TOPIC 3

Basic concepts of Pharmacology. Pharmacokinetics of drugs.

Control questions:
1. Basic concepts of Pharmacology, definition and its contents. Pharmacokinetics of drugs, its main constituents.
2. Ways of administration of medicinal substances to an organism (classification, the comparative characteristic). Transdermal way of administration and it use.
3. Comparative characteristics of oral, sublingual, rectal, intranasal and inhalational ways of administration of medicinal substances, their advantages and disadvantages.
4. Comparative characteristics of parenteral ways of administration of medicinal substances. The requirements applied to medicinal forms for injections.
5. Advantages and lacks oral way of administration of medicinal substances. The main mechanisms of drug’s absorption. First-pass effect.
7. Elimination and its components. Half-life ($t\frac{1}{2}$) and clearance.
8. Biotransformation (definition, main steps and the factors changing metabolism). The characteristic of ways of excretion of drugs from an organism. Quantity indices of rate of drug elimination and its characteristic.
TOPIC 4

Basic principles of pharmacology. Pharmacodynamics.

Control questions:
1. Pharmacodynamics, its definition and the content. Types (mechanisms) of action of drugs, their brief characteristic.
2. Receptors. The mechanism of action of drugs, types of receptors. Drugs as agonists (including partial) and antagonists of receptors.
3. Interaction of drugs with specific receptors of biologically active substances. A role cyclic AMP, phosphoinositol and others secondary messengers in mechanisms of action of drugs.
4. The brief characteristic of the final pharmacological effects caused by drugs.
5. The characteristic local, reflex, systemic (resorbtive), selective and non-selective (protoplasmic) actions.
6. The characteristic of direct and indirect, reversible and irreversible, main and adverse (side) action.
10. Dependence of action of drugs on internal factors (age and a sex; a pathological condition of organism and the systems). Features drug’s action by older persons and children.
13. The phenomena developing at repeated application of drugs: tolerance, tachyphylaxis, a sensitization (allergy).
15. Kinds of medicinal therapy, their characteristic and use.
16. Adverse (side) action of drugs, its versions and the prevention.
17. Drug allergy (drugs illness), definition, clinic, diagnostics, the preventive measurements and the treatment.
18. The super infections caused by drugs (the causes, versions, treatment and preventive measurements).
TOPIC 5
DRUGS ACTING ON THE AFFERENT NERVOUS SYSTEM

I. Control questions:
1. Nervous system: main divisions and subdivisions. Afferent nervous system and its role. Classification of drugs acting on the afferent nervous system: a) drugs decreasing activity of the afferent nervous system (local anesthetics, astringent drugs, adsorbing drugs; b) drugs increasing activity of the afferent nervous system (counterirritating drugs).
2. Local anesthetics: definition, mechanism of action, classification (by chemical structure and by duration of action). Factors influencing on the effect of the local anesthetics. Resorbtive action of the local anesthetics.
3. Methods of the local anesthesia (topical anesthesia, infiltrative anesthesia, regional anesthesia). Distinctive features of the most known local anesthetics (procaine, lidocaine, tetracaine, cocaine, benzocaine, bupivacaine, ropivacaine, prilocaine, articaine).
4. Astringent drugs, absorbing drugs, counterirritant drugs (main representatives, mechanisms of action, application).

II. The main drugs of the topic:
procaine, lidocaine, tetracaine, cocaine, benzocaine, bupivacaine, ropivacaine, prilocaine, articaine, decoctum of Oak bark (decoctum corticis Quercus), silver nitrate, activated charcoal, menthol.

III. To prescribe next drugs:
1) 0,5 % solution of Procaine in bottles of 400 ml; for infiltrative anesthesia;
2) 1 % solution of Lidocaine in ampules of 10 ml; 10 – 20 ml for infiltrative anesthesia;
3) 2 % solution of Lidocaine in ampules of 10 ml; 10 ml intravenously in cardiac arrhythmias;
4) 0,5 % solution of Tetracaine (10 ml), for topical anesthesia in ophthalmology;
5) 5 % ointment of Benzocaine for topical application in skin inflammation;
6) 0,5 % solution of Bupivacaine in ampules of 1 ml; 1 ml for spinal anesthesia;
7) 400 ml of decoctum of Oak bark (decoctum cortices Quercus); for mouth washing in stomatitis;
8) activated charcoal (Carbo activatus) in tablets of 0,5 g; 2 – 4 tablets 2 times daily in flatulence or in diarrhoe.

Literature:
Lecture.
I. Control questions of the topic:

1. Anatomic and physiologic characteristic of the efferent nervous system and their subdivisions (somatic and autonomic nervous system). Parasympathetic and sympathetic nervous systems as subdivisions of the autonomic nervous system: anatomic and physiologic differences, effects.


4. M,N-cholinergic agonists: direct and indirect agonists (cholinesterase inhibitors), effects and clinical application.


The main drugs of the topic: pilocarpine, betanechol, carbachol, physostigmine, neostigmine, pyridostigmine, edrophonium, tacrine, echotiophate, pralidoxime.

III. To prescribe next drugs:

1) 10 g of eye ointment containing 1% of Pilocarpine; use into each eye 1 – 4 times daily;

2) Betanechol in tablets of 0,025 g; 25 mg 3 times daily;

3) 1,5 % solution of Carbachol; 1 drop into each eye 3 times daily;

4) Neostigmine in tablets of 0,015; 15 mg every 3 or 4 hours;

5) Pyridostigmine in tablets of 0,06; 60 mg every 3 – 6 hours;

6) 1% solution of Edrofonium in ampules of 1 ml; 10 mg intravenously for diagnostic of myasthenia gravis;

7) 0,25 % solution of Echothiophate as eye drops; 1 drop into each eye 2 times daily;

8) Tacrine in tablets of 0,01 g; 10 – 40 mg 4 times daily.

**Literature:**


Lecture 4 (and question 4,5 – in lecture 5).
TOPIC 7.
CHOLINERGIC ANTAGONISTS

I. Control questions:
2. Nicotinic antagonists – classification (ganglionic-blocking drugs and neuromuscular-blocking drugs). Ganglionic-blocking drugs: the main representatives, effects, application, adverse effects.

II. The main drugs of the topic: atropine, scopolamine, propantheline, pirenzepine, ipratropium, tropicamide, trimethaphan, hexamethonium, mecamylamine, tubocurarine, pipecuronium, pancuronium, atracurium, vecuronium, rapacuronium, mivacurium, succinylcholine (suxamethonium).

III. To prescribe next drugs and to indicate possible application:
1) 0,1 % solution of atropine in ampules of 1 ml; 0,5 – 1 mg (0,5 – 1 ml) subcutaneously;
2) 1 % solution of atropine for ophthalmic application; 1- 2 drops in each eye 1 – 2 times daily;
3) medication for prevention of motion sickness (scopolamine in capsules of 0,25 mg (0,00025 g); 1 capsule by mouth before a trip;
4) pirenzepine in tablets of 0,05 g (50 mg); 1 tablet two times daily;
5) ipratropium as an aerosol; 1 – 4 inhalations during asthma attack;
6) 5 % solution of trimethaphan in ampules of 1 ml; 50 mg (1 ml) for intravenous unfusion;
7) 1% solution of atracurium in ampules of 1 ml; 10 mg (1 ml) intravenously;
8) 2 % solution of suxamethonium in ampules of 1ml; 0,5 – 1 mg/kg intravenously.

Literature:
Lecture 5
TOPIC 8
ADRENERGIC AGONISTS

I. Control questions:
1. Brief characterization of adrenergic synapses. Biosynthesis of norepinephrine and its elimination from the synapse (metabolism, pre-synaptic and post-synaptic uptake).
2. Subtypes of adrenergic receptors (adrenoceptors): localization, effects.
3. Classification of adrenergic agonists. α,β-Adrenergic agonists: the main representatives, their effects and application.
4. α-Adrenergic agonists: the main representatives, effects and application.
5. β-Adrenergic agonists: classification (non-selective, selective β1- and selective β2-agonists), comparative characterization of their effects and application.
6. Dopamine receptors: localization and effects. Effects and application of dopamine and other dopaminergic agonists.

II. The main drugs of the topic: epinephrine, norepinephrine, ephedrine, phenylephrine, xylomethazoline, oxymethazoline, clonidine, isoprenaline (isoproterenol), dobutamine, albuterol (salbutamol), terbutaline, ritodrine, fenoterol, salmeterol, formoterol, dopamine, fenoldopam.

III. To prescribe and to indicate possible application:
1) 0,1% solution of Epinephrine in ampoules of 1 ml; 0,3 – 0,5 ml subcutaneously;
2) Ephedrine in tablets of 0,025 (25 mg); 25 mg (1 tablet) 2 – 3 times daily;
3) 0,1% solution of Norepinephrine in ampoules of 1 ml; to infuse intravenously with a rate of 0,2 - 1 mcg/kg/min;
4) 1% solution of Phenylephrine as eye drops; 1 drop into each eyes for dilation of pupil before examination of retina;
5) 0,1% solution of Xylomethazoline as nasal drops; 1 – 3 drops into each nostril every 8 – 10 hours;
6) 1,25 % solution of Dobutamine in vials of 20 ml; for intravenous infusion with a rate of 2 – 20 mcg/kg/min;
7) Salbutamol as an aerosol; 1 – 2 inhalation for relieving of asthma attack;
8) Ritodrine as tablets of 10 mg; 1 tablet every 4 – 6 hours.

Literature:
TOPIC 9
ADRENERGIC ANTAGONISTS

I. Control questions of the topic:
1. Alfa-adrenergic antagonists: classification, effects, differences between groups, application.
2. Beta-adrenergic antagonists: classification, therapeutic and adverse effects, differences between groups, application.
3. Alfa,beta-antagonists: the main representatives, application.
4. Sympatholytics (adrenergic neuron-blocking drugs): the main representatives, mechanism of action, effects and application.

II. The main drugs of the topic:
phenoxybenzamine, phentholamine, prazosin, terazosin, doxazosin, tamsulosin, propranolol, bisoprolol, pindolol, timolol, metoprolol, atenolol, labetalol, carvedilol, reserpine, guanethidine, metyrosine.

III. To prescribe and to indicate possible application:
1) Phenoxybenzamine in capsules of 10 mg; 10 – 20 mg once a day;
2) Prazosin in tablets of 1 mg; 0,5 – 1 mg 2 times daily (then the dose may be increased to 15 mg daily);
3) Tamsulosin in capsules of 0,4 mg; 0,4 mg once a day;
4) Propranolol in tablets of 40 mg; 20 – 40 mg 2 – 4 times daily;
5) 0,5 % solution of Timolol as eye drops; 1 drop in affected eye 2 times daily;
6) Metoprolol in tablets of 100 mg; 100 mg 1 – 2 times daily;
7) Pindolol in tablets of 5 mg; 5 mg 2 times daily;
8) 25% solution of Esmolol (10 mg/ml) in ampules of 10 ml; to dilute in 250 ml of physiologic solution and to infuse with the rate of 25 – 50 mcg/kg/min;
9) 0,5% solution of Labetalol in vials of 20 ml (5 mg/ml); 20 mg intravenously (slowly); 40 – 80 mg may be given after 10 min if needed;
10) Carvedilol in tablets of 3,125 mg; 3,125 mg 2 times daily with food; then the dose may be increased slowly to 25 mg 2 times daily.

Literature:
TOPIC 10. AUTACOIDS

I. Control questions of the topic:
1. Autacoids – definition, main representatives.
2. Histamine: physiological role, main subtypes of histamine receptors, effects of their activation.
3. Histamine antagonists: main subgroups, effects, application.
4. Serotonin (5-hydroxytryptamine): physiological role, main subtypes of serotonin receptors, effects of their application.
5. Agonists and antagonists of serotonin: the main representatives, effects, application.
6. Eicosanoids: definition, the main pathways of biosynthesis. The main effects of prostanoids and leukotriens.
7. Preparations of prostanoids and their application.
10. Nitric oxide donors and drugs increasing the effects of endogenous nitric oxide: main representatives, application.
11. Angiotensin II: biosynthesis, main effects.
12. Inhibitors of renine-angiotensin system: mechanisms of the action, application.
14. Other vasoactive peptides (natriuretic peptides, endothelin etc): effects, possible application in medicine.

II. The main drugs of the topic: diphenhydramine, loratadine, ranitidine, sodium cromoglicate (cromolyn), buspirone, sumatriptan, cisapride, cyproheptadine, ondansetron, dinoprost, dinoprostone, alprostadil, misoprostol, latanoprost, aspirin, nimesulid, zafirlukast, nitroglycerine, lovastatine, nebivolol, sildenafil (“Viagra”), enalapril, losartan, nesiritide, bosentan.

III. To prescribe and to indicate possible application:
1) Diphenhydramine in tablets of 50 mg; 1 tablet 4 – 6 times daily;
2) Loratadine in tablets of 10 mg; 1 tablet once a day;
3) Ranitidine in tablets of 150 mg; 1 tablet 2 times daily;
4) Sumatriptan in tablets of 50 mg; 1 tablet for relieving of migraine pain, another dose may be taken 2 hours later, do not take more then 200 mg daily;
5) Cyproheptadine in tablets of 4 mg; 1 tablet 3 times daily;
6) Ondansetron in tablets of 8 mg; 8 – 24 mg (1 – 3 tablets) for prevention of vomity before taking anticancer drug;
7) Dinoprost in suppositories of 20 mg; to insert 1 suppository to abort the pregnancy;
8) Misoprostol in tablets of 0,2 mg; 1 tablet 4 times daily;
9) Zafirlukast in tablets of 20 mg; 1 tablet 2 times daily, at least 1 hour before or 2 hours after meals;
10) Nebivolol in tablets of 5 mg; 1 tablet daily;
11) Sildenafil in tablets of 50 mg; 50 mg 1 hour before sexual act;
12) Enalapril in tablets of 5 mg; 5 mg 2 times daily; the dose may be increased to 40 mg daily divided into 2 doses.

Literature:
TOPIC 11
General anesthetics. Hypnotic drugs. The alcohols

I. Control questions of the topic.

1) General anesthesia: definition, main features. Preanesthetic medications.
2) Comparison of various inhalation and non-inhalation (intravenous) anesthetics.
3) Hypnotic drugs: definition and classification. Characterization of various groups of hypnotic drugs.
4) The rules and precautions during administration of hypnotic drugs. Drug abuse from prolonged using of hypnotics and acute poisoning by barbiturates (its features and treatment).
6) Pharmacotherapy of alcoholism.

II. The main drugs of the topic: nitrous oxide, halothane, enflurane, isoflurane, sevoflurane, thiopental, propofol, etomidate, ketamine, midazolam, fentanyl+droperidol, alprazolam, chlordiazepoxide, diazepam, lorazepam, flurazepam, triazolam, zolpidem, phenobarbital, diphenhydramine, disulfiram, apomorphine.

III. To prescribe next drugs:
1) Alprazolam (1 mg tablet): 1 mg at bedtime;
2) Chlordizepoxide (100 mg powder in ampules): 100 mg reconstitute by physiological saline and inject intravenously for the treatment of alcoholic delirium.
3) Triazolam (0.25 mg tablet): 1 mg at bedtime;
4) Diazepam (parenteral: 0.5% -2 ml); 2-4 ml intravenously for the treatment of convulsions.
5) Zolpidem (10 mg tablet): 10 mg at bedtime;
6) Phenobarbital (100 mg tablet): 100 mg at bedtime;
7) Disulfiram (antabuse, teturam) in tablets 500 mg. Take with alcohol according special schedule.
8) Thiamine (parenteral: 10%-1 ml): for intravenous injection several times daily.

Literature:
2. Lecture.
TOPIC 12
Opioid (narcotic) analgesics and non- narcotic analgesics.

I. Control questions of the topic.

7) Opioid (narcotic) analgesics, its mechanism of action.
8) Opioid analgesics, main features (on example of properties of morphine).
9) Classification and comparison of various opioid analgesics. Practical use of opioid analgesics.
10) Opioid analgesics overdosing – main features and treatment.
12) Non - opioid analgesics (Synonyms: non -narcotic analgesics, analgesics – antipyretics), its mechanism of action and clinical use. Main distinctions between opioid and non-opioid analgesics.

II. The main drugs of the topic: buprenorphine, fentanyl, meperidine, methadone, morphine (sulphate), pentazocine, propoxyphene, tramadol, naloxone, naltrexone, acetaminophen (paracetamol), ketorolac.

III. To prescribe next drugs:

1) Buprenorphine: 0.2 mg tabs. (1 – 2 tabs q 6 h sublingual);
2) Fentanyl: amp. 0. 005% -1 ml (2 – 3 mg/kg up to 50 mg IV).
3) Meperidine: amp. 1% -1 ml (1 – 1,8 mg/kg up to 150 mg IM);
4) Methadone: 5 mg tabs. (2,5 – 10 mg PO);
5) Morphine (sulphate): amp. 1% -1 ml (0,1 mg/kg up 2 – 4 mg/kg IV; 0,1 – 0,2 mg/kg up 15 mg IM or SC q 4 h);
6) Pentazocine: 50 mg tabs. (50 – 100 mg PO q 3 – 4 h);
7) ropoxyphene: 65 mg tabs. (65 mg PO q 4 h);
8) Tramadol: 50 mg tabs (50 – 100 mg PO q 4 – 6 h up 400 mg/day);
9) Naloxone: amp. 1 mg/ml (1-2 mg IV or IM);
10) Naltrexone: 65 mg tabs (50 mg PO once daily.
11) Acetaminophen (paracetamol): 325 mg tabs. (325 mg PO q 6 h);
12) Ketorolac: 10 mg tabs. (10 mg PO q 6 h);

Literature:

4. Lecture.
TOPIC 13

I. Control questions of the topic.

1. Epilepsy - essence of a pathology, the basic clinical forms, principles of pharmacologic management.
2. Antiseizure drugs (definition and classification). Mechanism of action and side effects of phenobarbital, phenytoin, carbamazepine, ethosuximide, clonazepam, valproic acid.
4. Parkinsonism: essence of pathology and approaches to its management.
5. Classification drugs for parkinsonism treatment, its mechanism of action. Features of action combined drugs ("Nacom", "Sinemet", etc.).

II. The main drugs of the topic: 1) phenobarbital, 2) phenytoin, 3) carbamazepine, 4) ethosuximide, 5) clonazepam, 6) valproic acid, 7) primidone, 8) diazepam, 9) lamotrigine, 10) levodopa, 11) bromocriptine, 12) selegiline, 13) tolcapone, 14) amantadine, 15) trihexyphenidyl, 16) cyclobenzaprine, 17) dantrolene, 18) baclofen, 19) tizanidine.

III. To prescribe the drugs under the following numbers (see above “The main drugs of the topic”): 1), 2), 3), 4), 5), 6), 8), 10), 11), 12) 15), 18).

Literature:

TOPIC 14
Psychotropic drugs: antipsychotic drugs, anxiolytic (sedative-hypnotic) drugs.

I. Control questions of the topic:
1. Psychotropic drugs: definition, main groups. The main groups of psychiatric disorders (psychoses and neuroses), different between them.
3. Therapeutic and adverse effects of antipsychotic drugs, application.
4. Distinctive features of different antipsychotic drugs. Comparison of typical and atypical antipsychotic drugs.
5. Anxiolytic (sedative-hypnotic) drugs: definition, classification, possible mechanisms of action.
6. Therapeutic and adverse effects, pharmacokinetic properties and possible application anxiolytics of benzodiazepine structure (benzodiazepine derivatives).
7. The main distinctive features of anxiolytics from the group of 5 HT_{1A} serotonin receptor agonists (buspirone).

II. The main drugs of the topic:
chlorpromazine, trifluoperazine, fluphenazine decanoate ("Moditen-depo"), prochlorperazine, haloperidol, droperidol, clozapine, olanzapine, risperidone, diazepam, chlor Diazepoxide, nitrazepam, oxazepam, lorazepam, triazolam, alprazolam, zolpidem, buspirone.

III. To prescribe and to indicate possible application:
1) Chlorpromazine (2.5 % solution) in ampules of 1 ml; 25 mg intramuscularly (IM) 2 – 4 times daily;
2) Trifluoperazine in tablets of 5 mg; 5 mg daily;
3) 2.5 % solution of Fluphenazine decanoate ("Moditen-depo") in ampules of 1 ml; 25 mg once for 1 – 4 weeks;
4) Thioridazine in tablets of 100 mg; 50 – 100 mg 1 – 3 times daily;
5) Clozapine in tablets of 25 mg; 12.5 – 25 mg 1 – 2 times daily;
6) Olanzapine in tablets of 5 mg; 5 – 10 mg once a day;
7) 0.5 % solution of Diazepam in ampules of 2 ml; 2 – 10 mg intravenously;
8) Chlor Diazepoxide in tablets of 5 mg; 5 mg 3 – 4 times daily;
9) Lorazepam in tablets; 1 – 3 mg 3 – 4 times daily;
10) Buspirone in tablets of 5 mg; 5 mg 2 – 3 times daily.
TOPIC 15.
Antidepressant drugs, normothymic (anti-manic, mood-stabilizing) drugs, psychostimulants, nootropic drugs.

I. Control questions of the topic:
4. Psychostimulants (psychomotor stimulants): definition, main representatives, their mechanisms of action, effects, possible application.
5. Nootropic drugs (psychometabolic stimulators): definition, main representatives, mechanisms of action, effects, possible application.

II. The main drugs of the topic: amitriptyline, imipramine, desipramine, protriptyline, maprotyline, amoxapine, trazodone, nefazodone, venlafaxine, mirtazapine, fluoxetine, sertraline, tranylcypromine, moclobemide, lithium carbonate, carbamazepine, sodium valproate, amphetamine, caffeine, pyracetam, gamma-aminobutyric acid.

III. To prescribe and to indicate possible application:
1) Amitriptyline in tablets of 25 mg; 25 mg 2 – 4 times daily; the dose may be increased gradually to 150 mg a day;
2) Imipramine in tablets of 25 mg; 25 mg 3 – 4 times daily; the dose may be increased gradually to 200 mg a day;
3) Desipramine in capsules of 25 mg; 100 – 200 mg a day; the dose may be increased gradually to 300 mg a day;
4) Trazodone in tablets of 50 mg; 50 mg 3 times daily;
5) Venlafaxine in tablets of 75 mg; 75 mg a day; the dose may be gradually increased to 225 mg a day;
6) Fluoxetine in tablets of 20 mg; 20 mg once a day;
7) Moclobemide in tablets of 150 mg; 150 mg 2 times daily; the dose may be gradually increased to 600 mg a day;
8) Lithium carbonate in tablets of 300 mg; 300 – 600 mg 3 times daily after the meal.

Literature:
CONCLUDING CLASS 1
DRUGS ACTING ON THE NERVOUS SYSTEM
The task for the class

1. To prepare the next questions:

1. Local anesthetics: definition, mechanism of action, classification (by chemical structure and by duration of action). Factors influencing on the effect of the local anesthetics. Resorbtive action of the local anesthetics.
2. Ways of application of the local anesthesia (kinds of anesthesia). Distinctive features of the most known local anesthetics.
3. Biosynthesis and metabolism of acetylcholine. Classification and localization of cholinergic receptors.
5. M, N-cholinergic agonists: direct and indirect agonists (cholinesterase inhibitors), effects and clinical application.
7. M-cholinergic antagonists (M-cholinoblockers): the main representatives, pharmacologic effects, application, adverse effects and contraindication. Distinctive features of specific agents.
9. Ganglionic-blocking drugs: the main representatives, effects, application, adverse effects.
12. α, β-Adrenergic agonists: the main representatives, their effects and application. Comparison of epinephrine and norepinephrine.
13. α-Adrenergic agonists: the main representatives, effects and application.
15. Alfa-adrenergic antagonists: classification, effects, differences between groups, application.
16. Beta-adrenergic antagonists: classification, therapeutic and adverse effects, differences between groups, application.
17. Histamine: physiological role, main subtypes of histamine receptors, effects of their activation. Histamine antagonists: main subgroups, effects, application.
19. Eicosanoids: definition, the main pathways of biosynthesis. The main effects of prostanoids and leucotriens. Preparations of prostanoids and their application.
23. General anesthesia: definition, main features. Preanesthetic medications. Comparison of various inhalation and non-inhalation (intravenous) anesthetics.


27. Distinctive features of different antipsychotic drugs. Comparison of typical and atypical antipsychotic drugs.

28. Opioid (narcotic) analgesics: mechanism of action, classification. The main pharmacologic effects of morphine and other strong agonists of opioid receptors.


36. Psychostimulants (psychomotor stimulants) and nootropic drugs (psychometabolic stimulators: definition, main representatives, their mechanisms of action, effects, possible application.

2. To prescribe and to indicate possible application for the next drugs:

1) solution of Procaine in vials for infiltrative anesthesia;
2) solution of Lidocaine in ampules for IV injections;
3) ointment of Benzocaine;
4) decoctum of Oak bark;
5) activated Charcoal in tablets;
6) Pilocarpine as eye ointment;
7) Betanechol in tablets;
8) solution of Carbachole as eye drops;
9) Neostigmine in tablets;
10) solution of Edrofonium in ampules;
11) solution of Echothiophate as eye drops;
12) solution of Atropine in ampules;
13) solution of Atropine as eye drops;
14) Pirenzepine in tablets;
15) Ipratropium as an aerosol;
16) solution of Atracurium in ampules;
17) solution of Epinephrine in ampules;
18) solution of Norepinephrine in ampules;
19) solution of Phenylephrine as eye drops;
20) solution of Dobutamine in ampules;
21) Salbutamol as aerosol;
22) Phenoxybenzamine in capsules;
23) Prazosin in tablets;
24) Propranolol in tablets;
25) Metoprolol in tablets;
26) solution of Timolol as eye drops;
27) Carvedilol in tablets;
28) Loratadine in tablets;
29) Ranitidine in tablets;
30) Sumatriptan in tablets;
31) Ondansetron in tablets;
32) Dinoprostone in suppositories;
33) Sildenafil in tablets;
34) Alprazolam in tablets;
35) Chlorpromazine in ampules;
36) Methadone in tablets;
37) Tramadol in tablets;
38) solution of Naloxone in ampules;
39) Naltrexone in tablets;
40) Ketorolac in tablets;
41) solution of Diazepam in ampules;
42) Buspirone in tablets;
43) Amitriptyline in tablets;
44) Imipramine in tablets;
45) Olanzapine in tablets;
46) solution of Diazepam in ampules;
47) Trazodone in tablets;
48) Fluoxetine in tablets;
49) Moclobemide in tablets;
50) Lithium carbonate in tablets.

3. To indicate the main representatives of the next pharmacologic groups:
1) local anesthetics;
2) astringent, adsorbing and counterirritating drugs;
3) M-cholinergic agonists and directly acting M, N-cholinergic agonists;
4) indirectly acting M, N-cholinergic agonists (cholinesterase inhibitors);
5) M-cholinergic antagonists;
6) ganglionic-blocking drugs;
7) neuromuscular-blocking drugs;
8) alpha, beta-adrenergic agonists;
9) alpha-adrenergic agonists;
10) beta-adrenergic agonists, dopamine agonists;
11) alpha-antagonists and alpha, beta-antagonists;
12) histamine antagonists;
13) serotonin agonists and antagonists;
14) prostanoids and their antagonists;
15) inhibitors of rennin-angiotensin system;
16) drugs which increase effects of nitric oxide;
17) general anesthetics (inhalational and intravenous);
18) hypnotic drugs;
19) drugs for the treatment of alcoholism;
20) opioid analgesics and their antagonists;
21) non-opioid analgesics;
22) antiepileptic drugs;
23) antiparkinsonic drugs;
24) drugs for the treatment of spasticity (skeletal muscle relaxants);
25) antipsychotic drugs (neuroleptics);
26) anxiolytic drugs;
27) antidepressants;
28) normothymic (mood-stabilizing, antimanic drugs);
29) psychostimulants (psychomotor stimulants);
30) nootropic drugs (psychometabolic drugs).
TOPIC 16
Diuretics. Drugs acting on myometrium

I. Control question of topic:
1. The main physiologic processes occurring in different parts of nephron. Classification of diuretic drugs, sites of action of the main groups of diuretic drugs.

2. Brief characterization of the main groups of diuretics (carbonic anhydrase inhibitors, loop diuretics, thiazide diuretics, K⁺-sparing diuretics, osmotic diuretics) by their mechanisms of action, efficacy, influence on electrolyte balance, adverse effects and application.

3. Classification of drugs acting on myometrium, possible application of groups.

II. The main drugs of the topic: acetazolamide, furosemide, bumetanide, etacrynic acid, hydrochlorothiazide, chlorothiazide, chlorothalidone, indapamide, triamterene, amiloride, spironolacton, mannitol, oxytocine, dinoprostone, dinoprost, fenoterol, ritodrine.

III. To prescribe and to indicate possible application:
1) Hydrochlorothiazide in tablets of 25 mg; 25 – 100 mg 1 – 2 times daily;
2) Chlorthalidone in tablets of 25 mg; 25 – 100 mg once a day;
3) solution of Furosemide 1 % (10 mg/ml) in ampules of 2 ml; 20 – 40 mg IV;
4) Acetazolamide in tablets of 250 mg; 250 mg 1 – 4 times daily;
5) Triamterene in tablets of 100 mg; 100 mg twice a day;
6) Spironolacton in tablets of 25 mg; 50 – 200 mg daily (as a single dose or divided into 2 – 4 doses);
7) Oxytocin in ampules of 1 ml (10 units); 10 units slowly IV;
8) solution of Ergonovine 0,2 mg/ml (0,02 %) in vials of 1 ml; 0.2 mg IM or IV; this dose can be repeated up to five times if needed, with a two- to four-hour wait between doses.

Literature:
Topic 17
Antihypertensive drugs (= drugs for treatment of arterial hypertension).
Antihypotensive drugs.

I. Control questions of the topic.
2) Classification of drugs that alter sympathetic nervous system function (to specify pharmacological groups and its main representatives), main pharmacokinetic and pharmacodynamic properties (including the mechanism of action and side effects).
3) Drugs that alter sodium and water balance (to specify pharmacological groups and its main representatives), main pharmacokinetic and pharmacodynamic properties (including the mechanism of action and side effects).
4) Vasodilators (to specify pharmacological groups and its main representatives), main pharmacokinetic and pharmacodynamic properties (including the mechanism of action and side effects).
5) Inhibitors of angiotensin (to specify pharmacological groups and its main representatives), main pharmacokinetic and pharmacodynamic properties (including the mechanism of action and side effects).
6) Management of hypertensive crisis (for emergency and urgent treatment).
7) Management of chronic and acute hypotensive states.

II. The main drugs of the topic: 1) propranolol, 2) metoprolol, 3) atenolol, 4) clonidine, 5) metyldopa, 6) guanethidine, 7) reserpine, 8) prazosin, 9) diazoxide, 10) fenoldopam, 11) hydralazine, 12) minoxidil, 13) nitroprusside, 14) verapamil, 15) nifedipine, 16) amlodipine, 17) hydrochlorothiazide, 18) enalapril, 19) captopril, 20) losartan, 21) phenylephrine, 22) midodrine.

III. To prescribe the following drugs (and to write for each one main clinical indication):
1. Propranolol (40 mg tablets; Orally 40 mg bid);
2. Metoprolol (100 mg tablets; Orally 100 mg qd);
3. Clonidine (0.3 mg tablets; Orally 0.3 mg for hypertensive crisis - urgent treatment);
4. Reserpine (0.25 mg tablets; Orally 0.5 mg qd during 2 weeks);
5. Prazosin (1mg capsules; Orally 1 mg bid);
6. Fenoldopam (10 mg./ml ampoules; For intravenous infusion);
7. Verapamil (120 mg tablets; Orally 120 mg bid);
8. Amlodipine (10 mg tablets; Orally 10 mg qd);
9. Hydrochlorothiazide (25 mg tablets; Orally 25 mg qd);
10. Enalapril (10 mg tablets; Orally 20 mg qd);
11. Losartan (100 mg tablets; Orally 100 mg qd);
12. Midodrine (5 mg tablets; Orally 5 mg bid);

TOPIC 18
Drugs for the treatment of the coronary artery disease (ischemic heart disease) and other local vascular disorders

I. Control question of topic:
1. Coronary artery disease (ischemic heart disease): definition, the main forms. Drugs for the treatment of angina pectoris (antianginal drugs): the main groups (nitrates, Ca++ channel blockers, beta-antagonists, other groups), their mechanisms of action in angina pectoris, side effects.

2. Treatment of myocardial infarction: the main groups of drugs, mechanisms of their beneficial effects in myocardial infarction.

3. The main forms of brain vascular disorders (stroke, migraine), the main drugs for their treatment.

II. The main drugs of the topic: nitroglycerin, isosorbide mononitrate, isosorbide dinitrate, verapamil, diltiazem, nifedipine, amlodipine, nitrendipine, nicardipine, nimodipine, propranolol, metoprolol, bisoprolol, aspirin, flunarizine, pentoxyfilline, sumatriptan, ergotamine.

III. To prescribe and to indicate possible application:
1) Nitroglycerine as sublingual tablets of 0,6 mg; 1 tablet sublingually for relieving of angina attack;

2) Oral sustained-release tablets of nitroglycerine (“Nitrong”) of 2,6 mg; 1 -3 tablets every 8 – 12 hours;

3) 2 % ointment of nitroglycerine in tubes of 30 g; 1 -2 inches on the skin every 6 – 8 hours;

4) Isosorbide mono-nitrate in tablets of 20 mg; 5 – 40 mg 2 times daily;

5) Nifedipine in capsules of 10 mg; 10 mg 3 times daily;

6) Amlodipine in tablets of 5 mg; 5 – 10 mg once a day;

7) Metoprolol in tablets of 50 mg;

8) Nimodipine in capsules of 30 mg; 60 mg every 4 hours;

9) Flunarizine in capsules of 10 mg; 10 mg once a day

Literature:
TOPIC 19
Drugs for the treatment of congestive heart failure

I. Control question of the topic:
1. Congestive heart failure: definition, the main pathogenetic mechanisms; the role of sympathetic nervous system and renin-angiotensin system in the pathogenesis of the congestive heart failure. Pathogenetic variants of the congestive heart failure (systolic and diastolic dysfunction).
2. The main approaches for the treatment of the congestive heart failure, pharmacological groups for realizing of this approaches.
3. Cardiac glycosides: definition, main drugs and plants containing them. Mechanism of action and main pharmacologic effects of the cardiac glycosides. Pharmacokinetic properties of the main cardiac glycosides.
5. Brief characterization of other drugs with positive inotropic action (phosphodiesterase inhibitors, beta-1 adrenergic agonists).
6. Other drugs which are used for the treatment of the congestive heart failure (ACE inhibitors, diuretics, beta-adrenergic antagonists, vasodilators), mechanisms of their beneficial action in the congestive heart failure.

II. The main drugs of the topic: digoxin, digitoxin, ouabaine (strophanthine), amrinone, milrinone, dopamine, dobutamine, captopril, enalapril, trandolapril, losartan, hydrochlorothiazide, furosemide, spironolactone, carvedilol, nitroglycerine, hydralazine, nesiritide

III. To prescribe and to indicate possible application:
1) Digitoxin in tablets of 0,05 mg; 0,05 – 0,2 mg daily;
2) Digoxin in tablets of 0,25 mg; 0,125 – 0,5 mg daily;
3) 0,5 % solution of Amrinone in ampules of 20 ml; 0,75 mg/kg IV over 2 – 3 min, followed by infusion of 5 – 15 mcg/kg/min;
4) Trandolapril in tablets of 2 mg; 2 mg once a day, then dose may be increased to 4 mg;
5) Spironolacton in tablets of 25 mg; 50 – 200 mg daily (as a single dose or divided into 2 – 4 doses);
6) Carvedilol in tablets of 3,125 mg; 3,125 mg 2 times daily with food; then the dose may be increased slowly to 25 mg 2 times daily.

Literature:
TOPIC 20
Antiarrhythmic drugs.

I. Control questions:

1. Classification of antiarrhythmic drugs for tachyarrhythmia treatment (classification of Vaughan-Williams, with the list of main drugs).

2. Main drugs for tachyarrhythmia treatment, its pharmacodynamic and pharmacokinetic properties.

2. The main drugs for the treatment of supraventricular and ventricular arrhythmias.

3. Bradyarrhythmias, their characteristic and directions in their elimination (names of drugs and their role).

II. The main drugs of the topic: 1) quinidine, 2) procainamide, 3) lidocaine, 4) mexiletine, 5) propafenone, 6) propranolol, 7) esmolol, 8) amiodaron, 9) bretylium, 10) sotalol, 11) verapamil, 12) atropine [sulfate], 13) isoprenaline [isoproterenol], 14) adenosine, 15) digoxin, 16) disopyramide.

III. To prescribe drugs (from part 2 – see above) 1; 2; 3; 5; 6; 8; 10; 11; 13; 15; 16.
TOPIC 21
Drugs acting on the respiratory system

I. Control questions:

1. Antitussive drugs: classification on the mechanism of action (with the name of preparations for treatment of cough).
2. Expectorants: definition, classification (on the mechanism of action), application.
3. Directions of pharmacotherapy of patients with a syndrome of bronchial obstruction: a choice of preparations for treatment of bronchial asthma and chronic obstructive pulmonary disease.
4. The asthmatic status (definition, directions of pharmacotherapy).

II. The basic preparations of the topic: 1) prenxdiazin (libexin), 2) codeine, 3) dextromethorphan, 4) ambroxol, 5) carbocystein, 6) guaifenezin, 7) Infusum herbae Thermopsidis, 8) salbutamol, 9) salmeterol, 10) theophyllin, 11) aminophyllin, 12) ipratropium (Atrovent), 13) cromolin - sodium, 14) beclomethasone, 15) zafirlukast, 16) prednisolone; 17) Tab. “Theophedrin”.

III. To prescribe the following drugs:
Prenoxdiazin (libexin): 100 mg tabl. (100 mg tid);
Dextromethorphan (in syrup “Tussin Plus”): 1 teaspoon before eating tid;
Guaifenesin (in syrup “Tussin”): 1 teaspoon before eating tid;
Salbutamol (aerosol);
Cromolin-sodium: 1 caps. (20 mg) qid;
Beclomethasone (aerosol);
Zafirlukast: tab. 20 mg (1 tab. qid);
Tab. “Theophedrin” (1 tab. tid);
Ipratropium (Atrovent) (aerosol).
TOPIC 22
 Drugs acting on gastrointestinal tract

I. Control questions
1. The drugs used at disturbances of appetite.
2. The drugs used at insufficient secretory function of stomach.
3. The drugs used for treatment of peptic ulcer disease (PUD). Principles of therapy, classification of preparations and the mechanism and actions.
4. The drugs used at insufficient and excessive secretory function of pancreas. The pathogenetic therapy of acute pancreatitis.
5. Drugs used in disturbances of bile secretion and treatment of gallstone colic.
6. Hepatoprotectors: definition and application.
7. Laxative drugs (definition, classification, the mechanism of action, the indication for use).
9. Emetic and antiemetic drugs (definition, classification, indications to use).


III. Prescribe the following drugs: 1), 2), 3), 4), 6), 8), 9), 13), 16), 17), 19.
TOPIC 23
Drugs acting on the blood

I. Control question of the topic:
1. The main physiologic aspects of hemostasis and fibrinolysis. Classification of drugs acting on hemostasis (antithrombotic and hemostatic drugs).
2. Antiplatelet drugs: definition, the main representatives, mechanisms of action, possible application, adverse effects.
3. Anticoagulant drugs: definition, classification (directly-acting and indirectly-acting anticoagulants), mechanisms of action, pharmacokinetic properties, possible application, adverse effects. Drugs used in overdosing of directly-acting and indirectly-acting anticoagulants.
4. Thrombolytic (fibrinolytic) drugs: definition, the main representatives and their distinctive features, mechanisms of action, possible application.
5. Drugs for the treatment of bleeding disorders (hemostatic drugs): the main groups and their representatives, mechanisms of action, possible application, adverse effects.
6. The main physiologic aspects of hematopoiesis, the main kinds of disorders of hematopoiesis. Classification of drugs acting on hematopoiesis.
8. B₁₂ (folate)-deficient anemias – the main causes, principles of therapy. Mechanism of influence of cyanocobalamin and folic acid on hematopoiesis.

II. The main drugs of the topic: aspirin, clopidogrel, ticlopidine, abciximab, tirofiban, heparin, enoxaparin, lepirudin, argatroban, warfarine, rivaroxaban, streptokinase, urokinase, tissue plasminogen activator (alteplase), anistreplase, phytonadione, aminocaproic acid, tranexamic acid, ferrose sulfate, iron dextran, cyanocobalamine, folic acid, epoetin alfa, sargramostim, filgrastim.

III. To prescribe and to indicate possible application:
1) Aspirin as an antiplatelet drug in tablets of 325 mg; 1 tablet per day;
2) Clopidogrel in tablets of 75 mg; 1 tablet per day;
3) Heparin in vials of 5 ml (5000 units/ml): 75 – units/kg IV every 4 hour;
4) Lepiruin in vials (50 mg powder for injection); to dissolve in sterile water for injection, IV slowly 0,4 mg/kg.
5) Warfarin in tablets of 5 mg; 1 – 2 tablets daily.
6) Rivaroxaban in tablets of 10 mg; 1 tablet quid;
7) Streptokinase in vials of 250000 units; 250000 units IV as a bolus, followed by continuous infusion of 100000 units/h;
8) Tissue plasminogen activator (alteplase) in vials of 100 mg; to dissolve in sterile water for injections, IV 100 mg.
9) Solution of Aminocaproic acid (250 mg/ml) in vials of; 5 g IV;
10) Ferrous sulfate in tablets of 325 mg; 3-4 tablets daily;
11) Solution of Iron dextran (50 mg/ml) in vials of 2 ml; 100 mg IV 1 – 3 times per week.
12) 0,1 % solution of Cyanocobalamine in ampules of 1 ml; 1 mg (1 ml) IM daily for 1 – 2 week; then 1 mg IM once a month;
13) Sargramostim in vials of 500 mcg; to dissolve in sterile water and to give IV in a dose 250 mcg/m²/day.
To prepare the next questions:

2. Expectorants: definition, classification (on the mechanism of action), application.
3. Directions of pharmacotherapy of patients with a syndrome of bronchial obstruction: a choice of preparations for treatment of bronchial asthma and chronic obstructive pulmonary disease.
4. The asthmatic status (definition, directions of pharmacotherapy).
7. Classification of hypotensive drugs that alter sympathetic nervous system function (to specify pharmacological groups and its main representatives), main pharmacokinetic and pharmacodynamic properties (including the mechanism of action and side effects).
8. Hypotensive drugs that alter sodium and water balance (to specify pharmacological groups and its main representatives), main pharmacokinetic and pharmacodynamic properties (including the mechanism of action and side effects).
9. Vasodilatators (to specify pharmacological groups and its main representatives), main pharmacokinetic and pharmacodynamic properties (including the mechanism of action and side effects).
10. Inhibitors of angiotensin (to specify pharmacological groups and its main representatives), main pharmacokinetic and pharmacodynamic properties (including the mechanism of action and side effects).
13. The drugs used at disturbances of appetite.
15. The drugs used at insufficient and excessive secretory function of pancreas. The pathogenetic therapy of acute pancreatitis.
16. Drugs used in disturbances of bile secretion and treatment of gallstone colic.
17. Hepatoprotectors: definition and application.
18. Laxative drugs (definition, classification, the mechanism of action, the indication for use).
20. Emetic and antiemetic drugs (definition, classification, indications to use).
21. Classification of antiarhythmic drugs for tachyarrhythmia treatment (classification of Vaughan-Williams, with the list of main drugs).
22. Main drugs for tachyarrhythmia treatment, its pharmacodynamic and pharmacokinetic properties.
23. The main drugs for the treatment of supraventricular and ventricular arrhythmias.
24. Bradycardias, their characteristic and directions in their elimination (names of drugs and their role).
25. Diuretic drugs, brief characterization of the main groups of diuretics by their mechanisms of action, efficacy, influence on electrolyte balance, adverse effects and application.
26. Classification of drugs acting on myometrium, possible application of groups.
27. Drugs for the treatment of angina pectoris (antianginal drugs): the main groups, their mechanisms of action in angina pectoris, side effects.
28. Treatment of uncomplicated myocardial infarction: the main groups of drugs, mechanisms of their beneficial effects in myocardial infarction.
29. Treatment of migraine: the main drugs for relieving and prevention of migraine attacks.
30. Drugs for the treatment of disturbances of peripheral and cerebral blood flow.
31. Hypolipidemic drugs: definition, the main representatives, mechanisms of their action.
32. The main approaches for the treatment of the congestive heart failure, main pharmacological groups and their representatives, mechanisms of their beneficial action.
33. Cardiac glycosides: definition, main drugs. Mechanism of action and main pharmacologic effects of the cardiac glycosides. Pharmacokinetic properties of the main cardiac glycosides.
34. Intoxication by cardiac glycosides: predisposing factors, symptoms, treatment.
35. Platelet aggregation inhibitors: definition, the main representatives, mechanisms of action, possible application, adverse effects.
36. Anticoagulant drugs: definition, classification, mechanisms of action, pharmacokinetic properties, possible application, adverse effects. Drugs used in overdosing of anticoagulants.
37. Thrombolytic (fibrinolytic) drugs: definition, the main representatives and their distinctive features, mechanisms of action, possible application.
38. Drugs for the treatment of bleeding disorders (hemostatic drugs): the main groups and their representatives, mechanisms of action, possible application, adverse effects.
39. Iron-deficient and B_{12}- (folate-) deficient anemias: the main causes, drugs for treatment, mechanisms of their action, principles of administration, adverse effects.
40. Hematopoetic growth factors – main preparations and their application.

2. To prescribe and to indicate possible application for the next drugs:
   1. Dextromethorphan (in syrup “Tussin Plus”);
   2. Guaifenesin (in syrup “Tussin”);
   3. Salbutamol (aerosol);
   4. Cromolin-sodium: in caps.;
   5. Beclomethasone (aerosol);
   6. Zafirlukast: in tab.;
   7. Tab. “Theophedrin”;
   8. Ipratropium (Atrovent) (aerosol).
   9. Metoprolol in tab.;
   10. Clonidine in tab.;
   11. Reserpine in tab.;
   12. Prazosin in tab.;
   13. Fenoldopam in ampoules;
   14. Verapamil in tab.;
   15. Hydrochlorothiazide in tab.;
   16. Enalapril in tab.;
   17. Losartan in tab.;
   18. Midodrine in tab.;
19. Quinidine in tab.;
20. Procainamide in ampoules;
21. Lidocaine in ampoules;
22. Propafenone in tab.;
23. Esmolol in ampoules;
24. Amiodaron in tab.;
25. Sotalol in tab.;
26. Verapamil in ampoules;
27. Atropine [sulfate] in ampoules;
28. Isoprenaline [isoproterenol] in tab.,
29. Digoxin in tab.;
30. Sibutramin in tab.;
31. Cyproheptadine in tab.;
32. Almagel;
33. Ranitidine in tab.;
34. Pirenzepine in tab.,
35. Omeprazole in tab.;
36. Sucralfat in tab.;
37. Tab. "Mezym";
38. Aprotinin in ampoules;
39. Tab. “Allochol”,
40. Drotaverine (No -Spa) in tab.;
41. Caps. “Essenciale”;
42. Bisacodyl in tab.;
43. Loperamide in tab.;
44. Apomorphine hydrochloride in ampoules;
45. Metoclopramide in tab.;
46. Spironolacton in tab.;
47. Furosemide in ampoules;
48. Oxytocin in ampoules;
49. Ergonovine in tab.;
50. Nitroglycerine as sublingual tablets;
51. Oral sustained-release tablets of nitroglycerine;
52. Amlodipine in tab.;
53. Aspirin in tablets as an antiplatelet drug;
54. Clopidogrel in tablets;
55. Heparin in vials;
56. Streptokinase in vials;
57. Ferrous sulfate in tablets;
58. Cyanocobalamine in ampoules;
59. Sargramostim in vials;
60. Warfarin in tab.

3. To indicate the main representatives of the next pharmacologic groups:
   a. Antitussive drugs and expectorants
   b. Preparations for treatment of bronchial asthma
   c. Hypotensive (antihypertensive) drugs
   d. Drugs used at disturbances of appetite and hepatoprotectors.
   e. The drugs used for treatment of peptic ulcer disease (PUD).
   f. The drugs used at insufficient and excessive secretory function of pancreas.
   g. Diarrhea treatment and drugs used in disturbances of bile secretion.
   h. Laxative drugs.
   i. Emetic and antiemetic drugs.
   j. Antiarrhythmic drugs.
   k. Drugs for treatment of congestive heart failure (CHF).
   l. Antianginal drugs.
   n. Antiatherosclerotic drugs.
   o. Diuretic drugs.
   p. Drugs influencing on uterus.
   q. Platelet aggregation inhibitors
   r. Anticoagulants.
   s. The drugs promoting a stop of bleedings and the drugs influencing on fibrinolysis.
   t. Drugs for treatment of anemia and leucopenia.
TOPIC 24
Hormones of polypeptide structure and aminoacid derivatives, their synthetic analogs and antagonists

I. Control question of the topic:
2. Thyroid hormones – effects and application. Antithyroid drugs – mechanism of action, application, adverse effects.
3. Calcitonin, parathyroid hormone, synthetic drugs influencing calcium balance – mechanisms of action, application.
5. Oral antidiabetic (hypoglycemic) drugs: the main groups, mechanisms of action, adverse effects.
6. Urgent situations in diabetes mellitus (ketoacidotic and hypoglycemic coma) and their treatment.

II. The main drugs of the topic: sermoreline (somatotropin-releasing hormone), octreotide, pegvisomant, goserel, leuprolide, bromocriptine, somatropin (growth hormone), urofollitropin (follicle-stimulating hormone), human chorionic gonadotropin (luteinizing hormone), danazole, ganirelix, oxytocin, desmopressin, melatonin, levothyroxine, methimazole, potassium iodide, salmon-calcitonin (myacalcin), calcitriol, alendronate, teriparatide, insulin, chlorpropamide, glyburide, glimepiride, nateglinide, metformin, pioglitazone, acarbose, sitagliptin, exenatide.

III. To prescribe and to indicate possible application:
1) Depot preparation of Octreotide (Sandostatin Depot) in vials containing 20 mg; to dissolve in adding diluent, 20 mg IM once per 4 week;
2) Somatropin in vials containing 10 mg; to dissolve in adding diluent, 0,025 – 0,045 mg/kg daily SC or IM;
3) Bromocriptine in tablets of 2,5 mg; 2,5 – 7,5 mg daily (after the evening meal);
4) Desmopressin in tablets of 0,2 mg; 0,1 – 0,2 mg every 12 – 24 h;
5) Melaton in tablets of 1 mg; 1 tablet before a bed-time;
6) Levothyroxine in tablets of 0,025 mg; to start with 0,0125 – 0,025 mg daily, then to increase by 0,025 mg every 2 week until euthyroidism or drug toxicity will be observed;
7) Methimazole in tablets of 5 mg; 5 – 15 mg once daily;
8) solution of Salmon-Calcitonin (Miacalcin, 200 units/ml) in vials of 2 ml; 100 units/day SC or IM;
9) Alendronate in tablets of 70 mg; 1 tablet weekly;
10) Short-acting insulin preparation (solution of Humulin Regular 100 units/ml in vials of 10 ml; 10 – 20 units IV in ketoacidotic coma, followed by continuous infusion of 10 units/h);
11) Long-acting insulin preparation (suspension of Insulin ultralente 100 units/ml in vials of 10 ml; for SC injections);
12) Glyburide in tablets of 10 mg; 5 – 10 mg once a day (in the morning);
13) Metformin in tablets of 500 mg; 500 mg once a day (with breakfast).
TOPIC 25
Steroidal hormones, their synthetic analogs and antagonists

I. Control question of the topic:
1. The main groups of steroidal hormones, their mechanisms of action.
2. Estrogen hormones: natural hormones and their physiologic effects, synthetic analogs of estrogen hormones and their distinctive feature. Possible application of the estrogens, adverse effects.
3. The main physiologic effects of progesterone, synthetic analogs of progesterone and their distinctive features. Possible application of progestins, adverse effects.
4. Antagonists of estrogens and progesterone, their possible application.
5. Oral contraceptive drugs: the main groups, mechanisms of action, administration, adverse effects.
6. Androgen hormones: natural hormones and their physiologic effects, synthetic analogs of the androgens, its possible application, adverse effects.
7. Androgen antagonists and their application.
8. Glucocorticoids: natural hormones and their synthetic analogs, the main effects, comparison of natural and synthetic glucocorticoids, application and adverse effects.
9. Mineralocorticoids, their effects and application. Antagonists of glucocorticoids and mineralocorticoids, their application.

II. The main drugs of the topic: estrone, estradiol, conjugated estrogens, ethinyl estradiol, mestranol, progesterone, hydroxyprogesterone, medroxyprogesterone, dimethisterone, desogestrel, L-norgestrel, clomifen, tamoxifen, mifepristone, testosterone, methyltestosterone, nandrolone, flutamide, bicalutamide, cyproterone, abiraterone, finasteride, hydrocortisone, prednisolone, triamcinolone, dexamethazone, betamethazone, fludrocortizone, methyrapone, aminogluthethimide.

III. To prescribe and to indicate possible application:

1) Conjugated estrogens (Premarin) in tablets of 0,3 mg; 0,3 – 0,6 mg daily;
2) solution of Progesterone (50 mg/ml, in oil) in multiple-dose vials of 10 ml; 5 – 10 mg IM daily for 6 – 10 days for a treatment of amenorrhea or dysfunctional uterine bleeding;
3) contraceptive tablets “Minisiston” (contain ethinyl estradiol and L-norgestrel); 1 tablet daily starting from 5-th day of a menstrual cycle;
4) Clomifen citrate in tablets of 50 mg; 50 mg daily fo 5 days (usually from the 5-th to the 10-th days of a menstrual cycle);
5) Tamoxifen in tablets of 20 mg; 1 tablet 1 – 2 times daily;
6) solution of Nandrolone decanoate 100 mg/ml in vials of 2 ml; 50 – 200 mg IM every 1 – 4 week;
7) Flutamide in tablets of 250 mg; 250 mg every 8 hours;
8) Prednisolone in tablets of 5 mg; 5 – 200 mg daily;
9) 1% ointment of Hydrocortisone; to use topically on the skin 2 – 4 times daily.
TOPIC 26
Drugs acting on the immune system

I. Control question of the topic:
1. The main components of the immune system. The main types of disorders of the immune system. Classification of drugs acting on the immune system.
2. The main groups of drugs used in immediate-type allergic reactions, their mechanisms of action and application. Brief characterization of histamine H₁-receptors antagonists (classification, pharmacokinetic and pharmacodynamic differences, adverse effects). Treatment of anaphylactic shock.
3. Immunodepressants: the main representatives, mechanisms of action, application, adverse effects.
4. Immunomodulators: the main representatives, mechanisms of action, application.

II. The main drugs of the topic: hydrocortisone, prednisolone, dexamethasone, diphenhydramine, chloropyramine, clemastine, meclizine, cyclizine, loratadine, cromolyn-sodium, nedocromil, ketotifen, epinephrine, azathioprine, metotrexate, cyclophosphamide, cyclosporine, tacrolimus, mycophenolate mofetil, etanercept, infliximab, muromonab-CD3, levamisole, thymosine, BCG vaccine, ribomunyl, interferon-alpha (Roferone), interferon-beta (Betseron, interferon-gamma (Actimmune), interleukin-2 (Proleukin).

III. To prescribe and to indicate possible application:
1) Loratadine in tablets of 10 mg; 10 mg daily;
2) 0,1% solution of Epinephrine in ampules of 1 ml; 0,3 – 0,5 mg SC in anaphylactic shock;
3) Azathioprine in tablets of 50 mg; 0,5 – 1 mg/kg/day in rheumatoid arthritis, 3 – 5 mg/kg/day in organ transplantation;
4) Cyclosporine in capsules of 100 mg; 2,5 – 4 mg/kg/day in rheumatoid arthritis, 12 – 15 mg/kg/day in organ transplantation;
5) Tacrolimus in capsules of 1,5 mg; 0,1 – 0,3 mg/kg/day;
6) Muromonab-CD3 (1 mg/ml) in ampules of 5 ml; 5 mg IV once daily;
7) Levamisole in tablets of 50 mg; 50 mg 3 times daily;
8) tablets “Ribomunyl”; 1 tablet daily;
9) Interferon-alpha-2 in vials of 18000000 units; to dissolve in attached diluent, SC 3 – 18 millions units depending (depending on disease).
TOPIC 28
Anti-inflammatory drugs. Drugs used in gout.

I. Control question of the topic:
1. Inflammation: the main mechanisms and mediators. Classification of anti-inflammatory drugs.
3. Steroidal anti-inflammatory drugs: mechanisms of the anti-inflammatory action, application (as an anti-inflammatory drugs), adverse effects.
4. Slow-acting anti-inflammatory drugs (disease-modifying anti-rheumatic drugs): the main representatives, mechanisms of action, application, adverse effects.
5. Drugs used in gout: classification (drugs for relieving and for preventing of the gout attacks), mechanisms of action.

II. The main drugs of the topic: aspirin, indomethacin, ibuprofen, diclofenac, piroxicam, naproxen, meloxicam, nimesulide, celecoxib, hydrocortisone, prednisolone, dexamethasone, triamcinolone, methotrexate, azathioprine, cyclosporine, hydroxychloroquine, aurothioglucose, auranofin, penicillamine, sulfasalazine, etanercept, infliximab, colchicine, allopurinol, probenecid.

III. To prescribe and to indicate possible application:
1) Aspirin as an anti-inflammatory drug in tablets of 500 mg; 3.2 – 4 g daily, divided into 3 doses taken after meals;
2) Indomethacin in capsules of 50 mg; 50 – 170 mg tid (3 times daily);
3) Ibuprofen in tablets of 200 mg; 600 mg qid (4 times daily);
4) Diclofenac in tablets of 50 mg; 50 – 75 mg qid;
5) Piroxicam in tablets of 20 mg; 20 mg once a day;
6) Celecoxib in capsules of 200 mg; 200 mg bid (2 times daily);
7) Dexametasone as an anti-inflammatory drug in tablets of 0.5 mg; 2 – 3 mg daily (2 – 3 times a day);
8) Methotrexate in tablets of 2.5 mg; in rheumatoid arthritis 2.5 to 5 mg every twelve hours for three doses once a week, or 7.5 mg once a week.
9) Hydroxychloroquine in tablets of 200 mg; 200 – 400 mg daily;
10) Suspension of Aurothioglucose (50 mg/ml) in vials of 10 ml; IM - 10 mg for the first dose, then 25 mg once a week for the next two weeks, then 25 or 50 mg once a week;
11) Infliximab in vials of 100 mg; to dissolve in 10 ml of sterile water for injections, 3 – 10 mg/kg IV, to repeat this dose 2 and 6 weeks later, then at intervals of 4 – 8 weeks;
12) Allopurinol in tablets of 100 mg; 100 – 300 mg daily.
TOPIC 29
Antiseptic and disinfectants. Antibiotics (β-lactamic antibiotics: penicillins, cephalosporins, carbapenems, monobactams)

1. **Control questions of the topic**
   1.1 Antiseptic and disinfectants (definition, classification with the name of the basic preparations, a principle of action, clinical significance).
   1.2. Chemotherapeutic means, definition, classification. A role and a place of chemotherapeutic drugs in treatment of usual infectious diseases.
   1.3. Principles of chemotherapy of bacterial diseases.
   1.5. Preparation of penicillins (classification, the mechanism and a spectrum of action, side effects, indications).
   1.6. Cephalosporins and others β-lactamic antibiotics (classification, the mechanism and a spectrum of action, side effects, indications).

2. **The main drugs of the topic:** 1) alcohol, 2) formaldehyde, 3) chlorhexidine, 4) iodine (tincture, aqueous), 5) benzalkonium, 6) Penicillin, 7) Benzathine penicillin, 8) oxacillin, 9) ampicillin, 10) amoxicillin, 11) piperacillin, 12) amoxicillin/clavulanat (Augmentin), 13) cefazolin, 14) cefuroxime, 15) cefaclor, 16) cefotaxime, 17) ceftazidime, 18) ceftriaxone, 19) imipenem/cilastatin (Tienam), 20) aztreonam.

3. **To prescribe the drugs under the following numbers** (see above “The main drugs of the topic”): № 7-20.
TOPIC 30
Antibiotics of various chemical groups (aminoglycosides, macrolides, tetracyclines, clindamycin, chloramphenicol, streptogramins, linezolid, rifampicin).

1. **Control questions of the topic.**

1.1. Aminoglycosides (definition, classification with the name of the basic preparations, a principle of action, clinical uses, adverse effects).

1.2. Macrolides (definition, classification with the name of the basic preparations, a principle of action, clinical uses, adverse effects).

1.3. Tetracyclines (definition, classification with the name of the basic preparations, a principle of action, clinical uses, adverse effects).

1.4. Antibiotics of various groups (clindamycin, chloramphenicol, streptogramins, rifampicin). Their principle of action, clinical uses, adverse effects.

2. **The main drugs of the topic:** 1) gentamicin, 2) streptomycin, 3) chloramphenicol, 4) doxycycline, 5) azithromycin, 6) clarithromycin, 7) erythromycin, 8) telithromycin, 9) clindamycin, 10) quinupristin and dalfopristin (Synercid), 11) rifampicin, 12) linezolid

3. **To prescribe the drugs under the following numbers** (see above “The main drugs of the topic”): №№: 1-12
TOPIC 31
Antibiotics of synthetic origin (sulfonamides, quinolones, nitrofuranes, nitroimidazoles etc.)

1. **Control questions of the topic.**

1.1. Sulfonamides (definition, classification with the name of the basic preparations, a principle of action, clinical significance, adverse effects).

1.2. Quinolones (definition, classification with the name of the basic preparations, a principle of action, clinical significance, adverse effects).

1.3. Nitrofurans, 8-oxyquinolines and nitroimidazole derivatives, (definition, classification with the name of the basic preparations, a principle of action, clinical significance, adverse effects).

2. **The main drugs of the topic:** 1) co-trimoxazole (sulfametaxazole/trimethoprim), 2) sulfalene, 3) sulfadoxin / pyrimethamine (Fansidar), 4) 5) sulfacetamide (sulfacylum-natrium), 6) nitroxoline, 7) nalidixic acid, 8) norfloxacín, 9) ciprofloxacín, 10) levofloxacín, 11) ofloxacín, 12) moxifloxacín, 13) furazolidone, 14) nitrofurantoin, 15) metronidazole

3. **To prescribe the drugs under the following numbers** (see above “The main drugs of the topic”): №№: 1-15
TOPIC 32
Drugs for the treatment of tuberculosis and leprosy. Antifungals.

1. Control questions:
   1) Antifungals (classification, a spectrum of action, feature of pharmacokinetics and pharmacodynamics, indications for use and side effects).
   2) Drugs for the treatment of tuberculosis (classification, the comparative characteristic of groups of preparations). Principles of pharmacotherapy of patients with tuberculosis.
   3) The pharmacological characteristic drugs for the treatment of leprosy.

2. The main drugs of theme: 1) isoniazid, 2) rifampicin, 3) etambutol, 4) aminosalicylic acid, 5) streptomycin, 6) dapsone, 7) nystatin, 8) natamycin, 9) ketoconazole, 10) itraconazole, 11) clotrimazole, 12) amphotericin B, 13) fluconazole, 14) flucytosine, 15) terbinafine

3. Prescribe the following drugs № 1; 2; 5; 6; 7; 8; 10; 11; 12; 15.
TOPIC 33
Drugs for treatment of protozoal infections. Antihelmintic drugs.

1. Control questions:
1.1. Antihelmintic drugs, classification.
1.2. Drugs for nematode infections (spectrum of action, applications).
1.3. Drugs for trematode and cestode infections (spectrum of action, applications).
2. Drugs for treatment of protozoal infections, classification.
2.1. The pharmacological characteristic antimalarial drugs, classification.
2.2. Chemoprophylaxis of malaria.
2.3. Drugs for treatment of amebiasis (classification, the mechanism of action, application, and side effects).
2.4. Short pharmacological characteristic of the drugs for the treatment of lambliosis (giardiasis), pneumocystosis, toxoplasmosis, trichomoniasis, leishmaniosis, trypanosomiasis.

2. The basic preparations of a theme: 1) mebendazole, 2) albendazole, 3) piperazine, 4) ivermectine, 5) pyrancel pamoate, 6) dimethylcarbamazine, 7) thiabendazole, 8) metronidazole, 9) praziquantel, 10) niclosamide, 11) bithionol, 12) stibogluconate, 13) melarsoprol, 14) nifurtimox, 15) clindamycin, 16) chloroquine, 17) primaquine, 18) diloxanide furoate, 19) quinine, 20) doxycycline.

3. To prescribe the underlined (see above) drugs: № 1; 3; 5; 8; 9; 10; 15; 16; 20.
1. Control questions:

1) Drugs for the treatment of viral diseases of respiratory system: *(a flu or respiratory syncytial virus (RSV)): classification, a spectrum of action, feature of pharmacokinetics and pharmacodynamics, indications for use and side effects.*

2) Drugs for the treatment of herpes diseases: the comparative characteristic of drugs.

3) Pharmacological characteristic of drugs for the treatment of cytomegalovirus diseases.

4) Drugs for the treatment of retroviral infection (HIV): classification and main features.

5) Drugs for the treatment of virus hepatitis

**The main drugs of theme:** 1) acyclovir, 2) idoxuridine, 3) trifluridine, 4) zanamivir, 5) ozeltamivir, 6) ribavirine, 7) rimantadine, 8) ganciclovir, 9) zidovudine, 10) lamivudine, 11) zalcitabine, 12) nevirapine, 13) saquinavir, 14) ritonavir, 15) interferon alfa-2b

3. **Prescribe the following drugs:** № 1; 2; 5; 6; 7; 8; 9; 10; 11; 12; 13; 15.
Classification of antitumor drugs.

1. **Alkylating agents** (Cyclophosphamide, Melphalan, Carmustine, Streptozocin)
2. **Antimetabolites** (Fluorouracil, Mercaptopurin, Methotrexate)
3. **Alkaloids** (Vincristine, Vinblastine, Paclitaxel, Topotecan)
4. **Antibiotics** (Bleomycin, Daunorubicin, Doxorubicin)
5. **Enzymes** (Asparaginase)
6. **Hormonal agents** (Prednisolone, Cyproterone, Flutamide, Goserelin)
7. **Miscellaneous** (Procarbazine, Amsacrine, Razoxan)

To know mechanisms of action, possible application and adverse effects.