. 7. Hydrochlorothiazide. 8. Atenolol. 9. Captopril. 10. Diazoxide. 11. Hydralazine. 12. Nifedipine. 13. Sodium nitroprusside. 14. Losartan. 15. Prazosin.

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription:

Write out the following drugs in all possible medicinal forms: 1. Clonidine. 2. Methyldopa. 3. Guanethidine. 4. Reserpine. 5. Azamethonium. 6. Propranolol. 7. Hydrochlorothiazide. 8.Atenolol. 9. Captopril. 10. Diazoxide. 11. Hydralazine. 12. Nifedipine.13. Sodium nitroprusside. 14. Losartan. 15. Prazosin.

Administered drugs used in (for): hypertensive attack, pheochromocytoma (diagnostics), light arterial hypertension, severe arterial hypertension, arterial hypertension with arrhythmias.

H. Questions for self-training should be answered in written form while preparing for the lesson.

VASOCONSTRICTORS AND ANTIHYPOTENSIVE DRUGS.

A. Actuality. Acute and chronic arterial hypertensions are pathological states that are met in therapeutic, surgical practice etc. and needs a complex treatment. Thus, there is a need in deeper study of existing drugs and elaboration of new ones, more efficacious in treatment of hypotension.

B. Educational task. Study of pharmacology of vasoconstrictors and antihypotensive drugs, concomitant to principles of their selection according to indications, with their possible side effects and measurers of their prophylaxis.

C. Didactic dims:

a) Students must **know**: general characteristics of vasoconstrictors and antihypotensive drugs, their origin and chemical structure, principles of classification, names, medicinal forms and ways of administration of the main drugs of given class, mechanism of action, basic effects, main indications and contraindications for administration, side effects.

b) Students must **be able to**: prescribe antihypotensive drugs, order these drugs depending on hypotensive states.

D. Initial level of knowledge necessary for integration of allied disciplines:

Human physiology. Hemodynamics. Speed of blood circulation. Laminar and turbulent circulation. Nervous regulation of terminal circulation. Vasomotor centers. Humoral regulation of terminal circulation (adrenaline, vasopresine, rennin, histamine, prostaglandins, quinines).

Physiopathology. Acute and chronic circulatory insufficiency. Mechanical disturbances of blood vessels properties. Disturbances of their tonus. Nervous mechanisms disturbance of vascular tonus regulation. Disturbances of humoral mechanisms of the vascular tonus regulation. Rennin-angiotensin-aldosterone system. Hypotension.

E. Questions for self-training.

1. Definition and classification principles of vasoconstrictors and antihypotensive drugs.
2. Vasoconstrictors. Classification:
   a) Sympatheticomimetics (norephinephrine, epinephrine, dopamine, phenylephrine, midodrine, ephedrine). Mechanism of action. Indications, Contraindications. Side effects. Pharma-

cokinetics. Comparative characteristics.

b) Alkaloids of ergot and their derivatives (ergotal, ergotamine). Mechanism of action. Indications, Contraindications. Side effects. Pharmacokinetics.

c) Isothioureic compounds (izoturon, difetur). Peculiarities of pharmacodynamics. Indications, Contraindications. Side effects.

d) Musculotropic vasoconstrictors (vasopresine, angiotensinamide). Mechanism of action. Indications. Contraindications. Side effects. Pharmacokinetics.

e) Psychostimulants (caffeine sodium benzoate). Analeptics (Niketamide). Mechanism of action. Indications, Contraindications. Side effects. Pharmacokinetics.

f)General tonifying drugs (tincture of Ginseng, Echinopanax, Aralie, extract of Leuzeae, Rodiola, pantocrine). Mechanism of action. Indications, Contraindications. Side effects.

g) Topic vasoconstrictors (naphazoline, xylomethazoline, phenylephhrine, epinephrine, ethylepthrine, ephedrine). Pharmacokinetics.

3. Vasoconstrictors with complex mechanism. (DOXA, fludrocortizone). Pharmacodynamics. Pharmacokinetics.
4. Vasoconstrictors having permissive action (corticosteroids). Peculiarities of action.
5. Antihypotensive drugs increasing cardiac output (isoprenaline, dopamine, dobutamine, glucagon). Mechanism of action. Indications, Contraindications. Side effects. Pharmacokinetics.
6. Substitutes of plasmatic volume (dextran-40, dextran-70). Pharmacokinetics.

F. Brief characteristics of compulsory antihypotensive drugs:

Down. Drug name: 1. Epinephrine. 2. Norepinephrine. 3. Phenylephrine. 4. Ergotamine. 5. Caffeine sodium benzoate. 6. Dopamine. 7 Pantocrin. 8 Dextran-70. 9. Dezoxycorticosterone. 10. Izoturon. 11. Angiotensinamide. 12. Raviten

Across: 1. Medicinal form. 2. Way of administration. 3. Maximal doses (for a single use, for 24 hours, therapeutic).4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Epinephrine. 2. Norepinephrine. 3. Phenylephrine. 4.Ergotamine.

5. Caffeine sodium benzoate. 6. Dopamine. 7 Pantocrine. 8 Dextran-70. 9. Dezoxycorticosterone. 10. Izoturon. 11. Angiotensinamide. 12. Raviten

Administered drugs used in (for): hemorrhagic hypotension, hypotension caused by overdosage of CNS depressing drugs, cardiogeneous shock with hypotension, migraine, neurovegetative dystonias, hypotensions resistant to sympatheticomimetics, ortostatic hypotension, acute rhinitis, hypovolemic shock, chronic hypotension.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTIARRHYTHMIC DRUGS.

A. Actuality. Cardiac arrhythmias are the most frequent symptoms of cardiovascular diseases, some acute intoxications etc., which may cause severe disorders of cardiodynamics and systemic hemodynamics, often can be a major factor of lethality. Pharmacotherapy of these diseases has a leading role in decreasing of lethality among people having cardiac arrhythmias. From this point of view, knowledge of pharmacokinetic and pharmacodynamic aspects of antiarrhythmic medication, and also elaboration of some new drugs has a great importance for medical practice.

B.Educational task. Gaining of fundamental knowledge in the domain of anti arrhythmic medication and problems of urgent medical assistance (removal of rhythm disorders).

C. Didactic aims:

a) The students must **know:** the names of the main antiarrhythmic drugs, principles of classification, pharmacokinetic aspects, mechanism of action and pharmacological effects, indications and contraindications, side effects, optimal ways of administration and principles of selection and dosage of antiarrhythmic drugs depending on the situation, substitution of drug with another analogical one according to pharmacological properties.

b) The students must **be able to:** prescribe antiarrhythmic drugs mostly used in therapeutics, order drugs in different rhythm disorders, use knowledges gained while solving situation problems.

D. Initial level of knowledge necessary for integration of allied disciplines.

Human anatomy. Heart system conduction.

Histology. Heart. Development (growth). Conducting system structure of heart and cytochemical characteristics. Heart innervation. Age modifications of heart. Regeneration. Cytochemical and functional Peculiarities of myocardium.

Biophysics. Bioelectrogenesis. Inregistration of biopotenties. Transmission of information by biological channels of commu-nication.

Biochemistry. Structural organization of biological membranes.

Physiology. Physiological properties of myocardium (automatism, excitability, conductibility, contractility). Role of sinus and atrioventricular nodes, bundle of Hiss and fibers of Purkinje. ECG and electrocardiographical interpretation of cardiac vices.

Toxicology. Toxic substances and drugs causing cardiac arrhythmias.

Physiopathology. Disorders of cardiac rhythm, automatism, excitability, conductibility and contractility of heart. Causes of arrhythmias in children.

Semiology. Arrhythmias: Ventricular, supraventricular, bradyarrhythmias etc.

E.Questions for self training:

1. Definition and classification of antiarrhythmic drugs.
2. Sodium channel blockers (class I a) Pharmacokinetics and pharmacodynamics (mechanism of action, influence on conductibility, contractility, excitability, automatism and frequency of cardiac counterctions) of quinidine, procainamide, disopyramide. Indications, contraindications. Side effects.
3. Sodium channel blockers (class I b). Pharmacokinetics and pharmacodynamics of lidocaine, mexiletine, phenytoin, tocrinide. Indications. contraindications. Side effects.
4. Pharmacodynamics of flecainide, encainide, ethacisine, moracisine and propafenone (class I c). Mechanism and peculiarities of action.
5. β-adrenoblockers (class II), (propranolol, oxprenolol, timolol, atenolol, metoprolol). Classification. Mechanism of action. Influence on functional properties of heart. Indications. Contraindications. Side effects.
6. Ca^{++} channel blockers (class IV), (verapamil, diltiazem). Mechanism of action. Pharmacological effects. Indications, Contraindications. Side effects.
7. Drugs increasing prevalent the effective refractory period (class III), (Bretylium, amiodarone). Mechanism and peculiarities of action.

Indications. Contraindications. Side effects.

8. Drugs brief characteristics (atropine, isoprenaline), used in bradyarrhythmias and conductibility disorders (block phenomena).
9. Other drugs having antiarrhythmic properties (tonicardiac glycosides, potassium drugs, allinidine etc).
10. Peculiarities of antiarrhythmic drugs in children.

F. Brief characteristics of compulsory antiarrhythmic drugs:

Down. Drug name: 1. Quinidine. 2. Procainamide. 3. Ethacisine. 4. Lidocaine. 5. Mexiletine. 6. Flecainide. 7. Metoprolol. 8. Bretylium. 9. Amiodarone. 10. Verapamil. 11. Potassium chloride. 12. Propranolol. 13. Moracisine

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on medical prescription.

Write out the following drugs in all existent medicinal forms: 1. Quinidine. 2. Procainamide. 3. Ethacisine. 4. Lidocaine. 5. Mexiletine. 6. Flecainide. 7. Metoprolol. 8. Bretylium. 9. Amiodarone. 10.Verapamil. 11. Potassium chloride. 12. Propranolol. 13. Moracisine

Administered drugs used in (for): supraventricular extrasystoles and paroxysmal tachyarrhythmias, atrial and ventricular extrasystoles of sympatheticoadrenal type (neurogeneous), atrioventricular block, atrial flutter, ventricular fibrillations, ventricular paroxysmal tachycardic, arrhythmias caused by overdosage of tonicardiac glycosides, atrial fibrillation, sinus bradycardia, ventricular extrasystoles and tachycardias after acute myocardial infraction, WPW-syndrome, re-entry extrasistoly.

H. Questions for self-training should be answered in written form while preparing for the lesson.

DRUGS THAT IMPROVE MYOCARDIAL CIRCULATION AND METABOLISM (antianginal drugs)

A. Actuality. Angina pectoris, especially acute myocardial infraction, is one of the most frequent causes of invalidity and lethality in patients. To improve the situation in this domain of medicine there is a correct deep study that improves myocardial circulation and metabolism

(antianginal).

B. Educational task. Fundamental knowledges gaining in treatment domain of angina pectoris, problems of urgent medical assistance (removal of angina seizures, principles of medicinal treatment of acute myocardial infraction).

C. Didactic aims:

a) The students must **know:** definition, classification, mechanism of action of antianginal drugs, their action on heart and hemodynamics, indications and contraindications, side effects, removal of angina seizures, medicinal principles of treatment of acute myocardial infraction, optimal ways of administration and principles of dosage depending on the situation.

b) The students must **be able to:** prescribe drugs of the given groups most widely used in therapeutics, administer them in different forms of angina pectoris, use knowledges while solving situation problems.

D. Initial level of knowledge necessary for integration of allied disciplines.

Human anatomy. Arteries, veins, capillaries, anastomosis of the heart vessels. Pulmonary and systemic circulations. Age peculiarities of heart and coronary circulation.

Histology. Cytochemical and functional Peculiarities of myocardium.

Human physiology. Volume of circulating blood, systolic volume and minute volume, venous flow to the heart (pre-load), diastolic pressure in the left ventricle, peripheral resistance (after-load).

Physiopathology: Parameters of heart failure; modifications of systolic volume, frequency of heart counterctions and heart activity.

Internal diseases. Notion about ischemic heart disease. Main clinical forms of angina pectoris (stable and unstable). Actuality of this problem. Hazard factors of ischemic heart disease.

E. Questions for self-training:

1. Definition and classification of antianginal drugs.
2. Organic nitrates (nitroglycerin, nitrong, trinitrolong, nitroderm, isosorbide, dinitrate, sustac). Classification. Pharmacokinetics. Mechanism of action. Influence on the heart and hemodynamics. Indications. Side effects. Contraindications.
3. Peculiarities of molsidomin.
4. Ca^{++} channel blockers (verapamil, nifedipine, diltiazem). Pharmacokinetics. Mechanism of action. Influence on heart and hemo-

dynamics. Indications. Side effects. Contraindications.

5. β-blockers as antianginal drugs (propranolol, oxprenolol, metoprolol, pindolol). Classification. Antianginal action mechanism. Indications. Side effects. Contraindications.
6. Coronary vasodilators with myotropic action (dipyridamole, carbochromen, nonchlazine, lidoflazine, aminophylline, validol). Classification. Mechanism of action. Indications. Side effects.
7. Drugs used for removal of angina seizures.
8. Treatment principles of acute myocardial infarction and angina pectoris.

E. Brief characteristics of compulsory drugs:

Down. Drug name: 1.Propranolol. 2.Verapamil. 3.Nifedipine. 4. Nitroglzcerin. 5. Dipyridamole. 6. Nitrong. 7. Isosorbide dinitrate. 8. Amiodarone.

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. Side effects.

F. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Propranolol. 2. Verapamil. 3. Nifedipine. 4. Nitroglicerin. 5. Dipyridamole. 6. Nitrong. 7. Isosorbide dinitrate. 8. Amiodarone.

Administered drugs used in (for): acute myocardial interaction, pain relieving in acute myocardial infraction, removal of angina pectoris seizures, prevention of angina pectoris seizures.

H. Questions for self-training should be answered in written form while preparing for the lesson.

DRUGS AFFECTING BLOOD AND HEMOTOPOIETIC ORGANS

A. Actuality. Coagulation disorders, fibrinolysis and haematopoiesis are frequent, sometimes severe (acute hemorrhage, surgical, interventions) or lethal (thrombosis of pulmonary artery, cerebral vessels, intravascular, coagulation).

B. Educational task. Knowledge of basic treatment principles of hyper- and hypocoagulability stress, disorders of fibrinolysis and haematopoiesis.

C. Didactic aims:

a) The students must **know:** definition, classification, mechanism of

action, indications, Contraindications and side effects of antithrombotic drugs, haemostatic drugs used in disturbances of haematopoiesis.

b) The students must **be able to:** prescribe drugs influencing on blood system in different medicinal forms, order drugs of this group in different forms of blood system pathology.

D. Initial level of knowledge necessary for integration of allied disciplines.

Human physiology. Blood coagulation. Modern scheme of blood coagulation. Origin and physiological role of heparin.

Biochemistry. Cascade mechanism of action of enzymes, which lead to blood coagulation. Metabolic functions of cyanocobolamin and folic acid.

Physiopathology. Blood anticoagulant system. Pathology of blood coagulation and fibrinolysis. Anemias, leucopenias, thrombocytopenias. Forms, causes and mechanisms of their development. Leukemia, thrombocytopenia. Causes and development mechanism.

Hematology. Main types of anemias (iron deficiency, hemolytic, aplastic, megaloblastic).

E. Questions for self training:

1. Definition and classification of antithrombotic drugs.
2. Anticoagulants having direct action (heparin, nadroparin, enoxaprin). Pharmacokinetics. Mechanism of action. Indications. Contraindications. Antagonists of direct anticoagulants.
3. Indirect anticoagulants (Ethyl biscumacetate, phenindion). Mechanism of action. Indications. Side effects. Contraindications. Comparative characteristics with heparin. Antagonists of indirect anticoagulants.
4. Antiagregants drugs (platelet inhibitors) (acetylsalicylic acid, sulfinpyrazone, prostacyclin, dipyridamole, ticlopidine). Classification. Peculiarities action mechanism. Indications. Side effects.
5. Fibrinolytic drugs (plasmin, streptokinase, urokinase). Classification. Peculiarities of plasmin's action mechanism and streptokinase. Medicinal biopreparations of longterm action (streptodecase). Indications. Side effects. Contraindications.
6. Definition and classification of haemostatic drugs.
7. Direct (thrombin, fibrinogen) and indirect (drugs of vitamin K). Coagulants action mechanism. Indications. Side effects.
8. Synthetic antifibrinolytic drugs (aminocapronic acid, aminomethylbenzoic acid) and of animal origin (aprotinine). Mechanism of

action. Indications. Side effects.

9. Aggregant drugs (calcium chloride, calcium gluconate, adipinated serotonin, carbasochrome). Mechanism of action. Indications.
10. Haemostatic drugs of plant origin. Substances that diminish permeability of the vessel wall (ascorbic acid, vitamin P, ascorutine etc.). Indications.
11. Usage of drugs that modify coagulability and fibrinolysis in intravascular coagulopathy.
12. Antianemic drugs. Classification. Drugs used in iron deficient anemias (ferrous sulphate, feroplex, ferogradument, fercoven, ferrumlek, ferbitol), B-12 deficient (vitamin B_{12}, folic acid), aplastic (methandrostenolone, prednisolone vitamins C, B_6 and B_{12}) and hemolytic (tocoferol acetate).
13. The role of cobalt and copper in hematopoiesis (coamide).
14. The importance of antiarrythmic drugs in pediatrics.
15. Leucopoiesis stimulants (methyluracil, sodium nucleinate). Mechanism of action. Indications. Side effects.
16. Leucopoiesis inhibitors (novembichine, metotrexate, mercaptopuryne etc.). Principles of classification. Peculiarities, mechanism of action. Indications. Side effects.

F. Brief characteristics of compulsory drugs:

Down. Drug name: 1. Heparin. 2. Ethyl biscumacetate. 3. Menadione. 4. Streptokinase. 5. Acetylsalicylic acid. 6. Fercoven. 7. Ferrous sulphate. 8. Sodium nucleinate. 9. Fibrinogen. 10. Aminocaproic acid. 11. Cyanocobolamin (B_{12}). 12. Nandroparin. 13. Protamine sulphate. 14. Carbasochrome. 15. Acenocumarol. 16. Alteplase. 17. Aprotinine. 18. Ticlopidine.

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Heparin. 2. Ethyl biscoumacetate. 3. Menadione. 4. Streptokinase. 5. Acetylsalicylic acid. 6. Fercoven. 7. Ferrous sulphate. 8. Sodium nucleinate. 9. Fibrinogen. 10. Aminocaproic acid. 11.Cyanocobolamin (B_{12}). 12.Nandroparin. 13.Protamine sulphate. 14. Carbasochrome. 15. Acenocumarol. 16. Alteplase. 17. Aprotinine. 18. Ticlopidine.

Administered drugs used in (for): overdosage with indirect anticoagulants, overdosage with direct anticoagulants, stopping of

parenchimatous and capillary hemorrhages, treatment of profound venous thrombosis, prevention of postsurgical thromboembolia, prophylaxis of arterial thrombosis, emboli of pulmonary artery, hemorrhages caused by hyperfibrinolysis, iron deficient anemia, leucopenia, intravascular coagulopathy, aplastic anemia, hemolytic anemia, B_{12} deficient anemia, hemophilia.

H. Questions for self-training should be answered in written form while preparing for the lesson.

CEREBRAL AND PERIPHERAL VASODILATORS

A. Actuality. The variety of cerebral and peripheral circulation disturbances creates many difficulties in elaboration of systemized treatment conceptions of these pathological states. Modern medicine possesses a large remount of pharmacological drugs that improve cerebral and peripheral circulation, metabolic and energetic processes, diminish the process of thrombogenesis.

B. Educational task. The study of drugs pharmacology with more or less specific action on cerebral and peripheral circulation, and also the drugs previously studied.

C. Didactic aims:

a) The students must **know:** classification, drugs names, mechanism of action, effects, indications, side effects and pharmacokinetics properties of cerebral and peripheral vasodilators.
b) The students must **be able to:** prescribe the main drugs from this group in all possible medicinal forms, select drugs depending on disease and pathological stress.

D. Initial level of knowledge necessary for integration of allied disciplines.

Human anatomy. Brain arteries and veins. The structure and innervation of brain. Pulmonary and systemic circulations.

Human physiology. Physiology of cerebral and peripheral circulation.

E. Questions for self training:

1. Classes of pharmacological drugs used in regional circulatory disorders.
2. Peripheral vasodilators. Classification. Pharmacological drugs used in disturbances of peripheral circulation. (obliterating endarteritis,

Raynand, varicose ulcer, artheritis etc.). Peculiarities of action.

3. Antiischemic cerebral vasodilators. Classification.
4. Myotropic vasodilators. Alkaloids of Vinca minor (vincamin, vinpocetine, vincapan). Mechanism and peculiarities of action. Usage. Side effects.
5. Derivatives of xanthenes (aminophylline, xanthinol nicotinate, pentoxyphylline). Mechanism and peculiarities of action. Indications.
6. Ca^{2+} channel blockers (cinnarizine, flunarizine, nimodipine) used as cerebral antiischemic drugs.
7. Myotropic spasmolytics with wide spectrum of action (papaverine, drotraverine). Mechanism and peculiarities of action. Indications.
8. Neurotropic vasodilators:
   a) Ergot alkaloids – ergotamine, dihydroergotamine, dihydroergotoxine.
   b) α-adrenoblockers – nycergoline, tolasoline.
   c) β-adrenomimetics – isoxuprine.
   d) Antiserotoninic drugs – ciproheptadine, metisergide, cinnarizine, moldsidomine. Mechanism and peculiarities of action. Indications.
9. Drugs changing rheological properties of blood, used in disturbances of cerebral circulation (ticlopidine, dipyridamole, acetylsalicylic acid).
10. Drugs influencing metabolism of the brain, used in disturbances of cerebral circulation (nootropic drugs etc.).
11. Drugs used in migraine treatment.
12. Medicinal treatment principles of cerebral insult (hemorrhagic and ischemic).
13. Angioprotectors (pyricarbate, ethamsylate, calcium dobesylate etc.).
14. Venotropic drugs.

F. Brief characteristics of compulsory drugs:

Down. Drug name: 1. Vinpocetine. 2. Pentoxyphylline. 3. Cinarizine. 4. Nycergoline. 5. Phentolamine. 6. Nimodipine. 7. Bendazol. 8. Xanthinol nicotinate. 9. Pyricarbate. 10. Nootropil. 11. Sumatriptan. 12. Ravimig

Across: 1. Medicine form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Vinpocetine. 2. Pentoxyphylline. 3. Cinarizine. 4. Nycergoline. 5. Phentolamine. 6. Nimodipine. 7. Bendazol. 8. Xanthinol nicotinate. 9. Pyricarbate. 10. Nootropil. 11. Sumatriptan. 12. Ravimig

Administered drugs used in (for): migraine, hypertensive encephalopathy, vestibulo-cochlear disturbances, ischemic insult, chronic cerebral circulation insufficiencies, cerebral trauma, Raynand syndrome, obliterate endartheritis, cerebral atherosclerosis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

DRUGS INFLUENCING ON FUNCTIONS OF RESPIRATORY SYSTEM

A. Actuality. According to WHO statistics, every 3rd - 4th patient who visits the doctor has a respiratory disease. Because of this, treatment of many acute and chronic respiratory diseases has an important role in ambulatory and clinical practice. Medicinal treatment of various pathological states of respiratory organs is complex and needs usage of drugs from different pharmacological groups (spasmolytics, cardiovascular, antiinflammatory, antiallergic etc.). For better study of this topic it is necessary to repeat the previous topics and uptake new information.

B. Educational task. The students must aquire basic knowledges in the domain of treatment of the most widespread diseases of the respiratory system, must know drugs used in medical emergency assistance-removal of bronchial spasm, different forms of asphyxias, pulmonary edema, non surgical shutting off of pulmonary hemorrhages.

C. Didactic dims:

a) The students must **know:** the definition, classification, mechanism of action, of anticough, expectorant, mucolytic drugs, bronchodilators and drugs used for removal of bronhospasm, pulmonary edema, asphyxia and constant cough.

b) The students must **be able to:** prescribe compulsory drugs of this group in all medicinal forms.

D. Initial level of knowledge necessary for integration of allied disciplines.

Human physiology. Antagonism of respiratory center. Neuro-

humoral influence on the respiratory center. The importance of vascular chemoreceptors in regulation of respiration.

Physiopathology. Main causes of external respiration insufficiency. Obturation of bronchi. Mechanism.

Internal diseases. Notion of asphyxia, bronchial obstruction, bronchospasm. Classification and characteristics of cough. Bronchial asthma. Symptoms of bronchial asthma and asthmatic bronchitis.

E. Questions for self training:

1. Stimulators of respiration. Classification. Mechanism of action. Comparative characteristics of respiratory stimulants from the group of analeptics (bemegride, nikethamide, ethimizol etc.) and N-cholinomimetics (lobeline, cytiton). Peculiarities of ethimizol. Distinction in duration of action. Ways of administration. Indications and contraindications. Side effects.
2. Anticough drugs (codeine, ethylmorphine, glaucine and prenoxdiazine). Definition and classification. Mechanism of action. Characteristics of drugs from diverse groups. Usage. Danger of habit-forming and medicinal dependence.
3. Drugs used in acute obstruction of bronchi. Classification.
4. Expectorant drugs. Classification. Drugs having direct (sodium and potassium iodide) and reflex (ipecac drugs) actions. Localization and mechanism of action of expectorant drugs. Ways of administration. Usage. Association of expectorant and anticough drugs.
5. Mucolytics. Mechanism and peculiarities of action of bromhexine, acetylcysteine, proteolytic enzymes (tripsin, chimopsin, elastolytine, desoxyribonuclease,).
6. Bronchodilators. Classification. Peculiarities and mechanism of action of bronchodilators from group of α, β-adrenomimetics (epinephrine, ephedrine), xanthenes (theophylline, aminophylline), M-cholinoblockers (atropine, platiphylline, ipratro-pium), $\beta_{1,2}$ -and β_2-adrenomimetics (isoprenaline, salbutamol, orciprenaline, terbutaline), corticosteroids. Principle of action and usage of disodium cromoglycate and ketotifen. Inhibitors of D_4-leukotriene receptors. Indications for administration of different bronchodilating drugs in asthma seizures, status asthmatics and systemic treatment. Ways of administration, side effects. Contraindications.
7. Groups of drugs used in pulmonary edema. Mechanism of antifoam action, of ethanol and antifomsilane. Dehydrating action of manitol.

Usage of fast-acting diuretics (furosemide, ethacrynic acid). The importance of normalization of hemodynamics in positive ionotropic action of tonicardiac glycosides in pulmonary edema. Oxygenotherapy. Opioid analgesics. Tranquilizers.

F. Brief characteristics of compulsory drugs:

Down. Drug name: 1. Bemegride. 2. Nikethamide. 3. Cytiton. 4. Epinephrine. 5. Ipratropium. 6. Aminophylline. 7. Salbutamol. 8. Disodium cromoglycate. 9. Codeine. 10. Ketotifen. 11. Ethimizol. 12. Prenoxdiazine. 13. Bromhexine. 14. Pentetrazol. 15. Acetylcysteine. 16. Sodium benzoate. 17. Furosemide.

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Bemegride. 2. Nikethamide. 3. Cytiton. 4. Epinephrine. 5. Ipratropium. 6. Aminophylline. 7.Salbutamol. 8. Disodium cromoglycate. 9. Codeine. 10. Ketotifen. 11. Ethimizol. 12. Prenoxdiazine. 13. Bromhexine. 14.Pentetrazol. 15. Acetylcysteine. 16. Sodium benzoate. 17. Furosemide.

Administered drugs used in (for): removal of newborn's asphyxia, dry cough, dehydratation in pulmonary edema, for facilitation by reflex way of expectoration, desegregation of glycopeptides of bronchial mucus, stimulation of cardiac activity in pulmonary edema, decrease of arterial tension in pulmonary edema, removal of asthma seizures, treatment of bronchial asthma, obstructive bronchitis, status asthmaticus, removal of cough of different origin, removal of reflexive inhibition of respiration.

H. Questions for self-training should be answered in written form while preparing for the lesson.

DRUGS AFFECTING GASTROINTESTINAL TRACT

A. Actuality. The Gastrointestinal diseases are frequent enough. Drug therapy has the same certain advantages compared with other methods of treatment thanks to the direct action on the patient's organs and convenience of application.

B. Educational task. Presentation to the students of the basic remedies affecting the functions of gastrointestinal tract and the

principles of choice of the necessary drug in each specific case.

C. Didactic goals:

a) The students must **know**: drugs affecting the functions of Gastrointestinal tract, their characteristics, classification, names, medicinal forms, ways of administration, mechanism of action, indications, contraindications, side ffects.

b) The students must **be able to:** prescribe the drugs; choose the drugs in the specific pathologies.

D. Initial level necessary for the integration of the allied disciplines.

Histology. Morphological and functional characteristics of different portions of gastrointestinal tract. General principles of Gastrointestinal tract structure: mucosa, submucose and serous membranes. General characteristics of mucose membrane, its structure. Peculiarities of mucous membranes in different gastrointestinal tract portions. The pancreas: morphofunctional characteristics. Pancreas: exocrine and endocrine parts, vascularrisation, innervation. The liver. Morphofunctional characteristics. Hepatite lobe as a structural unit of the liver. The structure of hepatocites. Peculiarities of vascularisation. Ability of the liver to (self) regenerate. Gall bladder, bile ducts, their structure. Bile ducts mucosa regeneration.

Human physiology. The importance of digestion for an organism. Physiological bases of hunger, appetite and satiey. The center of digestion. Digestion in the oral cavity. Composition and properties of saliva, its enzymes.

Digestion in stomach. Composition and properties of the duodenal juice. Mechanism of gastric secretion, its regulation. Phases of gastric juice secretion. Enterogastrine, enterogastron. Digestion in duodenum. The role of duodenum in digestion. Composition and properties of duodenal juice, its effect on proteins, carbohydrates, lipids, nucleic acids. Enterokinase. Its role in digestion. Mechanisms of bile formation in liver. Excretion of bile into duodenum. Bile excretion stimulants. Digestion in small and large intestines, absorption of nutrients in Gastrointestinal-tract. Intestinal juice. Gastrointestinal tract motility Antiperistaltic contractions, vomiting.

Biochemistry. The main nutritive substances. Decomposition of carbohydrates, proteins, lipids. Absorption. Fermentation in the intestine. Biochemical regulatory mechanisms of digestion. Parenteral feeding.

Pathophysiology. Gastrointestinal insufficiency, its causes. Disturbance of appetite, gastric digestion (secretion and excretion, motility, absorption). Disturbance of duodenal digestion in pancreatic juice and bile deficiency. Disturbance of the digestion in small and large intestines. Diarrhea, constipation. Autointoxication, intestinal impossibility.

E. Questions for self-training.

1. Classification of drugs affecting the functions of G.I. tract.
2. Appetite-stimulating remedies (orexigenic) - bitter tincture, wormwood tincture, (cyproheptadine). Classification, mecha-nism of action, indications.
3. Appetite suppressing remedies (amfepramon, chlorfentermine, mazindol). Classification, mechanism of action, indications, contraindications, side effects.
4. Gastric juice secretion stimulants (m-cholinomimetics, mineral waters) and drugs used in digestive gland hypofunction. Comparative characteristics of gastric juice, pepsine, acidinepepsine, abomine, pamzinorm, festal, oraze, mexaze. Diagnostic uses of gastric gland stimulants (histamine, pentogastrine, caffeine).
5. Gastric gland secretion stimulants and drugs increasing digestibility of gastric juice. Classification, principles of action.
6. Comparative characteristics of cholinoblokers (pirenzepine, atropine), H_2-hystaminoblockers (ranitidine, famotidine) in hyposecretion of gastric juice.
7. Characteristics of drugs with antigastrine action, proton hemp inhibitors, prostoglandins and their synthetic derivatives (proglumide, omeprazol, mizoprostol).
8. Antacids (sodium hydrocarbonate, magnesium oxide, aluminum oxide, almagel, phospholugel, maalox). Classification, principles of action.
9. Gastroduodenoprotectors and remedies used to regenerate the mucosa of the stomach and duodenum. Sucralfate. Bismuth preparations-colloidal subcitrate of Denol. Prostoglandins (mizoprostol). Anabolics (nandrolon). Vitamins E, P, U. Plant remedies (licviriton, carbenoxolon, alanton). Synthetic drugs (levodopa, DOXA, solcoseril, sulpirid, oxiferiscarbon). Antiprotozoal drugs (metronidazol, erythromicine, clarithromicine. Antiulceric remedies.
10. Drugs that act on the pancreas excretoric secretion (pancreatine, festal).

11. Classification of peristaltic stimulants (prockinetics) (vasopressine, neostigmine).
12. The emetics (apomorphine hydrochloride, cuprum sulphate). Classification, mechanism of action, indications.
13. The laxatives. Classification. Motility stimulating laxatives purgatives (irifoting purgatives) - castor oil, rhevent remedies, preparations of senna, buckthorn (senade, glaxena), synthetic drugs (thenolphtaleine, oxyphenhisathine, bisacodil). Indications. Remedies with mechanic action, acting throughout the intestine's extent (mineral oils, ballast substances, laminarid). Osmotic purgatives (magnesium sulphate, sodium sulphate).
14. Gastrointestinal-tract motility suppressing drugs (colinoblockers, musculotropic spasmolytics).
15. Anti-vomiting drugs (triflunoperazine, metoclopramide, domperidon, diethylfenazine). Antispastic drugs: perphenazine. Classification, principles of action, indications. Antiserotoninic drugs.
16. Anti-diarrheic drugs (loperamide, amibazine). Classification, mechanism of action, characteristics. Bacterial preparations (bificol, colebacterine, bactisubtil). Euterol.
17. Carminatives: espumisane. Classification, mechanism of action. Uses.
18. Hepatotropic substances. Classification. Drugs affecting secretion and excretion of bile. Classification, principles of action, indications.
19. Hepatoprotectors. Classification, Peculiarities of action on heaptocites.
20. Cholelytholytics (chenodioxicolic acid, ursodeoxicolic acid).

F. Brief characteristics of the compulsory drugs:

Down: Drugs name. 1. Ciproheptadine. 2. Natural gastric juice. 3. Pirenzepine. 4. Ranitidine. 5. Almagel. 6. Panzinorm. 7. Diferamide. 8. Bisacodil. 9. Festal 10. Silibinine. 11. Metaclopramide.12. Cholosas. 13. Esentiale. 14. Bactisubtil. 15.Amphepramon. 16. Atropin. 17. Famotidine. 18. Apomorfin. 19. Enterol. 20. Omeprazol. 21. Sucralfate. 22. Bismuth subcitrate. 23. Ondan-setron. 24. Ademethoniu. 25. Diethylpyrazine. 26. Magnesium hydroxide. 27. Urzodioxicolic acid. 28. Aprotinine. 29.Pancreatine 30. Cisaprid 31. Regesan

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (maximum single, daily, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medicinal prescription.

Write out the following drugs in all possible medicinal forms: 1. Ciproheptadine. 2. Natural gastric juice. 3. Pirenzepine. 4. Ranitidine. 5. Almagel. 6. Panzinorm. 7. Diferamide. 8. Bisacodil. 9. Festal 10. Silibinine. 11. Metaclopramide. 12. Cholosas. 13. Esentiale. 14. Bactisubtil. 15.Amphepramon. 16. Atropin. 17.Famotidine. 18. Apomorfin. 19. Enterol. 20. Omeprazol. 21. Sucralfate. 22. Bismuth subcitrate. 23. Ondansetron. 24. Ademethoniu. 25. Thiethylperazine. 26. Magnesium hydroxide. 27. Urzodioxicolic acid. 28. Aprotinine. 29. Pancreatine. 30. Cisaprid. 31. Regesan.

Prescribe in (for): anorexia, alimentary obesity, hyposecretion of digestive glands, gastric ulcer, acute pancreatitis, vomiting prevention in the pregnant, hepatitis, acute intoxication, to prepare a patient for an operation, bile secretion and excretion disturbances, chronic constipation, anchlorhydria, gastric achilia, hyperacid gastric, kinetosis, preparation for a radiological examination, of gastrointestinal tract, acute diarrhea, cholelythiasis, winds.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTISPASTIC REMEDIES

A. Actuality. Smooth muscle contractions of intern organs (bronchi, gall bladder, urinary bladder, myometrium) are the manifestations of many acute and chronic diseases having an inflammatory, allergic, neural (dyskinesia) origin. In such cases an active intervention of a specialist - physician is necessary. Fundamental knowledge of antispasmodic drugs is required for this.

B. Educational task consists of studying the pharmacological properties of antispasmodics from different groups.

C. Didactic goals.

a) The students must **know**: definition, classification, mechanism and Peculiarities of action, indications, side effects.

b) The students must **be able to:** prescribe the basic antispasmodics in different medicinal forms write them out in special diseases and pathological states.

D. The initial level of knowledges necessary for the integration of the allied disciplines.

Biochemistry. Biochemistry of smooth muscle contraction. Adenilatecyclaze, c-AMP, phosphodiesteraze.

Human physiology. Smooth muscle contraction mechanism. Physiology of the autonomic nervous system (sympathetic, parasympathetic). Tone and motility regulation of intern organs (bronchi, stomach, intestine, gall bladder, bile ducts, uterus and urinary bladder).

E. Questions for self-training.

1. Antispasmodic drugs. Classification.
2. Neurotropic antispasmodics. Classification, mechanism of action. Comparative characteristics. Indications and side effects.
3. Antispasmodics with myotropic action. Classification, mecha-nism of action.
4. Comparative characteristics of antispasmodic drugs with myotropic action. Indications.
5. Comparative characteristics of myotropic and neurotropic antispasmodics. Combined antispasmodics (baralgine, bispan). Their characteristics.
6. Plant antispasmodics. Peculiarities of action, indications.

F. Brief characteristics of the compulsory drugs.

Down: Drugs name: 1. Atropine sulphate. 2. Papaverine hydrochloride. 3. Platyphylline hydrotartrate. 4. Aminophylline. 5. Drotaverine. 6. Bendazole. 7.Baralgine.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Atropine sulphate. 2. Papaverine hydrochloride. 3. Platyphilline hydrotartrate. 4. Aminophylline. 5. Drotaverine. 6. Bendazole. 7. Baralgine.

Prescribe in (for): cholelythiasis, intestinal contractions, bronchial asthma attack, stenocardia, acute pancreatitis, cholecystitis, endoarteritis, cystitis, urolythiasis.

H. Questions for self-training should be answered in written form while preparing for the lessons.

CONCLUDING SESSION ON DRUGS AFFECTING THE FUNCTIONS OF RESPIRATORY, CARDIOVASCULAR AND DIGESTIVE SYSTEMS

A. Actuality. The treatment of intern organs diseases takes one of the leading places in practical activity of a family doctor. In the majority of cases the treatment of these diseases is protracted and requires drugs from different pharmacological groups (especially in elderly people). All this requires deep studies about drugs from the given groups.

B. Educational task includes generalization of students knowledge regarding the treatment of respiratory, cardiovascular and digestive systems, summarization of the material on these topics and formation of the main basic principles of the somatic diseases treatment.

C. Didactic goals:

a) The students must **know**: pharmacological characteristics of the groups of drugs used in intern organs'diseases, general principles of treatment of the intern organs'diseases, means of urgent help.

b) The students must **be able to:** write out the compulsory drugs, prescribe them in different somatic diseases which requires an urgent help, use the obtained knowledge to solve the situational problems.

D. Questions for self-training.

1. Classification of drugs used in cardiac insufficiency.
2. Cardiac glycosides. Definition, mechanism of action, influence upon the functional parameter of the heart, administration of cardiotonics in cardiac insufficiency.
3. Indications for cardiac glycosides, principles of dosage. Intoxication with cardiotonics and treatment.
4. Characteristics of non-steroid cardiotonics.
5. Classification of antihypertensive drugs:
   a) Inhibitor of sympathetic tone at different levels (neurotropic drugs). Their classification and characteristics.
   b) classification and characteristics of musculotropic vasodilators.
   c) characteristics of drugs that affect the hydrosaline metabolism and rennin-angiotensine-aldosterone system.
   d) characteristics of drugs used to control hypertensive crisis.
6. Characteristics and classification of antihypotensive drugs.
7. Classification of antiarhythmic drugs, characteristics of drugs.
8. Classification of drugs affecting the peripheral circulation. Classification of groups.

9. Classification of antianginal drugs.
   a) characteristics of organic nitrates.
   b) characteristics of β-adrenoblockers and calcium antagonists.
   c) classification and characteristics of coronodilators.
   d) general principles of treatment in myocardial infarction.
10. Classification of drugs affecting the peripheral blood circulation. Characteristics of cerebral antiischemic drugs and cerebral metabolism affecting drugs. Characteristics of drugs affecting the processes of blood coagulation.
11. Classification of diuretics according to the place of action localization.
   a) diuretics affecting the proximal contorted tubes. Mechanism of action, indications. Side effects.
   b) loop diuretics. Mechanism of action, indications, side effects.
   c) diuretics affecting the distant contorted tubes.
12. Classification of haemostatic and antithrombotic drugs.
   a) classification and characteristics of antiaggregants.
   b) fibrinolitics: classification, mechanism of action, indications, side effects.
   c) classification and characteristics of antiaggregants.
   d) coagulants: classification, mechanism of action, indications, side effects.
   e) antifibrinolitics: classification, mechanism of action, indications, side effects.
13. Classification and characteristics of antianemic drugs, side effects.
14. Venotropic drugs.
15. Anti-cough drugs: classification, mechanism of action, indications.
16. Expectorants and mucolitics, classification, mechanism of action, indications.
17. Drug used for bronchial asthma: classification, mechanism of action, indications. Drug used to control bronchial asthma attack.
18. Principles of pharmacotherapy in pulmonary edema.
19. Classification and characteristics of appetite effecting drugs (orexigenics).
20. Classification of anorexigenic drugs. Mechanism of action, indications, side-effects.
21. Classification and characteristics of drugs used in gastrointestinal glands hyposecretion. Gastrointestinal secretion stimulants and gastrointestinal secretion substitutes.

22. Classification of drugs used in gastrointestinal glands hypersecretion.
    a) antacids: classification, mechanism of action, peculiarities of indication.
    b) colinoblockers which reduce gastrointestinal secretion. Properties, indications.
    c) histaminoblockers used in gastric gland hypersecretion. Properties, indications.
    d) Drugs having antigastrinic action. Characteristic.
    e) Proton hump inhibitors. Characteristic.
23. Drugs used for gastric and duodenal mucous regeneration. Classification, mechanism of action, indications.
24. Classification of Gastrointestinal motility increasing drugs.
25. Emetics and anti emetics. Classification, mechanism of action, indications.
26. Laxatives: classification, principles of action, indications.
27. Antiflatulent drugs: classification, principles of action, indication.
28. Classification of Gastrointestinal motility reducing drugs.
29. Antispasmodics. Classification.
30. Myotropic antispasmodics: classification, mechanism of action, properties, and indications.
30. Antidiarrheic drugs: classification, principles of action, indications. Characteristics of synthetic drugs.
31. Hepatotropic drugs. Classification.
32. Drugs affecting bile secretion and bile excretion: classification, principles of action, indications.
33. Hepatoprotectors: classification, characteristics of groups.

G. Questions on general and medical prescription

Write out the following drugs in all possible medicinal forms: strophantine, dioxine, corglicon, clonidine, reserpine, guanethidine, hydralazine, verapamil, nifedipine, furosemid, hydrochlortiazide, captopril, nitroglycerine, dipirydamol, procainamide, lidocaine, manitol, etebenicide, triamterene, spironolactone, heparin, ethylbiscumacetate, menadion, aminocapronic acid, streptokinaze, cyanocobalamine, wormwood tincture, natural gastric juice, pirenzepine, famotidine, almagel, panzinorm, magnezium sulphate, bificol, esentiale, silibinium, niketamide, bemegrid, prenoxdiazine, ipratropium bromide, ethimizol, acetylcysteine, bromhexine, vinpocetine, pentoxiphilline, cinnarizine, nicergoline, nimodipine, protamine sulphate, nitrong, isosorbid dinitrate,

propanolol, quinidine, flecainide, mexiletine, metoprolol, amiodarone, bretylium tosilate, etacizin, epinephrine, norepinephrine, phenylephrine, dopamine, izoturon, atenolol, prazosine, azamethonium, sodium nitroprussite, moracisine, cystenal, omeprazol, nebivolol, ondansetron, thiethylperazine.

Prescribe in (for):

- pulmonary edema
- cerebral edema
- acute intoxication
- acute renal insufficiency
- hypertension with hyperaldosteronism
- acute cardiac insufficiency
- chronic cardiac insufficiency
- hypertensive crisis
- intoxication with cardiac glycosides
- I-II degree arterial hypertension
- severe arterial hypertension (III degree)
- supraventricular tachycardia and extrasystole
- ventricular tachycardia and extrasystole
- to control angina pectoris attack
- chronic stenocardia
- direct anticoagulants overdose
- indirect anticoagulants overdose
- capillary and parenchymatoses hemorrhage
- high fibrinolytic activity after operation
- iron-deficient anemia
- fetal asphyxia
- bronchial asthma attack
- symptomatic treatment of bronchial asthma
- stimulation of appetite
- hyposecretion of gastric glands
- acute pancreatitis
- regeneration of gastric and duodenal mucose
- gastric ulcer
- cholelithiasis
- acute diarrhea
- hepatitis
- chronic constipation

- elimination of toxins from stomach
- acute arterial hypotention
- chronic arterial hypotention

ANTI-INFLAMMATORY AGENTS

A. Actuality. Inflammation is a complex neurotropic, vascular and metabolic reaction, which appears as a result of penetration of a pathological agent into healthy tissues of the body. It is a protective reaction and has some common mechanisms with allergy and infection. In some cases inflammatory process develops into a disease in which the connection inflammation – distruction – inflammation establishes. In such a case anti-inflammatory drugs have a special importance.

B. Educational task consists of presentation to the students of the possible strategies of treatment with anti-inflammatory drugs.

C. Didactic goals

a) The students must **know**: general characteristics of anti-inflammatory drugs, original and chemical structure, principles of classification medicinal forms and ways of administration for the compulsory drugs, mechanism of action, general indications, Contraindications, side effects, symptoms of chronic and acute intoxication with some anti-inflammatory agents and the first aid in it.

b) The students must **be able to**: write out anti-inflammatory drugs different medicinal forms, prescribe them in dependence of patient's pathology and age.

D. The initial level of knowledge necessary for the integration of the allied disciplines

Pathological physiology. Inflammation. Definition. Ethyo-logy. Alteration. Metabolic, patho-chemical and physicochemical disturbances in the inflammation place. Mediators of inflammation. Peculiarities of microcirculation in the inflamed region. Changes of capillary permeability. Exudation of leukocytes, its mechanism. Phagocytosis in the inflamed region. Proliferation. Consequences of inflammation.

E. Questions for self training

1. Anti-inflammatory drugs. Classification, characteristics of groups.
2. Anti-inflammatory drugs having a quick effect. Classification.
3. Steroid anti-inflammatory drugs. Classification (hydrocortizone, prednisolone, prednisone, dexamethazone, fluocinolone acetate).

Mechanism of anti-inflammatory action, indications and contraindications, side effects.

4. Non-steroid anti-inflammatory drugs. Classifications. Acetylsalicylic acid derivatives (acetylsalicylic acid), phenylacetyc acid derivatives (diclofenac), indolacetylic acid derivatives (indomethacine), phenylpropionic acid derivatives (ibuprofen), naphtylpropionic acid derivatives (naproxen), antranilic acid derivatives (fluphenamic acid, metaphenamic acid), pyrazolone derivatives (methamizol, phenylbutazol) and oxicams (pyroxicam). Mechanism of antiinflammatory action, contrain-dications, indications, therapeutically use. COG-2 inhibitors.
5. Basic anti-inflammatory drugs. Classification, mechanism of action, indications, contraindications, side effects.
6. Synthetic anti-inflammatory drugs or 4-aminoquinolon derivatives (chloroquine, hydronychloroquine).
7. Gold preparations (crizanol).
8. Thyole's derivatives (penicillamine).
9. Big immunodepressors. Classification. Glucocorticoids and cytostatics. Mechanism of action (cyclophosphamide, azathyoprine, metotrexate).
10. Immunostimulants. Sulphasalazine. Classifications, characteristics.
11. Other anti-inflammatory drugs (rumalon). Characteristics, indications, contraindications.
12. Auxiliary anti-inflammatory (antirheumatic) drugs (analgesics, muscle relaxants, tranquilizers). Characteristics, indications.
13. Inhibitors of COX2 (nimesulid, celeoxib).

F. Brief characteristics of the compulsory drugs:

Down. Drug name. 1. Prednisolone. 2.Diclofenac. 3. Indomethacine. 4. Ibuprofen. 5. Naproxen. 6. Phenylbutazone. 7. Chlorochine. 8. Nimesulid. 9. Mefenamic acid. 10. Fluocinolone. 11. Auranofin. 12. Aurothiomalate. 13. Piroxicam. 14. Meloxicam.

Across. 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription

Write out the following drugs in all possible medicinal forms: 1. Piroxicam. 2. Prednisolone. 3. Meloxicam. 4. Aurothiomalate. 5. Indomethacine. 6. Ibuprofen. 7. Phenylbutazone. 8. Naproxen. 9. Chlorochine.

10. Nimesulid. 11. Mefenamic acid. 12. Fluocinolone. 13. Auranofin. 14. Diclofenac.

Prescribe in (for): rheumatic polyarthritic, ankilosing spondiloartritis, degenerative alteration of joints, lupoid type of chronic polyartritis, myositis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTI-ALLERGIC THERAPY AND IMMUNE PROCESSES CORRECTING DRUGS

(immunostimulants, immunodepressors, immunomodulants).

A. Actuality. Allergic manifestations are different and often. In the majority of cases the patients get severe after. That is why the treatment of allergic manifestations is complex, and pharmacotherapy has a special importance.

B. Educational task consists of studying of the pharmacology of anti-allergic drugs, choosing drugs in different pathologies, witting out the correct recipes according to the prescription.

C. Didactic goals

a) The students must **know**: definition and classification of drugs' groups, their pharmacokinetics and pharmacodynamics, Latin names, medicinal forms and ways of administration of the compulsory drugs, indications, contraindications, side effects,

b) The students must **be able to**: write out anti-allergic drugs in different medicinal forms, according to the patient's age and pathological state.

D. The initial level of knowledge necessary for the integration of the allied disciplines

Histology. Organs of immune defense. Immune system and cellular interconnection in the immune reactions.

Biochemistry. Biochemical peculiarities of blood cells. Structure and function of immunoglobulins.

Physiology. Immunity. Allergy. Role of lymphocytes and immunoglobulins.

Pathological physiology. Notion of allergy. Exoallergy. Sensibilization, hyposensibilization. Immediate allergic reactions. Mechanism of their development. Immunological stage. Allergic reactions of slow type.

Bacterial allergy. Autoallergy. Pathophysiology of immunopathologic reactions. Immunodeficiency. Hypoallergic type reactions.

Microbiology, virusology and immunology.

Immune reactions. Idea of allergen and antibody. Sensibilization of organism. General symptoms of an anaphylactic shock. Mechanism of anaphylaxis. Idea of transplant immunity. The characteristic features of type sensibilization reactions and their mechanism.

E. Questions for self training

1. Types of allergic reactions and chemical substances, which may cause such reactions. Immunopharmacology.
2. Treatment for immediate type allergic reactions. Classification of drugs used to control them.
3. Antihistaminic drugs. Classification, mechanism of action. Comparative characteristic and advantages of H_1-histaminoblockers of the 1st generation (diphenhydramine, clemastine, quiphenadine) and the 2nd generation (aztemizol, terphenadine, loratidine, cetirizine).
4. Acute H_1-antihistaminic drugs intoxication. Clinical picture, treatment. Intoxication peculiarities in children.
5. Degranulation of mastocytes inhibitors. Classification, mechanism of action, pharmacokinetics, indications, contraindications, side effects.
6. Pharmacodynamics peculiarities of glucorticoids, β-adrenomimetics,
7. xanthenes, sodium chromoglicate, ketotifen, m-colino-blockers. Indications, contraindications, side effects.
8. Drugs affecting the basic manifestations of anaphylactic and bronchial asthma like allergic reactions.
9. Drugs affecting cytotoxic reactions and formation of circulating immune cortexes. Characteristics of glucocorticoids and immune complex inhibitors (salts of gold, aminocapronic acid, heparin, indomethacine, mephenamic acid. Indications, side effects.
10. Treatment for slow – type reactions. Classifications of drugs, general characteristics.
11. Small immunodepressors. Classification, mechanism of action, pharmacokinetics, indications, contraindications, side effects.
12. Quinoline derivatives (chloroquine, hydroxichloroquine).
13. Salts of gold (aurothiomalate, auranofin).
14. Thyole's derivatives (penicillamine).
15. Big immunodepressors. Classification, mechanism of action, pharmacokinetics, indications, contraindications, side effects. Characteristics of glucocorticoids and cytostatics (azathioprine, metotrexate, mercap-

topurine, cyclosporine).

16. Immunostimulants (levamizol, timaline, interferon, miclopid, filgrastim). Classification, mechanism of action, pharmacokinetics, indications, contraindications, side effects.
17. General idea of immunomodulants.

F. Brief characteristics of the compulsory drugs:

Down. Drug name. 1. Diphenhydramine. 2. Chloropiramine. 3. Clemastine. 4. Quifenadine. 5. Disodium cromoglicate. 6.Ketotifen. 7. Interferon. 8. Terfenadine. 9. Levamizol. 10. Cetirizine. 11. Azatioprine. 12. Mebhidroline. 13. Loratadine. 14. Imupurin.

Across. 1. Medicinal form. 2. Way of administration. 3. Doses (maximal for a single use, for 24 hours, therapeutic). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions on general and medical prescription

Write out the following drugs in all possible medicinal forms: 1. Diphenhydramine. 2. Clhoropiramine. 3. Clemastine. 4. Quifenadine. 5. Disodium cromoglicate. 6. Interferon 7. Ketotifen. 8. Terfenadine. 9. Levamizol. 10. Azatioprine. 11.Cetirizine. 2. Mebhidroline. 13. Loratadine. 14. Imupurin.

Prescribe in (for): pollenosis, urticaria, post-operatory vomiting, kinetosis, premedication, rheumatoid arthritis, bronchial asthma, anaphylactic shock, contact dermatitis, asthmatic bronchitis, chronic infections, AIDS, organ and tissue transplantation, cancer.

H. Questions for self-training should be answered in written form while preparing for the lesson.

HORMONES AND THEIR ANTAGONISTS

A. Actuality. Pathological states appearing as a result of insufficiency and hyperfunction of endocrine glands are often met. In the first case hormones are given as a substitution therapy, in the second case antihormonal drugs are administered. Hormonal drugs are administered to treat non-endocrine diseases too as a pathogenetic therapy.

B. Educational task consists of the study of the pharmacology of hormonal drugs and their antagonists, principles of choice in different pathology and a correct prescription of recipes according to the indications.

C. Didactic goals

a) The students must **know**: definition and classification of hormonal drugs and their antagonists, pharmacokinetics and pharmacodynamics, names, medicinal forms and ways of administration, general indications and contraindications, side effects,

b) The students must **be able to**: write out hormonal drugs and their antagonists in different medicinal forms; prescribe them according to pathological state and age of the patient.

D. The initial level of knowledge necessary for the integration of the allied disciplines

Human anatomy. Endocrine glands.

Human physiology. General characteristics of endocrine glands. Hormones. Participation of hormonal factors in integration reactions of an organism. Hypothysis. Relation ship between hypothysis and hypothalamus. Neurosecretion. Thyroid gland. Parathyroid glands. Pancreas. Cortex of adrenal glands. The importance of steroids for an organism. Sexual glands. Sexual hormones and their importance for an organism.

Histology. Endocrine system. The structure of endocrine glands. Endocrine system regulation centers. Hypothalamus. Hypophysis. Epyphysis. Peripheral endocrine glands. Thyroid glands. Parathyroid glands. Adrenal glands. Isolated hormonal secreting cells. Male reproductive system. Female reproductive system.

Biochemistry. Drugs metabolism regulation 3; 5'-c-AMP as a secondary mediator. The structure, influence upon the metabolism and mechanism of action of the basic hormones. Liberines, statines and the hormones of adenohypophysis. Somatrotropin, vasopresine, thyroxine, parathormone, calcitonine, insulin, glucagon. Glucocorticoids, mineralocorticoids. Their biosynthesis and secretion regulation. The influence upon the metabolism of proteins, carbohydrates, lipids and hydrosaline metabolism. Sexual hormones: structure, influence upon the metabolism and function of reproductive system.

Pathologic physiology. Pathology of hypophysis. Pathology of thyroid gland. Hyper- and hypo- function. Endemic goiter: ethyology and pathogenesis. Pathology of parathyroid glands. Mechanism of convulsions as a result of parathormone deficiency. Hypotention of parathyroid glands. Pancreas, pathology. Adrenal suprarenal glands pathology. Acute and chronic adrenal cortex insufficiency. Hyperproduction of aldosterone, glucocorticoids. Adrenogenital syndrome in children and adults. Sexual

glands pathology change of organism's function in male and female sexual gland disturbances.

Pathologic anatomy. Morphologic changes in endocrine gland pathologies.

E. Questions for self-training.

1. Notion of hormones, hormonal drugs and antihormonal drugs.
2. Classification, sources and general principles of hormonal drugs standardization.
3. Mechanism of action of polypeptide and steroid hormones on the cell level.
4. Hormones of hypothalamus and their role in endocrine glands'activity and regulation. Hormonal drugs of hypothalamus. Usage.
5. Hypothysis hormones containing drugs. Effects of adrenohypothysis hormones) corticotropine, choryonic gonadotropine, menopause gonadotropine) upon the endocrine gland activity. Hormons of the intermediate lobe of hypophysis (melonatropin). Effect of neurohypophysis hormones (oxitocine, vasopressine) on the tone of myometrium, bowels and blood vessels. Hypophysis hormonal drugs uses.
6. Hormonal drugs of parathyroid glands. Effect of levothyroxine, and liothyroxine on the functions of organs and metabolism. Therapeutically uses. Peculiarities of action and dosage of levothyroxine in children. Classification of antithyroid drugs. Pharmacodynamics of thyamazol, mechanism of antithyroid action of iodine. Uses, side effects. Preparations of parathyroid glands (parathyroidine). Influence upon phosphorus and calcium metabolism.
7. Pancreatic drugs. Classification of insulin. Influence of insulin upon the metabolism of proteins carbohydrates, lipids. Comparative characteristics of insulin preparations. Indications, side effects. First oil in hypo-and hyperglycemic coma. Glucagon. Mechanism of action, indications.
8. Classification of oral antidiabetic drugs. Mechanism of action. Comparative characteristics of sulfanylureic derivatives. Peculiarities of second-generation drugs. Indications, contraindications, side effects. Biguanides.
9. Female sexual hormones preparations (estron, hexestrol, progesterone, noretisteron). Mechanism of action, effects, indications.
10. Antiestrogens. Mechanism of action. Their utilization.

11. Estrogens and progestins use as anticontraceptives. Classification. Mechanism of action. Complications contraindications.
12. Androgens (testosteron propionate, methyltestosteron). Mechanism of action. Utilization. Side effect.
13. Androgens antagonists (antiandrogens). Mechanism of action. Indications.
14. Anabolic remedies. Classification. Anabolic steroids (nandrolone phenylpropionate and decanoate, metandienone). Their influence on the proteic metabolism. Indication and contraindication. Side effects. Peculiarities of their utilization in children.
15. Anabolic nonsteroids. Classification (potassium orotate, inosine). Mechanism of action. Pharmacological effects. Indications. Side effects.
16. Mineralocorticoids (deoxycorticosterone acetate). Their influence on the metabolism. Mechanism of action. Indications.
17. Glucocorticoids. (hydrocortisone, prednisone, dexamethasone, triamcinolone, flumethasone privalate).Classification. Their influence on the metabolism (proteic, lipidic, hydrosalin) on the mesenchemial tissue, cardiovasculary system, CNS, muscles, and blood. Mechanism of action. Antiinflammatory, antialergic, immunodepresive and antishock action of glucocorticoids.
18. Therapeutically use of glucocorticoids. Principles of the administration. Synthetic glucocorticoids for external use. Side effects.

F. Brief characteristics of the compulsory drugs:

Down: Drug name: 1. Corticotropine. 2. Oxytocin. 3. Desmopresine. 4. Levothyroxin. 5. Thyamasol. 6. Parathyroidine. 7. Insulin. 8. Glybenclamide. 9. Metphormine 10. Estron. 11. Progesterone.12. Testosteron. 13. Nandrolon. 14. Hydrocortisone acetate. 15. Prednisilone. 16. Deoxycorticosterone acetate. 17. Cyproteron. 18. Clomyphen citrate. 19. Trisistone. 20. Finasterid. 21 Calcitonine 22. Ethysterone. 23. Liotironine

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions on general and medicinal prescription.

Write out the following drugs in all possible medicinal forms:

1. Corticotropine. 2. Oxytocin. 3. Desmopresine. 4. Levothyroxin. 5. Thyamasol. 6. Parathyroidine. 7. Insulin. 8. Glybenclamide. 9. Metphormine 10. Estron. 11. Progesterone. 12. Testosteron.

13. Nandrolon. 14. Hydrocortisone acetate. 5. Prednisilone. 16. Deoxy-corticosterone acetate. 17. Cyproteron. 18. Clomyphen citrate. 19. Trisistone. 20. Finasterid. 21 Calcitonine 22. Ethysterone. 23. Liotironine

Prescribe in (for): Diabetes mellitus, diabetes insipidus, diabetic coma, mixedem, hyperthyroidisms, hypoglycemic coma, ovarian hypofunction, prostatic cancer, masculine genital hypoplasia, myocardial infarction, alimentary-infectious dystrophy in children, Addison disease, rheumatism, eczema, labor stimulation, abortion prevention, prevention of unwanted pregnancy.

H. Questions for self-training should be answered in written form while preparing for the lesson.

DRUGS AFFECTING THE TONUS AND CONTRACTIBILITY OF MYOMETRIUM

A. Actuality. Drugs stimulating the smooth muscles of the uterus have a wide use in obstetrics and gynecology to stimulate and support the labor process, to provoke an abortion and prevent postnatal hemorrhage. Tocolytics are used for prophylaxis and treatment of a spontaneous abortion and premature labor.

B. Educational task. To present to the students the basic drugs affecting the myometrium contractibility and uterine cervix tone.

C. Didactic goals:

a) The students must **know:** international names of the basic drugs and principles of their classification, pharmacokinetics aspect, mechanism of action, ways of administration, dosage, pharmacological effects, indications, contraindications and side-effects.

b) The students must **be able to:** choose a drug depending on therapeutically uses in different diseases, substitute a drug with the analogous one, write out the compulsory drug for different pathological states

D. Initial level necessary for the integration of the allied disciplines.

Human anatomy. The structure of uterus. Functional changes of uterus. Uterine nerves and vessels.

Histology. The uterus. Development. Structure. Vascula-rization and innervation of the uterus.

Biochemistry. Prostoglandins. Structure and nomenclature. Biosynthesis and metabolism. Biological activity.

Physiology. Physiological labor. Intensification of uterine contractibility before labor. Influence of oxytocin upon the uterus. Contraction of uterine muscles. Beginning of labor – positive feedback theory. Mechanism of labor. Placental detachment. Involution of the uterus.

Pathological physiology. Pathology of the uterus. Anatomy of the uterus. Role of prostoglandins in uterine pathology.

Pathological anatomy. Pathological changes of the uterus.

E. Questions for self-training.

1. Classification of drugs affecting the tone and contractility of myometrium.
2. Uterine remedies increasing the contractility of myometrium (oxytocin, dinoprost, dinoprostone). Pharmacokinetics, pharmacodynamics, indications, contraindications, side effects.
3. Drugs increasing the tone of myometrium (ergot alkaloids). Pharmacokinetics, pharmacodynamics. Indications, contraindications, side effects.
4. Tocolytics. Classification, pharmacokinetics, pharmacodynamics. Indications, contraindications, side effects.
5. Drugs increasing the tone of uterine cervix (dinoprost, dinoprostone, atropine). Comparative pharmacological characteristics of these drugs.

F. Brief characteristics of the compulsory drugs:

Down: Drugs name: 1.Oxytocin. 2. Dinoprost. 3. Dinoproston. 4.Ergotamine. 5.Methylergometrine. 6.Fenoterol. 7. Ritodrine. 8. Ergotal.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions on general and medicinal prescription.

Write out the following drugs in all possible medicinal forms: 1. Oxytocin. 2. Dinoprost. 3. Dinoproston. 4. Ergotamine. 5. Methylergometrine. 6. Fenoterol. 7. Ergotal. 8. Ritodrine.

Prescribe in (for): postnatal hemorrhage, labor stimulation, lack of tones of the uterus in postnatal period (uterine insufficiency), metrorrhage, relaxation of uterine cervix, abortion provocation.

H. Questions for self-training should be answered in written form while preparing for the lesson.

VITAMINS AND VITAMINOIDS

A. Actuality. Vitamins are exogenous organic substances, which are able to affect the metabolic processes in the organism in small quantities. Together with enzymes and hormones they act as biocatalysts. Vitamin insufficiency causes characteristic pathological states, which require administration of vitamin preparations as the drug.

B. Educational task consists of presentation to the students' possibility of uses of vitamins with prophylactic aim and treatment for some states with or without vitamin insufficiency.

C. Didactic goals:

a) The students must **know:** general characteristics of vitamins preparations, origin, principle classification, international names, medicinal forms and administration routes of the compulsory preparations, mechanism of action, general indications and Contraindications, side effects, symptomatic of acute intoxications and aid in them.

b) The students must **be able to:** write out the vitamin preparations in different medicinal forms; prescribe them according to the patient's age and pathology.

D. The initial level of knowledges necessary for the integration of the allied disciplines.

Biochemistry. Vitamins A, D, K, B, B_6, B_2, B_{12}, C, PP, biotin, pantotenic acid, folic acid, structure, alimentary sources, daily necessity, avitaminosis symptoms, biological properties.

Pathological physiology. Hyper-, hypo- and avitaminosis. Exogenous hypovitaminosis (primary). Endogenous hypovitaminosis (secondary). Symptoms of hypo- and hypervitaminosis.

E. Questions for self-training.

1. Historical facts of development of vitamins. Biological meaning of vitamins. Notion of hypo- and hypervitaminosis. Foods containing vitamins. Causes of hypovitaminosis. Principles of classification of vitamins.
2. Pharmacokinetics, pharmacodynamics, indications, Contraindications of water-soluble vitamin preparations (thiamin, phosphothiamin, riboflavin mononucleotide, pyridoxine pyridoxalphosphate, cyanocobolamine, oxycobolamine, folic acid, ascorbic acid, nicotinic acid, nicotinamide, rutin, calcium pantotenate, biotin).
3. Pharmacokinetics, pharmacodynamics, indications, contraindications,

side effects of liposoluble vitamins (retinol, fish fat, carotine, carotolene, tocopherol acetate, phytomenadion, vicasol, ergocalcipherol, videcol).

4. Polyvitamin preparations (panhexavit, decamevit, quadevit).
5. Vitaminoids: choline chloride, calcium panganate, lipoic acid, methylmetionin sulphonium chloride. Characteristics, uses.
6. Plan vitamin preparations (hawthorn oil, seabuckhorn oil, grape oil, vitamin species).
7. Clinico-physiological characteristics, indications, side effects of the following groups:
   a) vitamin preparations affecting the general reactivity of organism (thiamine hydrochloride, riboflavine, nicotinic acid, pyridoxine hydrochloride, calcium panganate, retinol acetate, ascorbic acid).
   b) skin and mucosa protecting vitamins (retinol acetate, riboflavin calcium pantotenate, nicotinic acid, pyridoxine hydrochloride, biotin, tocopherol acetate).
   c) vitamins having antitoxic and anti-infectious action (ascorbic acid, retinol acetate, thiamine hydrochloride, riboflavine, calcium pantotenate, nicotinic acid, pyridoxine hydrochloride cyanocobolamine, folic acid).
   d) vitamins affecting hematopoesis and blood coagulation (cyanocobolamine, folic acid, ascorbic acid, pyridoxine hydrochloride, rutine vikasol).
   e) vitamins affecting tooth and bone metabolism (ascorbic acid, ergocalcipherol, thiamine hydrochloride).
   f) vitamins that act the visual function (retinol acetate, ascorbic acid, riboflavin).
8. Interaction of vitamins drugs.

F. Brief characteristics of the compulsory drugs:

Down: Drugs name.

Hydrosolubic vitamins: 1. Thiamine chlorhidrate. 2. Riboflavin. 3. Nicotinic acid. 4. Nikotinamide. 5. Calcium pantotenate. 6. Pyridoxine chlorhidrate. 7. Folic acid. 8. Cyanocobalamine. 9. Fitomenadione. 10. Ascorbic acid. 11. Rutine. 12. Calcium pangamate.

Liposolubic vitamins: 1. Retinol acetate. 2. Ergocalciferol. 3. Tocoferol acetate. 4. Vikasol.

Polivitamins: 1. Panhexavit. 2. Decamevit. 3. Kvadevit.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action.

5. Indications and Contraindications. 6. Side-effects.

G. Questions on general and medicinal prescription.

Write out the following drugs in all possible medicinal forms: 1. Pyridoxine chlorhidrate. 2. Cyanocobolamine. 3. Vikasol.4. Riboflavin. 5. Folic acid. 6. Ascorbic acid. 7. Retinol acetate. 8. Ergocalciferol. 9. Nicotinic acid. 10. Kvadevit. 11. Thiamine clorhidrate. 12. Nicotinamide. 13. Calcium pantotenate. 14. Rutine. 15. Fitomenadione. 16. Panhexavit. 17. Decamevit.

Prescribe in (for): alcoholism, neuritis, keratitis, pellagra, anemia, mucose and skin diseases, hemorrhagic diathesis, infections diseases, upper respiratory ducts inflammation, rachitis, sterility.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ENZYMES USED AS DRUGS, ANTIENZYMES

A. Actuality. These drugs have different natural enzymelike and antienzyme-like activity. Not only can they be used with prophylactic, but also with therapeutic goals.

B. Educational task consists of presentation to the students' possibilities of administration of enzymes and anti-enzymes in treatment.

C. Didactic goals:

a) The students must **know:** general characteristics of enzymes and antienzymes, natural origin and chemical structure, principles of classification, international names, medicinal forms and Ways of administration, mechanism of action, basic indications and contraindications, side effects.

b) The students must **be able to:** write and the enzymes and anti-enzymes, prescribe them according to the pathology.

D. The initial level necessary for the integration of the allied disciplines.

Biochemistry. History of discovery and investigation of enzymes. Isoenzymes. Temperature dependence of enzymatic reactions pH, concentration of enzyme and substrate dependence of enzymatic reactions. Measurement units of enzymatic activity and quantity of enzymes. Enzyme co-factors: ions of metals and coenzymes. Vitamins with coenzymatic functions. Enzyme inhibitors: reversible, irreversible. Drugs with antienzymatic properties. Enzymatic activity regulation

(regulation of enzymatic activity).

E. Questions for self-training.

1. Enzyme definition. Biological meaning.
2. Enzymes used as drugs. Classification depending of therapeutics aims. The use.
3. Enzymes used in purulent processes and gangrene (tripsin, terilipsin). Pharmacology. Pharmacotherapy.
4. Fibrinolytic enzymes (fibrinolysine, streptolyase). Pharmacodynamics. Notion of fixing enzymes (streptodecaze).
5. Digestive enzymes (pepsin, natural gastric stomach juice, pancreatic, oraze, festal).
6. Enzymes with different properties (cytochrome C, lidaze, lecizim, asparaginaze, penicilinaze). Pharmacodynamics.
7. Notions of drugs with of a microbe origin nature having enzymatic characteristics (bactisubtil). Therapeutic uses.
8. Anti-enzymes. Definition. Classification by the mechanism of action.
9. Anti-proteaze (aprofinin). Pharmacodynamics.
10. Antifibrinolytics (aminocapronic acid, amben). Pharmacodynamiccs.
11. Drugs from different groups used as antienzymes:
    a) anti-cholinesteraze (neostigmin, paraoxon).
    b) monoaminoxidaze inhibitors (nialamide).
    c) carboanhydraze inhibitors (acetazolamide).
    d) xantinoxidaze inhibitors (allopurinol).

F. Brief characteristics of the compulsory drugs:

Down: Drugs name.

Enzymes used as drugs: 1. Terilitine. 2. Streptokinaze. 3. Pepsin. 4. Festal. 5. Lidaze.

Antienzymes: 1.Aprotinine. 2.Aminocapronic acid. 3. Neostigmine. 4.Nialamide. 5. Acetazolamide. 6. Allopurinol.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms:

1. Streptokinaze. 2. Festal. 3. Aminocapronic acid. 4. Allopurinol. 5. Aprotinine. 6. Lidaze. 7. Pepsin. 8. Neostigmine. 9. Nialamide. 10. Acetazolamide. 11. Terilitine.

Prescribe in (for): acute pancreatitis, bronchectatic disease, pulmonary artery embolic, hemorrhages, hemorrhages as a result of intensive fibrinolysis, gastric achilia, intoxication with phosphor-roganic substances, epilepsy.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTI-ATHEROSCLEROTIC DRUGS

A. Actuality. Exogenous and especially endogen lipoproteins participate in the atherogenesis process, which in the majority of cases accompany cardiovascular diseases. The reducing of hyperlipoproteinemia is one of the secondary lactic principles in many diseases, especially in the elderly patients. Administration of hypolipidemic drugs is one the methods in the treatment of atherosclerosis and scheme-type diseases.

B. Educational task consists of studying antisclerotic drugs, the possibility of prophylaxis, and treatment of atherosclerosis.

C. Didactic goals:

a) The students must **know:** definition, classification, mechanism of action and peculiarities of action indications, side effects of hypolipidemic drugs.

b) The students must **be able to:** write out the compulsory hypolipidemic drugs in different medicinal forms; administer the given drugs depending on the pathology.

D. The initial level of knowledges necessary for the integration of the allied disciplines.

Biochemistry. Cholesterol, triglicerides and lipoproteins. Traction's and their role in energetic and plastic processes of organism.

Pathological anatomy. Atherogenesis processes lipoproteins in atherosclerosis. Cerebral, coronary and peripheral vessel atherosclerosis. Peculiarities of the structure.

E. Questions for self-training.

1. Hypolipidemic drugs. Classification. Drugs with polyvalent activity.
2. Cholesterol absorption detaining drugs (cholesteramin). Mechanism of action and peculiarities of action. Indications.
3. Drugs facilitating the excretion and catabolism of cholesterol (dextrothyroxine, linetol, lipostabil). Mechanism of action.

4. Nicotinic acid. Mechanism of action, effects, indications, side effects.
5. Fibrates. Mechanism of action, effects, indications, side effects.
6. Probucol. Pharmacodynamics, indications.
7. Status (levostatin, simvastatin)
8. Endotheliotrop drugs (piricarbate) and anti-oxidants (tocopherol, vitamin B_{12}). Characteristics.
9. Drugs with lipotropic action (cholin, metionin, inozitol, vitamin B_{12}). Characteristics.

F. Brief characteristics of the compulsory drugs.

Down: Drugs name. 1. Clophibrat. 2. Nicotinic acid. 3. Cholestiramine. 4. Piricarbate. 5. Lovastatine. 6. Lipostabil. 7. Probucol.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Clophibrat. 2. Nicotinic acid. 3. Cholestiramine. 4. Piricarbate. 5. Lovastatine. 6. Lipostabil. 7. Probucol.

Prescribe in (for): dys-β-lipoptoteinemia, hypertrigli-ceridemia, hypercholesterinemia, treatment of itch in mechanic jandance, drug intoxication.

H. Questions for self-training should be answered in written form while preparing for the lesson.

DRUGS USED IN WATER-SALINE BALANCE DISTURBANCE. Acids and bases salts of alkaline and alkaline-earth metals

A. Actuality. States of dehydration are observed in some gastrointestinal diseases (diarrhea, dyspepsia, cholera) which need intensive and adequate rehydratation of the organism. During the treatment with glucocorticoids, diuretics, cardiac glycosides and other drugs cases of water-saline disturbances are often observed.

B. Educational task consists of presentation to the students the basic drugs used for hydration of organism, methods of plasma substitution therapy, acidosis and alkalosis control and hypokaliemia, hypocalciemia, hypomagnemia correction.

C. Didactic goals

a) The students must **know:** drugs in organism dehydration states,

polymeric plasma substitute, alkaline and acid therapy, salts of calcium, potassium and magnesium.

b) The students must **be able to:** write out the necessary drugs from the given group in all medicinal forms.

D. Questions for self-training.

1. Classification of drugs used in organism dehydration. Saline solutions (isotonic, hypertonic, hypotonic).
2. Restoring solutions (Ringer, Ringer-Lock).
3. Polyelectrolytic solutions used in hemodialysis, peritoneal dialysis.
4. Solutions for organism rehydratation (acesol, rehydrol).
5. Polymeric plasmosubstutiens used to control shock (dextra-40, gelatinol, albumin, dextrane-70, reogluman), systemic intoxication (hemodez, hemodez-H), alimentary intoxication (enterodez).
6. Alkaline therapy (lastasol, trisol, closol, natrium bicarbonate, trisamine). Administration in acidosis and for urine alkalization.
7. Acid therapy (acetazolamide, ammonium chloride). Administration in alkalosis and for urine acidity.
8. Control of hypocalcemia (calcium chloride, calcium gluconate, ergocalcipherol, parathyroidine) in some hemorrhages, convulsions, rachitic.
9. Control of hypocalcemia (potassium chloride, potassium acetate, asparcam, spironolacton, triamteren) in long-term treatment with saluretics, cardiac glycosides.

E. Brief characteristics of the compulsory drugs.

Down: Drugs name. 1. Sodium chlorate de. 2. Dextran-40. 3. Dextran-70. 4. Enterodase. 5. Sodium bicarbonate de. 6. Ammonium chlorate . 7. Potassium acetate. 8. Calcium chlorate. 9. Rehidron.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

F. Questions on general and medical prescription.

Write out the following drugs in all medicinal forms: 1. Rehidron. 2. Dextran-40. 3. Dextran-70. 4. Enterodez. 5. Sodium bicarbonate. 6. Ammonium Clorate. 7. Potassium acetate de. 8. Calcium chlorate de. 9. Sodium chlorate

Prescribe in (for): hemodilution, isotonic organism dehydration hypnotic organism dehydration, hypertonic organism dehydration, traumatic shock, detoxification in peritonitis, detoxification in alimentary intoxication, urine alkalization, diabetic acidosis, treatment for alkalosis,

hypokaliemia, hypocalcemia.

G. Questions for self-training should be answered in written form while preparing for the lesson.

Concluding session on drugs:

AFFECTING INFLAMMATORY, METABOLIC AND IMMUNE PROCESSES

A. Educational task consists of consolidation of the students' knowledge about the pharmacodynamics of these group of drugs, choice depending on indications, side effects and aid in overdose of drugs from the given groups.

B. Didactic goals:

a) The students must **know:** pharmacological characteristics of drugs from the given groups (pharmacokinetics, pharmacodynamics), main effects, indications, side-effects and the first aid in overdose.

b) The students must **be able to:** write out the compulsory drugs, administer them in different disturbances and pathological states and, first of all, in urgent cases.

C. Questions for self-training.

1. Classification of anti-inflammatory drugs.
2. Steroid anti-inflammatory drugs. Classification, mechanism of action, indications and Contraindications, side effects.
3. Non-steroidal anti-inflammatory drugs. Classification by structure and duration of action. Mechanism of anti-inflammatory and antipyretic action. Indications and contraindications, side effects.
4. Main anti-rheumatic drugs. Classification, mechanism of action of gold derivatives, D-penicillamins, 4aminoquinolone derivatives. Side effects.
5. Big immunodepressors. Classification. Glucocorticoids and cytostatics. Classification, mechanism of action, indications.
6. Classification of anti-allergic drugs.
7. Classification of drugs used in immediate-type reactions.
8. Antihistamines. Classifications, effects, H_1-histaminoblockers. Mechanism and peculiarities of action. Indications and side effects. Clinical picture and treatment of intoxication with antihistamines.
9. Mast cell degranulation inhibitors. Classification, mechanism of

action, indications, contraindications, side effects.

10. Anaphylactic shock treatment. Quincke edema treatment.
11. Classification of drugs used for slow type reactions treatment.
12. Small immunosuppressants. Classification, mechanism of action, indications, contraindications, side effects.
13. Immunostimulants. Classification, mechanism of action, indications, contraindications, side effects.
14. Classification of hormonal drugs by structure and mechanism of action.
15. Mechanism of action of polypeptides and steroid hormones on the cell level.
16. Hormones of hypothalamus and their uses.
17. Hormones of adenohypophysis. Uses.
18. Hormones of neurohypophysis. Effects. Uses.
19. Thyroid gland hormones. Their influence on the functions of organs and metabolism. Mechanism of action. Indications.
20. Antithyreoid drugs. Classification, mechanism of action, indications, contraindications, side effects.
21. Parathyroidin and calcitonin influence upon the phosphorus and calcium metabolism. Uses.
22. Insulin preparations. Classification, mechanism of action. Influence of insulin on the carbohydrate, lipid, protein and hydrosaline metabolism. Principles of insulin dosage in diabetes mellitus. Indications, side effects. First aid in hyper-and hypolipidemia. Glucagon, mechanism of action, indications.
23. Oral antidiabetic drugs. Classification, mechanism of action of sulfonylurea derivatives and biguanides. Indications, contraindications, side effects.
24. Female sexual hormones (estrogens, gestagens). Classification, mechanism of action, effects, indications, contraindications, side effects.
25. Anti-estrogens. Mechanism of action, indications.
26. Oral contraceptives. Classification, mechanism of action, complications, contraindications, side effects.
27. Androgens. Classification, mechanism of action, effects, indications, contraindications.
28. Anti-androgens. Mechanism of action, indications.
29. Anabolics. Classification. Steroid anabolics. Mechanism of action,

influence on the protein metabolism, indications, contraindications.

30. Non-steroid anabolics. Classification, mechanism of action, pharmacological effects, indications, side effects.
31. Mineralocorticoids. Effects mechanism of action, indications.
32. Glucocorticoids. Classification. Influence on the carbohydrate, protein, lipid, hydrosaline metabolism, mezenchimal tissue, cardiovascular system, CNS, muscles and blood. Mechanism of action. Anti-inflammatory, anti-allergic, immunosuppressive and anti-shock action of glucocorticoids. Indications, side effects.
33. Classification of myometrium affecting drugs.
34. Myometrium contractibity affecting drugs. Classification, peculiarrities of action, indications.
35. Myometrium tone affecting drugs. Classification, effects indications.
36. Classification of vitamins by solubility and therapeutic uses.
37. Pharmacology of vitamin preparations: A, K, D, E, B, and C.
38. Classification of enzyme drugs.
39. Classification of antienzymes.
40. Classification of anti-atherosclerotic drugs.
41. Classification of hypolipidemic drugs.
42. Fibrates. Mechanism of action, effects, indications, main administrations, side effects.
43. Nicotinic acid. Mechanism of action, effects, indications, dosage principles, side effects.
44. Hydroximethylglutanil coenzyme-A-reductase inhibitors (lovastatin, simvastatin). Mechanism of action, administrations.
45. Cholesterol catabolism and excretion increasing drugs. Mechanism of action and administrations of cholestyramin, neomycin, β-sitasterol.
46. Endoteliotropic drugs. Effects, administrations.
47. Classification of drugs used in organism dehydration.
48. Saline solutions used in isotonic, hypotonic and hypertonic dehydration.
49. Plasma substitutes. Classification, therapeutic uses.
50. Drugs of alkaline action. Peculiarities of action. Therapeutic uses.
51. Drugs with acid action. Peculiarities of action. Administrations.

D. Questions on general and medicinal prescription.

Write out the following drugs in all possible medicinal forms: diclofenac, indomethacine, ibuprofen, naprohen, fenilbutazone, chlorochine, piroxicam, meloxicam, levamizol, mefenamic acid, fluocenalone, auronafin, aurothyoprol, diphenhydramine, chloropiramine, clemastine,

quifenadine, disodium cromoglicate, ketotifen, interferon, terfenadine, mebhidroline, cetirizine, azatioprine, corticotropine, vasopresine, levotiroxine, thyamazol, parathyroidine, insulin, glibenclamide, buformide, buformine, estrone, progesteron, testo-steron, nandrolone, hydrocortizon acetate, prednisolone, dezoxycorticosteron acetate, ciproteron, clomifen citrate, triziston, oxytocin, dinoproston, ergotamine, methylergometrine, fenoterol, ritodrine, ergotal, thiamine chlorhidrate, riboflavin, nicotinic acid, nicotinamide, calcium pantotenate, pyridoxine chlorhidrate, folic acid, cianocobalamine, fitomenadione, ascorbic acid, rutine, retinol acetate, ergocalciferol, tocoferol acetate, vikasol, panhexavit, decamivit, kvadevit, terilitine, streptokinaze, pepsin, festal, lidaze, aprotinine, aminocapronic acid, neostigmine, nialamide, acetazolamide, allopurinol, clofibrat, cholestiramine, piricarbat, lovastatine, lipostabil, sodium chlorate, dextran-40, dextran-70, enterodez, sodiu bicarbonate, amonium chlorate, potassiu acetate rehidron, probucol, sodium chlorate, finasterid, ciproteron, calcitonine.

Prescribe in (for): rheumatic polyarthritis, spondyloarthritis anchilozis, acute ischio-lumbar gout, degenerative lesions of joints, myositis, pollinosis, urticaria, postoperatory vomiting, kinetosis, pre anesthesia, Parkinson's syndrome, rheumatoid arthritis, bronchial asthma, anaphylactic shock, contact dermatitis, asthmatic bronchitis, chronic infections, AIDS, tissue and organ transplantation, cancer, diabetes mellitus, non-sugar diabetes, diabetic coma, mixedema, hyperthyreosis, hypoglycemic coma, labor stimulation, ovary hypofunction, prostate cancer, threatened abortion prophylaxis, undesirable pregnancy prevention, male genitals hypoplasia, myocardial infarction, alimentary infections dystrophy, Adisson's disease, rheumatism, exema, stimulation uterine contraction, labor stimulation, uterine atony in postnatal period, metrorrhagies, uterine cervix relaxation, abortion stimulation, untreated postnatal hemorrhages, alcoholism, neuritis, keratitis, pellagra, anemia, skin and mucose membrane lesions, hemorrhagic diathesis, inflammatory diseases and infections of upper respiratory ducts, rachitis, sterility, acute pancreatitis, bronchoectase, pulmonary emboli, bleeding because of hyperfibrinolysis, gastric achilia, phosphororganic substances intoxication, epilepsy, dysethalipoproteinemia, hypertrigliceridemia, hypercholesterolemia, diminish of pruritus in mechanic icterus, drug intoxication, hemodilution, isotonic dehydration, hypotonic dehydration, hypertonic dehydration, traumatic shock treatment, detoxification in peritonitis, detoxification in alimentary toxicoinfection, urine alkalization, treatment of diabetic acidosis, treatment of alkalosis, hypokaliemia, hypocalciemia.

ANTISEPTICS AND DISINFECTANTS

A. Actuality. About 50% of all human diseases are caused by different pathogenic agents: bacteria, spirochetes, ricketsia, chlamydia, fungi, viruses and others. To control pathogenic agents situated on living tissue (mucose, skin, cavities, wounds), or in the external medium (different objects, instruments and others) medicines are used, which prevent their multiplication or causing their disappearing.

B. Educational task consists of studying the pharmacology of antiseptics and disinfectants with application of choice skills of preparations depending on pathology and localization of pathological agents, correct writing out of the recipes according to the corresponding administration.

C. Didactic aims:

a) The students must **know:** definition and classification of antiseptics and disinfectants, names, medicinal forms and routes of administration of the compulsory preparations, mechanism of action, main indications and contraindications, side effects.

b) The students must **be able to:** write out the basic antiseptics.

D. Initial level necessary for the integration of the allied disciplines.

Bases of microbiology. Taxonomy and classification of microorganisms. Distribution of microorganisms in the nature. Influence of the external factors on the microorganisms. Definition of infection. Bacteria, viruses, pathogenic fungi and human diseases caused by them.

E. Questions for self-training.

1. Antiseptics and disinfectants. History of antiseptics (A.Nelubin, U.Zemmelweis, L.Pasteur).
2. Classification of antiseptics by chemical structure. Basic mechanism of action on microorganisms. Factors which determine the choice of preparation (sensibility of pathogenetic agent, degree of dissociation, concentration, liposolubility, drug properties).
3. Compounds of metals (mercury dichloride, yellow oxide of mercury). Local action (astringent, irritating, coagulating). Peculiarities of action of the preparations. The main characteristics of resorbtive action. Intoxication. First aid. Protargol and colargol.
4. Halogen containing compounds (chloramine B, iodine alcoholic solution – 5% and 10%). Peculiarities of action and application of chlorine and iodine derivatives.

5. Oxidants (hydrogen peroxide solution – H_2O_2, magnesium permanganate – $KMnO_4$. Principles of action. Application.
6. Notion of tensoactive substances: ionogenic, non-ionogenic and amphoteric. Detergents (dodicin, cerigel, chlorhexidine). Antiionogenic and cationic detergents. Peculiarities of antimicrobic action of detergents. Application.
7. Antiseptics of aromatic (phenol, birch tar, resorcin, ichtiol) and aliphatic (ethylic alcohol 70%, 90%, 95%, phormaldehide solution) row. Peculiarities of action and application. Intoxication and assistance in it.
8. Colorants (diamond green, ethacridine lactate). Nitrofuran derivatives (nitrofural). Acids and bases (boric acid, ammonium solutions). Peculiarities of antimicrobic action. Application.
9. Principles of choice and indications for the application of antiseptics.
10. Sulfur preparations. Different drugs.

F. Brief characteristics of the compulsory drugs:

Down: Drugs name. 1. Nitrofural. 2. Phenol. 3. Nitrate of argent. 4. Zinc sulphate. 5. Chloramine B. 6. Alcoholic solution of iodium 5%. 7. Solution of hydrogen peroxide. 8. Potassium permanganate. 9.Ethanol. 10. Boric acid. 11. Ammoniac solution. 12. Brilliant green.13. Clorhexidine. 14. Citilpiridine. 15. Ethacridine lactate.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions on general and medicinal prescription.

Write out the following drugs in all possible medicinal forms: 1. Nitrofural2. Phenol. 3. Nitrate of argent. 4. Zinc sulphate. 5. Chloramine B. 6. Alcoholic solution of iodium 5%. 7. Solution of hydrogen peroxide. 8. Potassium permanganate. 9.Ethanol. 10.Boric acid. 11.Ammoniac solution. 12.Brilliant green. 13.Clorhexidine. 14. Citilpiridine. 15. Ethacridine lactate.

Prescribe in (for): phlegm disinfection, instruments disinfection, water purification, hands disinfection, wounds disinfection, operation field disinfection, treatment of conjunctivitis, hyperhydrosis, primary wound disinfection, fetal blenorrhea prophylaxis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTIBIOTICS

A. Actuality. Antibiotics are the most effective remedies to control infectious diseases. At present about 3500 antibiotics are known. Many of them are widely employed in treatment for infectious in therapeutic and surgical diseases.

B. Educational task. Presentation to the students of the principles of classification of antibiotics and their joint uses, mechanism of action, spectrum of action, indications and side effects.

C. Didactic goals:

a) The students must **know:** the main agents of different group of antibiotics. Their spectrum and mechanism of action. Chemical structure, classification, dosage principles, ways of administration, indications, Contraindications, side effects.

b) The students must **be able to:** write out antibiotics correctly in all existing medicinal forms, substitute one antibiotic with another in case of its infectivity.

D. The initial level of knowledges necessary for the integration of the allied disciplines.

Microbiology. Idea of chemotherapeutic drugs. Ways of conception in mechanism of action of chemotherapeutic drugs. Bactericide and bacteriostatic effects. Resistance of microorganisms to drugs and mechanism of its appearance. The problem of elimination the resistance of microorganism to antibiotics. Antibiotics as a variant of chemotherapeutic remedies. Antibiotic activity units of the basic drugs. The basic methods of determination the bacterial sensibility to antibiotics.

E. Questions for self-training.

1. Chemotherapy. Basic principles. Services of L.Pasteur, I.Mechnikov, P.Ehrlich in this domain. Requirements to antibiotics.
2. History of obtaining and using of antibiotics. Principles of classification. Basic and reserve antibiotics.
3. Classification of antibiotics by chemical structure. Brief characteristics of each group.
4. Classification of antibiotics by mechanism of action. Brief characteristic. Antibiotics with bacteriostatic and bacteriokilling effect.
5. β-lactam antibiotics. Classification. Group of penicillins (sodium and potassium benzylpenicillin, benzatinbenzylpenicillin). Classification, spectrum and mechanism of action. Semisynthetic penicillins

(methicillin, oxacillin, ampicillin, carbenicillin, ampiox). Classification. Principles of dosage, indication, contraindications, peculiarities of administration in children.

6. β-lactam antibiotics. Cephalosporins (cephalothine, cephaloridine, cefotaxime). Classification, spectrum and mechanism of action, indications, pharmacokinetics. β-lactamase inhibitors.
7. Macrolides and lincosamides (erythromycin, oleandomycin, lincomycin, clindamycin, azytromycine, clarythromycine). Spectrum and mechanism of action, indications, side effects, pharmacokinetics.
8. Aminoglycosides (streptomycin, gentamicin, kanamycin, tobramycin, amikacin, sisomycin). Classifications, spectrum and mechanism of action, indications, complications, pharmacokinetics. Application of aminoglycosides in pediatrics.
9. Tetracyclines (tetracycline, morphocycline, methacycline, doxycycline). Classification, spectrum and mechanism of action, indications, complications. Peculiarities of administration in children. Pharmacokinetics.

F. Brief characteristics of the compulsory drugs:

Down: Drugs name. 1. Sodium benzilpenicillin. 2. Benzatinbenzylpenicillin. 3. Ampicillin. 4. Carbenicillin. 5. Bicilline-5. 6. Cephalexine. 7. Erythromicine. 8. Lincomicine. 9. Clindamicine. 10. Gentamicine. 11. Sisomicine. 12. Cephotaxime. 13. Metacycline. 14. Tetracycline. 15. Carfecycline. 16. Cefuroxime. 17. Cefepime. 18. Cefixime. 19. Imipenem. 20. Aztreoname. 21. Claritromycine. 22. Doxicycline. 23. Amicacine. 24. Fenoxymethilpenicillin. 25. Augmentine. 26. Amoxicillin

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions on general and medicinal prescription.

Write out the following drugs in all possible medicinal forms: 1. Sodium benzilpenicillin. 2. Benzatinbenzylpenicillin. 3. Ampicillin. 4. Carbenicillin. 5. Bicilline-5. 6. Cephalexine. 7. Erythromicine. 8. Lincomicine. 9. Clindamicine. 10.Gentamicine. 11. Sisomicine. 12. Cephotaxime. 13. Metacycline. 14. Tetracycline. 15. Carfecycline. 16. Cefuroxime. 17. Cefepime. 18. Cefixime. 19. Imipenem. 20. Aztreoname. 21. Claritromycine. 22 .Doxicycline. 23. Amicacine. 24.Fenoxymethilpenicillin. 25. Augmentine. 26. Amoxicillin

Prescribe in (for): rheumatism prophylaxis, pneumonia, typhus, gas gangrene, anthrax, tetanus, syphilis, meningitis caused by

H.influenzae, infection cause by P.aerugenosa, infection caused by B.fragilis, osteomielitis, infection caused by staphylococci resistant to benzylpenicillin, infection caused by proteus, bacillus Pioceanic, tonsillitis, dysentery.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTIBIOTICS (continued)

10. Chloramphenicol. Spectrum and mechanism of action, indications, complications, Peculiarities of administration in children.
11. Polypeptides (ristomycine, vancomycine, polymexin). Classification. Spectrum and mechanism of action, routes of administration, indications, side effects.
12. Rifampicines. Spectrum and mechanism of action. Clinical applications. Complications.
13. Other antibiotics (sodium fusidine, furafungine).
14. Bacterial resistance to antibiotics. Types of resistance, mechanism of its appearance and ways of elimination.
15. Antistaphylococcus antibiotics. Characteristics.
16. Antibiotics used in diseases caused by Gr-bacteria.
17. Antibiotics used in diseases caused by anaerobic Gr-bacteria (Bacterioides fragiles).
18. Principles of combination of antibiotics. Antagonism and synergism. Basic indications for antibiotic combination.
19. Factors affecting the activity of antibiotics interaction with other drugs.

F. Brief characteristics of the compulsory drugs:

Dawn: Drugs name. 25. Cloramphenicol. 26. Ristomicine. 27. Polimixin-M sulphate. 28. Rifampicin. 29.Fuzidine. 30. Vancomycine.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions on general and medical prescription:

Write out the following drugs. 22. Cloramphenicol. 23. Ristomycine. 24. Rifampicin. 25.Polimixin-M sulphate. 29.Fuzidine. 30. Vancomycine.

Administered in (for): peninicillin resistant staphylococcus infection, infection caused by B. fragilis, salmonellosis, infection caused

by P. aeruginosa, pseudomembranous colitis, typhoid fever, bacterial meningitis, tuberculosis, urinary tract infections, chlamydiosis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

SULFANILAMIDES AND SYNTHETIC ANTIMICROBIAL DRUGS WITH DIFFERENT CHEMICAL STRUCTURE.

A. Actuality. Treatment of infections comes not only to administration of antibiotics. In many diseases it is more effective to administer sulfanilamides and other chemotherapeutic drugs of different chemical structures.

B. Educational task. Consists of studying the pharmacology of sulfanilamides, chemotherapeutic remedies of different chemical structures and their role in therapy.

C. Didactic goals:

a) The students must **know**: classification of antibacterial drugs, spectrum and mechanism of action, routes of administration, principles of dosage, indications and Contraindications.

b) The students must **be able to:** write out the compulsory drugs from the given groups; administer the effective drugs depending on indications.

D. The initial level of knowledge necessary for the integration of the allied disciplines.

Organic chemistry. Structure of sulfanilamides.

Biochemistry. Notion of antimetabolits.

Microbiology. Alimentation and metabolism of a microbial cell. Multiplication of bacteria.

E. Questions for self-training.

1. Obtaining the sulfanilamides - a new era in the history of infectious diseases treatment. Gr. Domagk's services in this domain.
2. Classification of sulfanilamides.
3. Pharmacokinetics of sulfanilamides and principles of dosage. Role of chemical structure in pharmacokinetics of different sulfanilamides.
4. Indications, Contraindications and side effects of different sulfanilamides. Bacterial resistance.
5. Spectrum and mechanism of action of sulfanilamides.

6. Combined sulfanilamides (cotrimoxazol, sulfaton, poteseptil). Composition. Spectrum and mechanism of action, pharmacokinetics, indications, contraindications, side effects.
7. Salasosulfamides (salasodine, salasodimetin, sulfasalasin). Composition and mechanism of action. Uses. Peculiarities of mesalasin.
8. Peculiarities of pharmacokinetics and pharmacodynamics of sulfanilamides in children.
9. Nitrofuran (nitrofural, furasidine, nitrofurantoin). Spectrum and mechanism of action, indications, side effects.
10. Nalidixic acid and other quinolone derivatives (pipemidic acid, oxolinic acid, oxolinic acid, cinoxacin). Classification. Spectrum and mechanism of action, indications and side effects. Fluoroquinolones.
11. Nitroimidazol derivatives (metronidazol, tinidazol). Spectrum and mechanism of action, indications and side effects.
12. 8-oxiquinolone derivatives (chlorquinolone, nitroxoline). Spectrum and mechanism of action, indications and side effects.
13. Quinoxalin derivatives (quinoxidin, dioxidin) spectrum and mechanism of action, indications, side effects.

F. Brief characteristics of the compulsory drugs.

Dawn: Drugs name 1. Sulfaetidol. 2. Sulfadimetoxine. 3. Sulfalen. 4. Co-trimoxazol. 5. Furazolidon. 6. Nalidixic acid. 7. Ofloxacine. 8. Metronidazol. 9. Nitroxoline. 10. Dioxidine. 11. Ciprofloxacine. 12. Sulfasalazine. 13. Ftalilsulfatiazol. 14. Nitrofurantoine.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions on general and medical prescription:

Write out the following drugs. 1.Sulfaetidol. 2.Sulfacetamide. 3. Sulfadimetoxine. 4. Co-trimoxazol. 5. Furazolidon. 6. Ofloxacine. 7.Nitroxoline. 8.Ciprofloxacine. 9.Sulfalen. 10.Dioxidine. 11.Mesalazine.

Prescribe in (for): pneumonia, dysentery conjunctivitis, urinary tract infections, infection caused by P. aeruginosa, infection caused by B. fragilis, non-specific ulcerative colitis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTITUBERCULOUS AND ANTILEPROUS DRUGS

A. Actuality. Specific antituberculous therapy includes synthetic chemotherapeutic drugs and antibiotics. The treatment for tuberculosis is a complex and a long-term one and requires a profound knowledge of drugs groups used in the given pathology and principles of their association.

B. Educational task consists of studying the pharmacology of antituberculous and antileprous drugs, possibilities of administration the rational chemotherapy proceeding from the forms and evolution of the disease and duration of treatment.

C. Didactic aims:

a) The students must **know**: classification and names of drugs, pharmacokinetics and pharmacodynamics of antituberculous and antileprous drugs, principles of pharmacotherapy for tuberculosis.

b) The students must **be able to**: write out the basic antituberculous drugs and administer them in different forms of the disease.

D. The initial level of knowledge necessary for the integration of the allied disciplines.

Organic chemistry. Structure of antituberculous drugs.

Microbiology. Tubercle bacillus. Development of resistance. Tuberculosis prophylaxis.

E. Questions for self-training.

1. Definition and principles of classification of antituberculous drugs:
   a) Isonicotinic acid hydrosides, its derivatives and analogous drugs.
   b) Paraaminosallicylic acid derivatives.
   c) Antibiotics and their preparations.
   d) Antituberculous remedies from different chemical groups.
2. The most effective chemotherapeutic drugs used first of all (isoniazid, rifampicin, ethambutol, pyrazinamide, streptomycin). Spectrum and mechanism of action, pharmacokinetics, pharmacodynamics. Aspects of used in therapy, side effects.
3. Isoniazid. Absorption, distribution, biotransformation and excretion. Quick and slow isoniaside acetylation.
4. Effective reserve chemotherapeutic drugs (ethionamide, kanamycin, viomycin, cycloserine). Peculiarities of pharmacokinetics, pharmacodynamics, indications, side effects.
5. Less effective chemotherapeutic drugs (sodium aminosalicylate,

thioacetason). Pharmacokinetics, pharmacodynamics, indications, contraindications, side effects.

6. Principles of combined therapy for tuberculosis.
7. Antileprous drugs (dapsone, solasulfone). Characteristics of pharmackinetics and pharmacodynamics, indications, contraindications, side effect.

F. Brief characteristics of the compulsory drugs:

Dawn: Drugs name. 1.Izoniazide. 2.Etambutol. 3. Rifampicin. 4. Streptomycin. 5. Sodium aminosalicilate. 6. Florimicine sulphate. 7. Dapson. 8. Solasulfon.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions on general and medical prescription.

Write out the following drugs. 1. Izoniazide. 2. Etambutol. 3. Rifampicin. 4. Streptomycin. 5. Sodium aminosalicilate.6. Florimycine sulphate. 7. Dapson. 8. Solasulfon.

Administered in (for): tuberculosis, meningitis, tuberculosis prophylaxis, active pulmonary tuberculosis, streptomycin resistant tuberculosis, and leprosy.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTISYPHILITIC AND ANTIVIRAL DRUGS

A. Actuality. Study of these remedies is absolutely necessary, because there are many people who are ill with syphilitic and viral infections.

B. Educational task consists of studying of antisyphilitic and antiviral drugs necessary for the prophylaxis and treatment of different diseases caused by the corresponding pathological agents.

C. Didactic aims:

a) The students must **know**: classification spectrum and mechanism of action, indication, adverse reactions and Peculiarities of pharmacokinetics.
b) The students must **be able to**: write out the compulsory antisyphilitic and antiviral drugs, administer them in dependence of pathogenic agent.

D. The initial level of knowledge necessary for the integration of the allied disciplines.

Microbiology. Pale treponema. Mechanism of transmission and clinical manifestations. Classification of leptospiras. Pathogenic agents of (recurrent) typhus. Viruses. Classification and general characteristics.

E. Questions for self-training.

1. Classification of antispirochetous drugs.
2. Antisyphilitic drugs. Classification, mechanism of action, uses, adverse reactions.
3. Drugs used to treat leptospirosis and typhus. Peculiarities of administration.
4. Antiviral drugs. Principles of classification.
5. Spectrum and mechanism of action of antiviral drugs. Viral resistance.
6. Peculiarities of pharmacology of synthetic antiviral drugs.
7. Antiviral drugs active towards influenza virus (remantadin, amantadin, arbidal).
8. Antiviral drugs active towards herpes virus (acyclovir, vidarabine, indoxudine, valacyclavir, trifluridil).
9. Antiviral drugs active towards the human. Immunodeficiency virus (zidovudine, dideoxicytidine, dideoxiinosine, stavudine).
10. Interferons. Peculiarities of pharmacology ant therapeutic uses. Interferon indicators (interferons).
11. Antimegaloviral drugs (hancyclovir, foscarnet).

F. Brief characteristics of the compulsory drugs.

Dawn: Drugs name. 1. Sodium benzilpenicillin. 2. Biyochinol. 3. Eritromicin. 4. Remantadine. 5. Oxolin. 6. Aciclovir. 7. Vidarabine. 8. Zidovudine. 9. Amantadine. 10. Interferon. 11. Benzatinbenzil-penicilline. 12. Foscarnet.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions on general and medical prescription.

Write out the following drugs. 1. Sodium benzilpenicilline. 2. Biyochinol. 3. Eritromicin. 4.Remantadine. 5.Oxolin. 6.Aciclovir. 7. Vidarabine. 8. Zidovudine. 9. Amantadine. 10. Interferon. 11. Benzatinbenzilpenicilline. 12. Foscarnet.

Administered in (for): treatment of syphilis, syphilis recidives

prophylaxis, influenza, viral keratitis, pox, skin viral infection, herpetic encephalitis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTIFUNGAL (antimicotic) DRUGS

A. Actuality. Pathogenic fungi and conditionally patho-genic fungi cause local and systemic mycosis the treatment of which is difficult. The efficiency of antimycotic drugs depends on the spectrum of action, pharmacokinetics, peculiarities and localization of fungi.

B. Educational task consists of studying the pharma-cology of animistic drugs, formation of skills in the choice if a drug depending on the fungal form and localization.

C. Didactic aims:

a) The students must **know**: classification, spectrum and mechanism of action, indications and side effects, pharmacokinetic peculiarities of antimycotic drugs.

b) The students must **be able to:** write out the compulsory antimycotic drugs, administer the effective drugs in different mycoses.

D. The initial level of knowledge necessary for the integration of the allied disciplines.

Microbiology. Pathogenic fungi - agents of dermatomycoses, systemic mycoses, candidomycoses.

E. Questions for self-training.

1. Antifungal drugs. Principles of classification.
2. Antifungal antibiotics. Spectrum and mechanism of action, indications, side effects, pharmacokinetics.
3. Imidasole derivatives (clotrimasole, ketoconasole, myconasole). Spectrum and mechanism of action, indications, adverse effects, pharmacokinetics.
4. Fatty acids derivatives (undecilenic acid, zincundan, mycoseptin). Characteristics of the preparations.
5. Antifungal drugs from different groups (amycasole, nitrofungine, decamine). Characteristics of the preparations.

F. Brief characteristics of the compulsory drugs:

Down: Drugs name. 1. Amfotericine B. 2. Nystatin. 3. Clotri-

mazol. 4. Micoheptine. 5. Nitrofungine. 6. Miconazole. 7.Terbinafine clorhidrate. 8. Decvalinine chloride. 9. Fluconazole.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions for general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Amfotericine B. 2. Nystatin. 3. Clotrimazol. 4. Micoheptine. 5. Nitrofungine. 6. Miconazole. 7. Terbinafine clorhidrate. 8. Decvaliniu chloride. 9. Fluconazole.

Prescribe in (for): systemic mycosis, candidosis, dermato-mycosis, mycotic meningitis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTIPROTOZOAL DRUGS

A. Actuality. Protozoa are pathogenic agents, which cause a range of maladies having more or less specific clinics. Antiprotozoal drugs form a considerable group of drugs with specific action on the parasites in dependence of localization and form of the disease. To realize an efficied treatment a deep study of pharmacology of the given drugs is required.

B. Educational task consists of studding of chemotherapeutic drugs that are efficient in malaria, amebiasis, trichomoniasis, toxoplas-mosis, leishmaniosis, balantidiasis revealing general and specific properties towards the parasite.

C. Didactic aims:

a) The students must **know:** classification, spectrum and mechanism of action, indications, adverse reactions, principle of prophylaxis the clinical manifestations with antiprotozoal drugs.

b) The students must **be able to:** write out the compulsory drugs, administer the effective drugs dependencing on the form of a disease and localization of parasite, drugs used for prophylaxis of parasite diseases.

D. Initial level necessary for the integration of the allied disciplines.

Biology. Parasitism. Specifics of parasites life. Classification.

Protozoa. Characteristics. Class sarcodae. Dysenteric ameba, intestinal ameba. Class flagellae. Leishmania. Trichomonada. Lamblia. Trypanosoma. Class sporaceae. Toxoplasma. Types of plasmodium. Class infuzoriae. Balanditia. Morphofunctional characteristics of protozoa, development cycle, pathogenic action.

E. Questions for self-training.

1. Classification of protozoal drugs.
2. Antimalarial chemotherapeutic drugs (chloroquine, pyrimethamine, mefloquine, primaquine). Classification. Characteristics of groups.
3. Drugs used for individual and social prophylaxis, relapse prophylaxis. Drugs used in malarial coma.
4. Chemotherapeutic drugs effective in amebiasis (metronidazole, tetracyclin, emetine hydrochloride, chloroquine). Classification. Characteristics of groups.
5. Drugs used to treat trichomoniasis (metronidazole, tinidazole, trichomonacide,furazolidon). Spectrum and mechanism of action, indications, side effects.
6. Chemotherapeutic drugs effective in lambliosis (metronidazole, mepacrine, furazolidon). Peculiarities of action.
7. Drugs used to treat balantidiasis (monomycine, chinioform, sulfadimirine). Peculiarities of action. Drugs to treat leishmaniosis (monomicine, solusurmine, sodium sibogluconate). Peculiarities of action.
8. Drugs used to treat toxoplasmosis (pyrimetamine, pentamidine, tetracycline). Peculiarities of action.

F. Brief characteristics of the compulsory drugs:

Down: Drugs name. 1. Cloroquine. 2. Metronidazol. 3. Trichomonacide. 4. Furazolidone. 5. Pirimetamine. 6. Tetracycline. 7. Monomycine. 8. Solusurmine.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions on general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Cloroquine. 2.Metronidazol. 3.Trichomonacide. 4. Furazolidone. 5. Pirimetamine. 6. Tetracycline. 7. Monomycine. 8. Solusurmine. 9. Pentamidine.

Prescribe in (for): malaria coma, individual prophylaxis of malaria, social malaria prophylaxis, malaria relapse prophylaxis, amebiasis of different localization, amebiasis in lumen and wall of

bowels, tissue amebiasis, lambliosis, trichomonadosis, toxoplasmosis, balantidiasis, leishmaniosis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTIHELMINTIC DRUGS

A. Actuality. Helmintoses diseases, caused by pathogenic worms are very often diseases especially in children and often have no clinical symptoms. Their care is empirical in most cases, because of difficulties in antihelmintic drug depends on worm and its place, that's why there is a need for deep study of action and principles of doses.

B. Educational task consists of studying the pharmaceutical properties of anthelmintic drugs.

C. Didactic aims:

a) The students must **know:** principles of classification, spectrum and mechanism of action, indications, and adverse reactions, Peculiarities of dosage of anthelmintic drugs.

b) The students must **be able to:** write out compulsory antihelmintic drugs, to administer the effective remedies in different helmintoses.

D. Initial level necessary for the integration of the allied disciplines.

Biology. Notion of helmintoses. Type flat worms. Trematodes, hepativcal twomouth, cat's two-mouth, licker, lung licker. Klass, Lental worns, bods Zepen, Pig's Zepen, Small-Zepen. The cycle of development. Type. Circle worms. Ascarids, the cycle of development.

E. Questions for self-training.

1. Definition and principles of classification of anthelmintic drugs.
2. Drugs, used in case of nematodoses (levamizol, pirantel, mebendazol, albendazol, piperazin), pirviniu pamoate), the spectrum and mechanisms of action. Indications.
3. Characteristics of medicaments, effective in cases of gestodoses (fenasal, mebendazol, praziquantel, aminoachrine, perchloretilen, intermectine).
4. Characteristics of medicaments, used in cases of intestinal helmintases (diethylcarbamazine, antimanyltartate of sodium, ivermectine, cloxil, mebendazol).

F. Brief characteristics of the compulsory drugs:

Down: Drugs name. 1. Levamizol. 2. Mebendazol. 3. Pirantel. 4. Diethylcarbamazine. 5. Praziquantel. 6. Niclosamide. 7. Niridazole. 8. Emetine clorhidrate. 9. Pirviniu pamoate. 10. Ivermectine. 11. Aminoacrihine.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

G. Questions of general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Levamizol. Mebendazol. 3. Pirantel. 4. Diethylcarbamazine. 5. Praziquantel. 6. Niclosamide. 7. Niridazole. 8. Emetine clorhidrate. 9. Pirviniu pamoate. 10. Ivermectine. 11. Aminoacrihine.

Prescribe in (for): Ascaridosis, enterobosis, trihocephalosis, antcylostomidosis, strongyloidosis, teniosis, botriocefalosis, teniarinhosis, non-intestinal helmintosis.

H. Questions for self-training should be answered in written form while preparing for the lesson.

ANTICANCER DRUGS

A. Actuality. Malignant tumors and hemoblastoses are painful psychological tumors for patients, because they are incurable, and their treatment is only palliative. That is why the deep study of cytostatics worries the medical science.

B. Educational task consists of studying the pharmaceutical Peculiarities of antitumor drugs from different groups.

C. Didactic aims:

a) The students must **know:** classification, mechanism of action, effects, indications, side effects, pharmacokinetics of antitumor drugs.

b) The students must **be able to:** write out the main antitumor drugs in all possible medicinal forms; administer them according to the diseases.

D. Initial level necessary for the integration of the allied disciplines.

Pathologic anatomy. Classification of tumors their structure.

Pathologic histology. Hemoblastoses. Classification. Leukemia.

Classification. Blood picture.

E. Questions for self-training.

1. Definition and classification of antitumors drugs.
2. Alkylating agents (cyclophosphamide, laminstine). Classification, mechanisms of action, indications, side effects.
3. Metabolic analogs (methotrexate, mercaptopurine, fluorouracil). Classification, mechanisms of action. Indications. Side effects.
4. Cytostatic antibiotics. Mechanism of action. Indications. Side effects.
5. Antitumor drugs of vegetal origin (vincristine, vinblastine). Mechanism of action. Indications. Side effects.
6. Hormonal drugs and their antagonists used in tumoral diseases. Mechanism of action.
   a) Androgens. Effects and their use.
   b) Estrogens. Effects and their use. Antiestrogens. Peculiarities and indications.
   c) Progestatives. Indications.
   d) Glucocorticoids. Peculiarities of cytostatic action. Indications.
7. Cytotoxic enzymes. Mechanism of action. Indications.
8. Diverse drugs with antitumor action (prospidine, spirazine, cisplatine, cyclosporine).
9. Radioactive isotopes. Their use.
10. Radioprotectors.

F. Brief characteristics of the compulsory drugs:

Down: Drugs name. 1. Cyclophosphamide. 2. Chlorambucile. 3. Methotrexate. 4. Mercoptopurine. 5. Fluoruracile. 6. Prospidine. 7. Adriamycine. 8. Colcamine. 9. Vincristine. 10. Asparaginose.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side effects.

G. Questions of general and medical prescription.

Write out the following drugs in all possible medicinal forms:

1. Cyclophosphamide. 2. Chlorambucile. 3. Bisulfan. 4. Metotrexate. 5. Mercoptopurine. 6. Fluoruracile. 7. Prospidine. 8. Adriamycine. 9. Colchamine. 10. Vincristine. 11. Asparaginose.

Prescribe in (for): chronic leukemia, lymphogranulomatose, lympho- and reticulo-sarcomas, ovarian tumor, mammary tumor, cerebral tumors, colon's tumors, acute leukemias, larynx cancer, stomach tumor, endometrium tumor, testicular tumors, osteogene sarcomas, skins tumor, prostate's cancer, estrogenodependent tumor, thyroid cancer.

H. Questions for self-training should be answered in written form while preparing for the lesson.

INTERACTION OF MEDICAL DRUGS

A. Actuality. Contemporary pharmacology allows concomitant administration of several medical drugs, which makes possible the interaction between these substances. Therefore it is necessary to know these interactions in order to avoid the possible side effects, and intensify (enhance) the therapeutical effects of the administered drugs.

B. Educational task consists of instruction for pointing out of the types and principles of drugs interactions, and their importance for therapeutics.

C. Didactic aims:

a) The students must **know:** the principles of classification of drugs interactions, their evolution and utilization possibilities in medical practice.

b) The students must **be able to:** analyze and make a prognosis of the possible results in concomitant administration of two or more remedies, taken in consideration their pharmacokinetical, pharmacodynamical properties.

D. Questions for self-training.

1. Principles of classification of drugs interactions according to their place of action, mechanism and clinical importance.
2. Pharmaceutical and pharmacological interaction.
3. Pharmacokinetical and pharmacodynamic level for the drugs interaction.
4. Drugs interaction in the absorption phase – enhancement or reducing of absorption (change of the medium's acidity, enhancement and modification of digestive tube peristalsis etc.).
5. Interaction during the distribution phase of drugs in the organism.
6. Interaction in the medical remedies metabolization phase. Induction and suspension of microsomal hepatic enzymes.
7. Interaction in the medical remedies eliminated phase.
8. Pharmacodynamic interactions of medical substances.
9. Clinical importance of the final effect, obtained as a result of medicinal interaction – rising or lowering of therapeutic effects and side effects.

E. The are possible medicinal interactions (to indicate the way of modifications of effects and type of interaction)

Acetylsalicylic acid + antibacteric sulfamide (hypoglycemic effect);

Aminoglycoside + myorelaxants (myorelaxing effect);

Insulin + amphetamine (β adrenergic blockages, tetracycline) (insulin effect);

Nifedipine + cimetidine (hypotensive), (hypotensive effect);

Streptokinase + acetylsalicylic acid (oral anticoagulants) (fibrinolitic effect);

Penicilins + inhibitors of penicilinase (impenemi), (antibacterial effect);

Simpathomimetics + aminophylline (bronchis, heart);

Propranolol + diuretics (hypotensive, side effect).

G. Questions for self-training should be answered in written form while preparing for the lesson.

COMPLICATIONS OF DRUGS THERAPY

A. Actuality. The large spreading of the drugs in the last decades has lead to the appearance of medicinal (drug) diseases, at the base of which are the side effects of pharmacotherapy. The complications that appear as a result of treatment need an adequate attitude in medical remedies administration.

B. Educational task consists of familiarization of the student with the main complications, as a result of the medicinal treatment and their prophylaxes.

C. Didactic aims:

a) The students must **know:** classification and general characteristics of pharmacotherapy complications, guarding system and pharmacovigilence of the country's drugs.

b) The students must **be able to:** outpoint and group the medical remedies according to possible complications.

D. Questions for self-training.

1. Classification of pharmacotherapy complications.
2. Classifications medicinal therapy, accused by absolute and relative overdosage of drugs. Noticed effects as a result of interactions at the level of absorption, distribution, metabolization and elimination.

Prophylaxes and therapy principles of these complications.

3. Medicinal therapy complications related to toxicity and side effects of drugs. Neurotoxic action, hepatotoxic, hematotoxic, ulcerogenous, theratogenous actions etc. medicinal psychoses. Prophylaxis.
4. Allergic reactions, the prompt type (anaphylactic shock, urticaria, angioneurotic edema, bronchial asthma, rinitis, allergic conjunctivitis etc. Treatment and prophylaxis.
5. Cytotoxic allergic reactions (granulocytopenia, hemolytic anemia's).
6. Allergic reactions with immune complex participation (sickness of serum, nodular periarthrites etc.).
7. Allergic reactions, late type.
8. Complications of medicinal treatment, favorized by genetic factors.
9. Complications of medicinal therapy, favorized by immuno-biological derangements of the organism (immune reactions lowering, manifested by superinfection, infections decease relapse increased frequency, disbacteriosis, candidomicosis, aspergillosis). Treatment and prophylaxis.
10. Pharmacotherapy complications appeared as a result of treatment annulment. Rebound – syndrome (after β-adrenoblockers treatment, clonidine, cimetidine, anticoagulants indirect), lack of glucocorticoids after therapy. Treatment, prophylaxis.
11. Medicinal and psychical dependence as a result of longterm usage of opioid analgesics, tranquilizators, CNS excitators, ethylic alcohol.
12. The system of surveillance and pharmacovigilence of the medicine.
13. Basic principles in rational usage of drugs.

FIRST AID ACTIONS IN ACUTE INTOXICATIONS WITH DRUGS

A. Actuality. Correct dosage of medical remedies has a very important role, because the posologic mistakes can lead to drugs intoxications. To prevent them it is necessary to know the first aid actions.

B. Educational task consists of familiarization of the student with the first aid actions in acute intoxications with drugs and other xenobiotics.

C. Didactic aims:

a) The students must **know:** the spreading of acute drug intoxi-

cations, their causes, consecutively of first aid actions according of dominant symptoms.

b) The students must **be able to:** prescribe medicinal substances that are obligatory in drug intoxications and to indicate them according the intoxicating symptoms.

D. Questions for self-training.

1. Dialectic notion about drug and toxic. The dependence between biologic action, dose, chemical structure, physicochemical peculiarities of the drug and body's reactivity.
2. the spreading of acute drug intoxications, their causes, structure, and consequences.
3. Main actions in drug and toxic intoxications. Methods of penetration stopping of the toxic in the skin surface and mucosa, through lungs). Mechanical methods of removing, chemical inactivation, physicochemical neutralization of the toxic from the digestive system. Gastric wash. Using of emetics for removing the toxic from the stomach.
4. Neutralizing methods of the absorbed toxic in the body and correcting the damaged functions (antidote, therapy, functional antagonism), stimulation of physiologic functions (blood transfunctions and its substituents). Thiolitic antidots, indications, action mechanism.
5. Methemoglobinizants (methylen blue, sodium nitrate) in intoxications with cyanide, dosage and administration. Demethemoglobizants (methylen blue).
6. Complexions. Usage in intoxications with methods, cardiac glycosides and in overdosage with calcium salts.
7. The importance of functional antagonists in therapy of intoxications with inhibitors and excitants of CNS, cholinomimetics and convulcivant substances.
8. Recuperation (reanimation) and maintaining (intensive therapy) of body's physiologic functions in intoxications. Normalizing remedies of acido-basic equilibrium and their importance.
9. Methods of intensification of toxins elimination from the body (hemodilution, forced diuresis, alkanisation and acidification of urine, hemotransfusion, hemodyalisis, peritoneal dialysis, hemosorbtion).
10. Diseases and syndromes that need intensive therapy and reanimation. The main groups of substances used in such states.

11. Measures used in anaphylactic shock, hypo and hyperglycemic coma, lung edema and cerebral edema, bronchospasm.
12. Drug intoxications that bring about urinary retention. First aid measures.
13. Remedies used in psychomotor agitation and convulsions.
14. Treatment of acute hypotension and of hypertensive crisis.

E. Brief characteristics of the compulsory drugs:

Down: Drugs name. 1. Dimercaptol. 2. Furosemide. 3. Epinephrine chlorhidrate. 4. Prednisolone. 5. Strophantine. 6. Clonidine. 7. Insulin. 8. Glucose. 9. Trimeperidine. 10.Diazepam. 11. Magnesium sulphate.

Across: 1. Medicinal form. 2. Ways of administration. 3. Doses (maximum single, daily, therapeutically). 4. Mechanism of action. 5. Indications and contraindications. 6. Side-effects.

F. Questions with general and medical prescription.

Write out the following drugs in all possible medicinal forms: 1. Dimercaptol. 2. Furosemide. 3. Epinephrine chlorhidrate. 4. Prednisolone. 5. Strophantine. 6. Clonidine. 7. Insulin. 8. Glucose. 9. Trimeperidine. 10. Diazepam. 11. Magnesium sulphate.

Prescribe in (for): acid intoxications, abolishing of bronchospasm provoked by anticholinestherasic substances, abolishing of convulsions, intoxications with opioid analgesics, stimulation of heart activity, lung and cerebral edema, acceleration of toxin elimination, from body through kidneys, psychomotor excitation, acute hypotension, hypertensive crisis, hypoglycemic coma, hyperglycemic coma, cardiac glycosides intoxications.

G. Questions for self-training should be answered in written form while preparing for the lesson.

Test control

CHEMOTHERAPEUTIC DRUGS

A. Questions for self-training.

1. Antiseptic drugs definition, disinfectant and chemotherapeutic. Main principles of chemotherapy.
2. Classification of antiseptics and disinfectants.
3. Characterization of antiseptics from oxidants, dyes and salts of heavy

metal groups.

4. Characterization of antiseptics from the soaps and volatile oils groups.
5. Definition and classification principles of antibiotics (according to structure, mechanism and action spectrum)
6. Beta-lactam antibiotics classification.
7. Penicillins: classification, spectrum and mechanism of action, indications, side effects, dosage principles.
8. Cephalosporines: classification, spectrum and mechanism of action, indications, side effects. Peculiarities of cephalosporines of II and III generation.
9. Aminoglycosides: classification, spectrum and mechanism of action, indications, side effects.
10. Macrolides and lincozamines: spectrum and mechanism of action, indications, and side effects. Peculiarities of lincomycine and clindamycine.
11. Tetracyclines: classification, spectrum and mechanism of action, indications, side effects.
12. Chloramphenicol: spectrum and mechanism of action, indications, side effects.
13. Antibiotics of peptide group: classification, spectrum and mechanism of action, indications, and side effects.
14. Riphampicin: spectrum and mechanism of action, indications, side effects.
15. Antistafilococus antibiotics: classification and characteristics.
16. Bacterial resistance: forms mechanisms biochemical and genetically mechanisms, ways of treatment.
17. Principles for antibiotics association. Indications.
18. Sulfamides: classification, spectrum and mechanism of action, principles of dosage, indications, side effects.
19. Sulfamides combined: components, spectrum and mechanism of action, indications, and side effects.
20. Characteristics of nitrofuranol and 8-oxichinoline derivates.
21. Classification and characteristics of quinolone derivates.
22. Characteristics of quinoxaline and nitroimidazol derivates.
23. Antituberculosis remedies: classification, characteristics of group.
24. Antivirotics: classification, mechanism of action, indications.
25. Antispiroketous remedies: classification and characteristics.
26. Antimycotics: classification, characteristics of group.

27. Chemotherapy active remedies in protozoic disease classification.
28. Antimalarics: classification, characteristics of group.
29. Antiameobials: classification, characteristics.
30. Active chemotherapics, in trichomonadose and giardiose. Metronidazole, its characteristics.
31. Antihelmintics: classification, their characteristics.
32. Characteristics of antihelmintics active in hematodoses.
33. Active antihelmintics in cestodoses. Characteristics.
34. Active chemotherapics in diseases caused by gram-negative bacilli and asporogenic anaerobes (Bacteroides fragilis).

B. Questions with general and medical prescription.

Write out the following drugs in all possible medicinal forms: benzilpenicillin of sodium, benzatinbenzilpenicillin, ampiox, carbenicilline, cefalexine, cefazoline, cefotaxim, eritromycine, lincomycine, gentamycin, sisomycine, metacicline, chloramphenicol, rifampicin, ristomycine, fusidine, sulfacetamide, sulfalen, co-trimoxazol, nitrofural, furazolidon, metronidazol, nitroxoline, ofloxacine, izoniazide, chloroquine, interferon, mebendazol, levamizol, nystatin, cefuroxim, polimixin-M-sulphate, vancomycine, sulfate-hydol, sulfadimetoxine, ftalilsulfathyazol, nalidixic acid, nitrofurantoine, ciprofloxacine, dioxidine, furazolidone, cefepim, cefixim, tetracycline, green brilliant, chlorhexidine, chloramine B, ethacridine lactate, phormaldehide solution, bicilline-5, clindamycine, carfecilyne, doxicilline, aztreonam, silver nitrate, potassium permanganate, iodide alcohol, amicacine, viarabine, acyclovir, amantadine, zidovudine, clotrimazol, miconazol, terbinafine, amphotericine B, pyrantel, pirviniu pamoate, niclosamid, perchlorethilen, fluconazol, foscarnet, sulfasalasine, phenoxymethylpenicillin, cithylpiridine.

Indicate the remedies used in case of: gaseous gangrene; staphylococci infections; rheumatism prophylaxis; diseases caused by H.influenzae; diseases caused by Pseudomonas; diseases caused by Bacteriodes fragile; disease caused by Proteus; disease caused by E.coli; disease caused by Salmonella typhus; disease caused by Clebsiella; disease caused by Shigella; urinary infections; conjunctivitis; ulcerous nonspecific colitis; syphilis; trichomonadozis; ameobiasis; malaria; candidomicosis, dermatomicose; systemic mycoses; ascaridosis; enterobiosis; strongiloidosis, tricocephalosis; cestodosis; tuberculosis; viral infections.

REFERENCE LIST

1. Dobrescu D. Farmacoterapie practică (vol. I şi II). "Editura medicală", Bucureşti, 1989.
2. Ghicavîi V. şi colab. Farmacologie. Ediţia a II-a (revizuită şi completată). Chişinău, "Tipografia centrală", 2010.
3. Gonciar V. şi coautorii. Scurt dicţionar explicativ de termeni farmacologici. Chişinău, 1991.
4. Guţu N. Farmacotoxicologie. Chişinău, 1998.
5. Harchevici D.A. Farmacologie. Chişinău "Medicina", 2009.
6. Harchevici D.A. Îndreptar pentru lucrări de laborator farmacologie. Chişinău, 1993.
7. Markova I., Saleaev V. Farmacologie. Chişinău "Lumina", 1992.
8. Matcovschi C.L. Manual de receptură. Chişinău, 1992.
9. Stroescu V. Bazele farmacologice ale practicii medicale (vol I şi II). "Editura medicală", Bucureşti, 1995.
10. Бачинский Н.Г. и др. Фармакология (Методические рекомендации для самостоятельной работы студентов). Кишинёв, 1989.
11. Бочкарёв В., Мухин Е., Гикавый В.И. и др. Справочник участкового терапевта по фармакотерапии. Кишинёв, 1986.
12. Гикавый В.И., Бачинский Н.Г. Справочник симптоматических лекарственных средств. Кишинёв, 1995.
13. Гусель В.А., Маркова И.В. Справочник педиатра по клинической фармакологии. Москва, 1989.
14. Каркищенко Н.Н. Фармакологические основы терапии. М., 1996.
15. Харкевич Д.А. Фармакология. М., «ГЭОТАР МЕДИА», 2006, 2008
16. Маркова И.В., Калиничева В.И. Педиатрическая фармакология. М., «Медицина», 2002.
17. Маркова И.В., Саляев В.Н. Фармакология. Москва, «Медицина», 1988.
18. Машковский М.Д. Лекарственные средства, М., «ГЭОТАР МЕДИА», 2010.
19. Мухин Е.А. Методические рекомендации к лабораторным знаниям по фармакологии. (части I, II, III,), 1987.
20. Харкевич Д.А. Руководство к лабораторным занятиям по фармакологии. М., «ГЭОТАР МЕДИА», 2010.
21. H. P. Rang, M. M. Dale, J. M. Ritter, R. J. Flower, G. Henderson.

Rang & Dale's Pharmacology, 7th Edition, 2012.
22. Richard A. Harvey, Michelle A Clark, Richard Finkel, Jose A. Rey, Karen Whalen. Pharmacology (Lippincott's Illustrated Reviews Series). 5th edition, 2011.
23. Bertram G. Katzung, Susan B. Masters, Anthony J. Trevor. Basic and Clinical Pharmacology (Lange Basic Science). 12th edition, 2012.
24. Anthony Trevor, Bertram Katzung, Susan Masters. Katzung & Trevor's Pharmacology: Examination & Board Review. 9th edition 2010.
25. Amy M. Karch. 2011 Lippincott's Nursing Drug Guide