MINISTRY OF HEALTH OF UKRAINE
POLTAVA STATE MEDICAL UNIVERSITY
Department of Pharmacology, Clinical pharmacology and Pharmacy

Methodical guidelines
for applicants for education the second (master's) level of higher education independent work in preparation for the practical lessons and the lesson

Academic subject	**Pharmacology**
Module 1	**Medical prescription. General pharmacology. Medicines that affect the nervous and cardiovascular systems**
Year of study	**III**
Faculty	**International Faculty Specialty of «Medicine»**

Topics of practical classes

N	Name topics	Number hours
Module 1		
Content module I. ***Medical prescription. General pharmacology***		
1.	Introduction to medical prescription. Hard, soft and liquid dosage forms. Medicinal forms for injections	2
2.	Non dosage medicinal forms	2
3.	Control of practical skills in medical prescription	2
4.	General pharmacology. Control of practical skills in using modern reference books on medicines	2
Content module 2. ***Medicines that affect the peripheral nervous system***		
5.	Medicines affecting the transmission of excitation in cholinergic synapses	2
6.	Medicines that affect the transmission of excitation in adrenergic synapses	2
Content module 3. ***Medicines that affect the function of the central nervous system. Psychotropic drugs***		
7.	Medicines for general and local anaesthesia	2
8.	Analgesics	2
9.	Antipsychotics, tranquilizers, hypnotics and sedatives	2
10.	Anticonvulsants. Medicines for the treatment of neurodegenerative diseases	2
11.	Antidepressants. Nootropic drugs. Psychotropic stimulants and analeptics	2
Content module 4. ***Pharmacology of agents affecting function of cardio-vascular system***		
12.	Antiarrhythmic drugs. Cardiotonic drugs. Cardiac glycosides	2
13.	Antianginal and lipid-lowering drugs	2
14.	Antihypertensive drugs. Angioprotectors	2
15.	Final module control	2

Content module № 3	**Medicines that affect the function of the central nervous system. Psychotropic drugs**
Topic № 7	**Medicines for general and local anaesthesia**

1. Relevance of the topic: Surgical intervention inevitably causes mechanical damage to the tissues and organs, a painful and emotional reaction with impaired vegetative reactions, up to shock that threatens life and health, and therefore anesthesia is necessary. There are no ideal anesthetic medicinal agents and for each patient the most adequate medicinal agent should be selected. It is the need to learn how to understand the pharmacology of existing anesthetic medicinal agents (clinical narcosis, speed of development and release from it, depth of narcosis, safety levels when using, etc.). One of the widely used methods for compensating the deficiencies of individual substances is their combined use and potentiating with the help of non-anesthetic medicinal agents. Close to anesthetic substances in its properties, ethyl alcohol is found using in medical practice. But there is an abuse of it, which leads to the development of acute and chronic alcohol poisoning (alcoholism).

Therefore, each Patient should have an idea of the pharmacological and toxicological properties of ethyl alcohol, ways to combat the abuse of this substance. Local anesthetic medicinal agents are widely used in surgery, traumatology, gynecology, ENT practice. Highly anesthetic Action provides a positive psychological condition in patients during operations in the mind. Choosing an anesthetic will provide good pain relief and a minimum of complications. Groups of preparation of astringent, enveloping action are widely used in the treatment of gastropathology, burns, erosion. Adsorbents are necessary in treatment schemes for allergies, dysbacteriosis, the effects of intoxication, including radiation. Medicinal agents of peripheral stimulating action are widely used in the treatment of emergency conditions (fainting, asphyxia, acute heart failure), in the treatment of broncho-pulmonary pathology, constipation, myalgia, neuralgia, regulate appetite. Most of these preparations are applied at the pre-hospital level, so the Patient must necessarily navigate among these preparations, be able to explain their mechanism action and prevent complications.

2. The specific goals:

1. Determine the grouping of anesthetic medicinal agents.
2. To envisage changes in the functions of the organism under the influence of anesthetic medicinal agents and ethyl alcohol in accordance with their pharmacodynamics and pharmacokinetics (in therapeutic and toxic doses).
3. Interpret indications for using anesthetic medicinal agents in accordance with knowledge of pharmacodynamics.
4. Estimate the positive effect / risk after using anesthesia medicinal agents.
5. To make judgments about the possibility of the appearance effects studied by medicinal agents for the purpose of their prevention.
6. Consider the priority of domestic science in introducing local anesthetics (cocaine, novocaine) into medical practice (works by V.K. Anrep), questions about cocaine and other types of drug addiction.
7. Student must-defined group of medicinal agents, oppressors and causes excitation, sensitive nerve endings of afferent nerves.
8. Anticipate changes in the functions of the organism under the influence of anesthetic, astringent, enveloping, adsorbing and irritating medicinal agents in accordance with their pharmacodynamics and pharmacokinetics (in therapeutic and toxic doses).
9. To consider the structure of the afferent part of the peripheral nerve system, Mechanisms action by bitterness in the light of the laboratory of I.P. Pavlova.

10. Interpret indications for using these medicinal agents in accordance with knoledge of pharmacodynamics. Pay attention to the importance of thesepreparation groups in the treatment of gastropathology, allergies (especially in children) and the modern version of painless surgery.
11. Assess the positive effect / risk after using ratio of medicinal agents causing anesthetic, astringent, enveloping, adsorbing and irritating action.
12. Put in practice analysis on the side effects of the medicinal agents being studied for the purpose of prevention.
13. Prescribe and conduct a pharmacology and therapeutic analysis that was written preperations that cause anesthesia and are used for the treatment of alcoholism, suppress and excite sensitive nerve endings of afferent nerves.
14. Perform experimental work and Explain the results obtained.

3. Basic knowledge, skills, skills needed to study the topic (interdisciplinary integration):

The name of the previous disciplines	Skills acquired
1. Latin language	Possess skills for writing of prescriptions
2. Anatomy and human physiology	Interpret the community of mediators of the nervous system in animal organisms, as an illustration of the unity of their origin.
3. Biological chemistry	Describe biochemical changes in adrenergic synapses. The role of catecholamine's in before the nerve impulses

4. Tasks for independent work in preparation for the lesson and in the lesson.

4.1. List of main terms, parameters, characteristics, which should be taken by the student in preparation for the lesson.

Term	Definition
1. Narcosis	Condition of terminal functional paralysis of CNS, which is characterized loss painful sensitivity , consciousness, majority of reflexes, diminishment of tonus of skeletal muscles with saving function of vital important centers and with sufficient level for supporting of life.
2. Narcoses medicinal agents	Medicinal agents, causes condition, which is characterized loss, consciousness, overall anesthesia, hyporeflexia, and for many narcoses medicinal agents myorelaxation.
3. Initial narcosis	Component of combine narcosis, short-acting narcosis with help non-inhalative medicinal agents. In initial narcosis excitation is absent.
4. Base narcosis	Component of combine narcosis, long-acting with help non-inhalative medicinal agents. For base narcosis is need less dose inhalative medicinal agent and less toxic action on parenchymatous organs.
5. Potentiate narcosis	Narcosis, which is gaining after using non-narcosis medicinal agents (somnolent , tranquilizer agents, neuroleptics, myorelaxants e.t.c.
6. Local anesthetics	Medicinal agents, which cause terminal, locally switching of pain sensitivity of receptors, nerve fibers after contact with local anesthetics.
7. Astringent medicinal agents	Medicinal agents, which cause creation on surface of ulcers, burns, wounds solid albuminate covering. Such covering protects wound surface during long-lusting period.
8. Covering medicinal agents	Medicinal agents, which cause creation on surface of ulcers, burns, wounds covering, which has consistent like gel. Such covering protects wound surface during long-lusting period.
9. Adsorptive medicinal agents	Medicinal agents, which due to crystalloid pore have significant adsorptive surface. They have possibility for adsorption and to keep back toxic substances and gases.
10. Charta Sinapis	Charta Sinapis – paper coated with a thin layer of fat free mustard

11. Mentholum	Mentholum – main component of ether oil of piper menthe
12. Sol. Ammonii caustici	Ammonia is volatile liquid with pungent odor

PREPERATIONS

N	Name of the drug	Form release	How to use
INHALATIVE NARCOSIS MEDICINAL AGENTSA			
1.	Aether pro narcosi	Flac.100 g	For inhalative using (beginning from 20-25 vol.% then diminishment of dose up to 2-4 vol.%)
2.	Isofluranum	Flac.100 ml	For inhalative using (beginning from 1,5- 3 vol.% then diminishment of dose up to 1-1,5 vol.%)
NONINHALATIVE MEDICINAL AGENTSA USING FOR NARCOSIS			
1.	Propanididum (Sombrevin)	Amp. 5 % 10 ml	Intravenously quickly 5-10 mg/kg
2.	Propofolum	Amp. 1 % 20 ml Flac.1 % 50 ml	Intravenous infusion 2 mg/kg
3.	Ketamini hydrochloridum	Amp. 1 % 1 ml Flac.5 % 10 ml	Intravenously 2 mg/kg, I/m 6-10 mg/kg
4.	Thiopenthalum-natrium	Flac.0,5 and 1 g	Intravenously 20-30 ml 2 % sol
5.	Natrii oxybutyras	Amp. 20 % 10 ml	Intravenously 50-70 mg/kg
6.	Hexobarbitalum (Hexenal)	Flac.1 g	Intravenously 8-10 mg/kg
ALCOHOLS			
1.	Spiritus aethylici	Mixture of spiritus aethylici with water (90, 70, 40 %)	For wiping and compresses, applications. For processing oh hands and surgical tools
MEDICINAL AGENTSA TREATMENT OF ALCOHOLISM			
1.	Teturamum (Disulfiram)	Tablets 0,15 and 0,25 g	Initially 0,5 g every day, then dose must be decreased till 0,15-0,1 g every day
MEDICINAL AGENTS FOR LOCAL ANESTHESIA			
1	Procainum	Flac.0,25% 200 ml Amp. 2% 5 ml Oitment 5%	For infiltrative anesthesia (i /m) For conductive anesthesia (i /m) For applicative anesthesia
2	Benzocainum (Anaesthesinum)	Powder, tablets 0,3 g Supp. rect.0,1 g Ointment, Paste 5% Gel 10% Aspersion 5%	Orally 0,3 g 3 times a day Suppositorium rectally 2 times a day Apply on affected skin surface and wound surface
3	Lidocainum	Amp. 2% 2 ml Amp. 10% 2 ml	For conductive anesthesia (i /m) I/v, i/m in arrhythmia
4	Articaini hydrochloridum (Ultracain)	Amp. 1% 5ml Amp. 2% 2 ml 5 ml and 10 ml	For infiltrative anesthesia 5-10 ml For conductive anesthesia 1-2 ml
5	Ultracain D-S Ultracainum DS	Carpules 1% 1 ml Amp. 1% 1 ml	For conductive anesthesia (i/m)
6	Bupivacaini hydrochloridum	Amp. 0,5% 1 ml	For spinal anesthesia
7	Mepivacaini hydrochloridum	Carpules 3% 1 ml	For infiltrative and conductive anesthesia (i/m)

ASTRIGENT MEDICINAL AGENTSA			
1	Bismuthi subcytratum (De-Nol)	Tablets 0,12 g	Orally before meal 2 tablets 2 times a day
2	Alvagel A and Almagel	Flac.170 ml	Orally spoon-dosator before meal
3	Tanninum	Flac.0,5% Flac.5%	For gargling and lavage of stomach For processing of ulcer, burns, wound
4	Folium Salviae	Infusum (single dose 0,5 g)	Orally15-30 ml 3 times a day, for gargling
COVERING MEDICINAL AGENTS			
1	Mucilago Amylum	Flac.100 ml	For application on ulcer surface of skin, burn surface, wound surface
ADSORBATIVE MEDICINAL AGENTS			
1	Enterosgel	Flac. with gel 450 g Paste 135 g	Orally 1 table spoon before meal Orally 1 table spoon before meal
2	Carbo activatis (Sorbex)	Powder	Orally 30-60 g together with water
IRRITATIVE MEDICINAL AGENTSA			
1	Sol. Ammonii caustici	Flac.30 ml Amp. 10% 1 ml	Disolve 5 drops in 100 ml of water and use orally Ampoule must be broken, then moisten the tampon and bring to the nose for inhalation
2	Mentholum	Ointment 1% 10 g Solution 1%	Apply on skin surface and mucous membrane For digging into the nostrils
3	Apomorphini hydrochloridum	Amp. 1% 1 ml	Subcutaneously 1 ml

4.2. Theoretical questions to the lesson:

1. Overall characteristic narcos condition. Hystory of investigation of medicinal agents, which are used for narcosis (D. Morton, F.I. Inozemtzev, N.I. Pirogov). Theories of narcosis. Types of narcosis. Classification of medicinal agents, which are used for narcosis. Needings for medicinal agents, which are used for narcosis.
2. Medicinal agents, which are useful for inhalative narcosis: ether for narcosis, halotan, isofluran, sevofluran, dinytrogen oxide, xenon. Comparative characteristic, side action. Combine using of medicinal agents for narcosis together with ohers pharmacological preperations.
3. Medicinal agents for noninhalative narcosis. Classufication of these agents accordantly to duration of action . Pharmacologycal characteristic propofol, thiopenthalum-natrium, hexobarbital (gexenal), ketaminum (calipsol), natrii oxybutyras, propanididud (sombrevin). Comparative characteristic of different preperations. Concept of premedication, initial, base, combine narcosis.
4. Spiritus aethylici. Pharmacology and toxicology of spiritus aethylici, which is used in clinical practice. Acute and chronic poisoning by alcohol. Emergancy care in poisoning by alcochol. Medicinal agents for treatment of alcoholism. Mechanism of teturam action (disulphiram), lidevin, apomorphini hydrochloridum.
5. Classification of medicinal agents, which cause decreasing of sensitivity of nerve ending of afferent nerves.
6. Medicinal agents, using for local anesthesia. Classification of such patterns for chemical structure. Requirements for local anesthetics.
7. Pharmacological characteristic esters (procain, benzocaine).
8. Pharmacological characteristic replacement amide groups (lidocaine (lidocaine), trimecain, articain, bupivacaine (marcain), mepivacaine).

9. Comparative characteristic local anesthetics and complex preparations based on them (ultrakain DS).
10. Indications for using local anesthetics, purpose of combine using local anesthetics together with adrenomimetics.
11. Side action of local anesthetics, measures for the prevention and treatment of cocaine toxicity.
12. Astringent medicinal agents.

Classification:

A) Organic - tannin, sage leaf, oak bark, St. John's worth grass, chamomile flowers

B) Inorganic - bismuth subcitrate (Venter, Denol), Almagel

13. Mechanisms action, pharmacologycal characteristics, indications for using astringent medicinal agents.
14. Covering medicinal agents (starch mucus, flax seeds), general characteristics, mechanism action, and indications for their using.
15. Adsorptive medicinal agents. Classification:

A) Natural sorbents - activated carbon (sorbex)

B) Synthetic sorbents - enterosgel.

16. Mechanism action, indications for using adsorbing medicinal agents. principles of hemo- and enterosorption.
17. Classification of medicinal agents that increase the sensitivity of the endings of afferent nerves: annoying medicinal agents (menthol, solution of ammonia).
18. Mechanisms action medicinal agents, causes excitation sensitive nerve endings of afferent nerves.
19. Pharmacological characteristic of irritating medicinal agents.
20. Complications with the introduction of medicinal agents, causes excitation sensitive nerve endings of the afferent nervous system and the conditions for their introduction.

4.3. Practical tasks performed at the lesson:

4.3.1. Prescribe recipes and conduct their pharmacotherapeutic analysis (indicate group affiliation, indications for use, possible complications):

1. Ketamini hydrochloridum in ampoules.
2. Natrii oxybate in ampoules.
3. Thiopental sodium in flaconis.
4. Propofolum.
5. Isoflurane in flaconis.
6. Ethyl alcohol for handling hands and disinfecting instruments.
7. Teturam in tablets.
8. Procaine in ampoules for conductive and infiltration anesthesia.
9. Lidocaine in ampoules.
10. Ultrakain.
11. Bismuth subcitrate.
12. Activated charcoal in tablets and non-dosed powder.
13. Enterosgel.
14. Solution of ammonia in ampoules and vials for inhalation when fainting and as an antidote.
15. Apomorphine and hydrochloride in ampoules.

4.3.2. Practical tasks performed at the lesson:

1. To familiarize with the preparations on the topic, to determine their affiliation with the pharmacological group and indications for use. Fill in the table:

Preparations	Mechanism of action	Indications for using	Side effects
1. Ketamine hydrochloride			
2. Natrii oxybate			

3. Thiopental sodium			
4. Ether for narcosis			
5. Izofluran			
6. Ethyl alcohol			
7. Teturam			
8. Procaine			
9. Lidocaine			
10. Ultarkaine			
11. Activated charcoal			
12. Enterosgel			
13. Solution of ammonia			
14. Apomorphini hydrochloridum			

2. To substantiate the choice of the drug, its pharmaceutical form, dosage, concentration, route of administration and prescribe.

1. Synthetic analogue of morphine and for injections to a child at the age of 5 years old.
2. Piperidine analogue of morphine a, which is a synergistic antagonist.
3. Medicinal agents, which are useful in patients with collaptoid condition.
4. Preparation for neuropanalgesia during biopsy.
5. Piperidine derivative for treatment of renal colic.
6. Medicinal agent for treatment of patient with a strong dry cough in a postoperative period.
7. Medicinal agent for first aid for morphine poisoning.
8. Medicinal agent, which is mixture of opium poppy alkaloids.
9. Antipyretic for suppression of fever for adult patient with gastric ulcer.
10. Antirheumatic medicinal agents in tablets.
11. Selective cyclooxygenase inhibitor in rheumatoid arthritis.
12. Analgesic with pronounced anti-inflammatory effect in suppositories.
13. Medicinal agent so from the group of selective inhibitors of COX-2 for treatment of osteoarthritis.
14. Medicinal agent from analgesic group for termination of toothache.
15. What medicinal agent for injection must be administered for treatment of neuralgia.
16. Medicinal agent for treatment of myalgia (choose an adequate dosage form).

3. Instructions for conducting an experiments:

EXPERIENCE 1. Influence of alcohol on oxidizer enzyme katalase and peroxidase.

Pour in three tubes solution lysozyme of hen protein and add in first 1 ml of 70% alcohol, in second - 1 ml of 40% alcohol, in third - 1 ml of physiological solution. Then in all tubes it was poured 0,5 ml 3% solution of hydrogen peroxide. Define intensify of creation of gases after 30 minutes exposition of tubes in thermostat at condition + 37°C. Draw conclusions.

EXPERIENCE 2. Alcohol narcosis.

For one frog it was administered 1 ml of 20% solution ethyl alcohol, and for second frog – same volume of physiological solution. Check expressiveness reflexes and degree of relaxation of muscles. For termination from narcosis must be administered 1-2 ml 10% solution of caffeine. Draw conclusions.

EXPERIENCE 3. Definition of absence of incompatible between ethyl alcohol preparations and saturated solution of sodium chloride, protein, mucilage, water.

In first tube was poured 2 ml of saturated solution of sodium chloride and 2 ml of ethyl alcohol, in the second tube was poured 2 ml of ethyl alcohol and 1 ml water after distillation, in third - 1 ml of protein solution of hen egg and 1 ml of ethyl alcohol/ Shake tubes. Draw conclusions.

EXPERIENCE 4. Studying of antifoam action of ethyl alcohol.

In two tubes must be introduced hen protein in volume 2-3 ml and ad in the first several drops of isotonic solution of sodium chloride, and in second – 20 % ethyl alcohol. Draw conclusions.

EXPERIENCE 5. Action of tannin on mucous membrane of mouth cavity. Students volunteers must gargle mucous membrane of mouth cavity.

EXPERIENCE 6. Investigation of solubility medicinal agents from group local anesthetic .

In two tubes must be poured 2 ml water after distillation, in third – 2 ml of oil. Then in the first must be added novocaine powder, in second and in third – anesthesin. Must be observation by students solubility of preparations. Draw conclusions.

EXPERIENCE 7. Investigation of adsorptive properties of charcoal (carbo activatis)

Pour in tube 10 ml 0,1% solution of methyl blue and add hear 0,2 g activated charcoal. Shake tube during 2-3 minutes, then realize filtration. Draw conclusion about adsorptive properties of activated charcoal.

Materials for self-control.

A. Task for self-control:

Using of text books and operative insyructions, syudent must fill in table:

Table №1 "Possibility of using of narcosis medicinal agents"

Medicinal agents	Types of narcoses			
	Independent (for long-lasting operations)	Initial	Base	Combine (with others narc medicinal agents)
1. Ether for narcosis 2. Izofluran 3. Nitrogen dioxide 4. Propophol 5. Thiopental sodium 6. Natrii oxibutiratis				

Table №2 «Define pharmacological group of medicinal agents»

	Lidocaine	Ultracaine	Bismuth subcitrates	Starch	Carbolen
Local anesthetics					
Astringent medicinal agents					
Covering medicinal agents					
Adsorptive medicinal agents					

B. Self-control tasks:

Task 1. A patient suffering from drug addiction entered a surgical clinic with symptoms of acute intestinal obstruction. After the introduction of atropine the Condition of the patient improved, the pain disappeared, the occurrence of stool indicated the elimination of obstruction.

A) Define preparation, which was used by a drug addict, his group belonging.

B) What is the reason for this complication? Ways to avoid this complication?

Task 2. Patient was taken to hospital with a fracture of the lower limb and severe pain. For the prevention of pain shock analgesic agent it was administered. The pain decreased, but vomiting began.

A) Define preparation, which was administered and its pharmacological group.

B) Explain mechanism of action and its prophylaxis.

C) What can be a shock for pain shock?

Task 3. It was called ambulance for the patient. Patient was fined at his flat. Integuments are pale, mucous membranes of lips has cyanotic color, respiration is irregular, cyanotic, irregular breathing, intermittent (Cheyn-Stokes), marked miosis, bradycardia, but tendon reflexes (knee, achilles) are preserved.

A) What caused the poisoning?

B) What first aid should be given to the patient?

C) Justify the main therapeutic measures.

C. Tests for self-control:

1. Patients with inoperable carcinoma of the stomach was prescribed promedol for relieving significant pain. Over time, Patient began to notice a decrease in the analgesic effect and duration of action preperation, a sharp increase in pain throughout the body. Patient explained this by saying that:

A. Promedol may accumulate B. Tachyphylaxis has arisen

C. Psychic staleness developed D. Addictive

E. The reabsorption of promedol in the tubules of the kidneys has decreased

2. Patient with urolythiasis it was developed intolerable spastic pain. For the prevention of the pain shock of the Patient, a narcotic analgesic with antispasmodic effect was introduced with atropine. What is a medicinal agento?

A. Tamadol B. Promedol C. Procain

D. Metamizole sodium E. Morphine and hydrochloride

3. 48-year-old male patient with symptoms of renal colic was admitted to the urology department. Which of the following medicinal agents for suppression of attack the main effects is an analgesia and relaxation of smooth muscles?

A. Promedol B. Pipekuroniy C. Meliktin D. Analgin E. Atropine

4. After cranial trauma, an experienced physician has forbidden the introduction of morphine. Why?

A. Increases intracranial pressure B. Inhibits dying

C. Reduces blood pressure D. Causes cardiac arrhythmia

E. Causes addiction

5. For analgesia when performing orthopedic surgery for a 4-year-old child, Patient used promedol. Why is this medicinal agent most shown in early ontogenesis?

A. Ultrashort action B. Provides long lasting analgesia C. Weaker respiratory depression

D. Not metabolized in the liver E. Does not cause addiction

6. The patient after surgery for severe fracture was prescribed anesthetic preparation for one week. After it was canceled, the patient developed hyperthermia, bowel spasms and vomiting. What condition developed in a patient?

A. Allergy B. Idiosyncrasy C. Intoxication D. Abstinence E. Tachyphylaxis

7. A patient with severe traumatic brain injury developed a painful shock with respiratory depression and decreased arterial pressure. Indicate medicinal agents for emergency care and prevention of shock complications?

A. Morphine hydrochloride B. Ketamine hydrochloride C. Cordiamin

D. Corglycon E. Fentanil

8. Administration of what preparation and is accompanied by a state of euphoria, and then drowsiness, violation of logical thinking, excitation of the centers of the analyzer (sight, hearing), the center of the vagus nerve?

A. Diazepam B. Ephedrine C. Difenin D. Omnopon E. Atropine

9. For patient in the postoperative period it is needed preparation for suppression of acute pain. Preparation with which mechanism of action it is advisable for using?

A. Opiate receptor inhibitors B. Prostaglandin synthesis inhibitors

C. Preparations causes stimulation of the receptor

D. Preparations causes stimulation of GABA-receptors.

E. Preparations causes a stimulation of barbituric receptors

10. A strong cough in a patient who underwent surgery caused pain in the wound and bleeding. What medicinal agent it is need to use in this state?

A. Methacin B Codein C. Libexin D. Omnopon E. Mesaton

11. The indications for narcotic analgesics (morphine, promedol) are only acute severe pains that threaten the life of the patient. What is the reason why the named group of drugs has such limited indications for practical use?

A. Medicinal dependence B. Hypersensitivity C. Cumulation D. Sensitization E. Potentiation

12. The introduction of morphine and effectively anesthetizes and prevents painful shock during injuries. What is the reason for the analgesic Action morphine?

A. With peripheral receptor unit B. With a strong anti-inflammatory action

C. With the inhibition of the formation of "mediators" of pain and inflammation in the tissues

D. In violation of the synaptic before achievement in the pathways of pain sensitivity of the CNS E. Impaired conduction of nerve fibers

13. Patients entered the intensive care unit with signs of acute morphine poisoning. What kind of medicinal agent it is needed in this case for gastric lavage?

A. Boric acid B. Natrii hydrocarbonate C. Solution Natrii chloride

D. Furacillin E. Potassium permanganate

14. For reduction of patient's chest pain, acute myocardial infarction was assigned to preparation from the group of narcotic analgesics. What type of therapy does this intervention belong to?

A. Symptomatic therapy B. Etiotropic therapy C. Replace therapy

D. Detoxification therapy E. Elimination of therapy

15. After the diagnostic injection of naloxone, the young man developed severe psychosomatic disorders: tachyarrhythmia, changes in blood pressure, chills, tremor, vomiting, psychosis-like behavior, fear of death. What promoted negativity when naloxone was administered?

A. Drug dependency of narcotic analgesics B. Allergy of a non-slow type

C. Idiosyncrasy D. Tolerance topreparation E. Acute poisoning

16. The patient is diagnosed with transmural myocardial infarction. Whatpreparation to him is it necessary to introduce for the prevention of carcinogenic shock?

A. Morphine hydrochloride B. Reserpine C. Octadin D. Phentolamine hydrochloride

E. Analgin

17. A patient with before ozirovkoy narcotic substance lacks consciousness, hypothermia, hypotension, sustained miosis. What help is most effective and will ensure patient survival?

A. Naloxone B. Nitrazepam C. Mezaton D. Etimizol E. Omeprazole

18. A woman of 63 years old was admitted with an acute attack of calculus cholecystitis. What analgesic is most appropriate to apply in this case?

A. Promedol B. Butadion S. Indomethacin D. Diclofenac-sodium E. Paracetamol

19. A patient has a severe polytrauma as a result of a car accident. Whatpreparation with anti-shock and universal anti-stress action m will prevent the development of traumatic shock?

A. Morphine hydrochloride B. Tubocurarin chloride C. Prednisolone hemisuccinate

D. Diclofenac sodium E. Adrenaline hydrochloride

20. After consuming acetylsalicylic acid, the patient developed abdominal pain as a result of an aggravation of gastric ulcer. What is the basis of ulcerogenative action of aspyrin?

A. Antiprostaglandin action B. Vasospasm

C. Immunosuppressive effect D. Choleretic medicines E. Stimulate action of pepsin

21. A patient has a pronounced pain syndrome in neuralgia. Medicinal agents from the group of NSAIDs will reduce pain-perception?

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

22. Patient M. at the age of 59 years old, with gouty arthritis, takes butadion. After analyzing the hemogram, the Patient canceled this preparation. What is a blood complication caused by butadione?

A. Leukemia B. Leucopenia C. Strengthening hemocoagulation
D. Reduced blood coagulation E. Eosinophilia

23. A patient during the endoscopic examination of the gastric mucosa revealed several erosions. Which of these medicinal agents could cause such a complication?

A. Diazepam B. Atropine C. Diclofenac sodium D. Tamadol E. Anestezin

24. Patients angina takes acetylsalicylic acid in dose 100 mg 1 time a day. What is acetylsalicylic acid used in this case?

A. For lowering the level of prothrombin B. For lowering cholesterol
C. For reducing blood coagulation D. For reducing platelet aggregation
E. For expansion of the coronary vessels

25. For lowering the temperature (+39.5 ° C), a non-narcotic analgesic, a derivative of pyrazolone, was introduced. It has a pronounced analgesic and antipyretic action, but weak anti-inflammatory activity. What preparation was used?

A. Analgin B. Ibubrofen S. Ortofen D. IndoMethacin E. Celecoxib

26. A patient with chronic hyperacid gastritis developed joint pain. For their reduction, given concomitant pathology, celecoxib was prescribed. Selective Action on which enzyme will eliminate the negative impact on the gastric mucosa?

A. Cyclooxygenase 2 B. Cyclo-oxygenase 1 C. Phospholipase A2
D. Phospholipase C E. Kallicrein

27. Patients with respiratory disease with constantly increased body temperature repeatedly used the antipyretic medicinal agent, which caused nausea, epigastric pain in right hypochondrium. What preparation was patient?

A. Ortofen B. Vitamin C C. Analgin D. Indomethacin E. Spasmalgon

28. Patients with rheumatoid arthritis for the prevention of possible negative effects on the gastric mucosa assigned preparation from the group of non-steroidal anti-inflammatory medicinal agents – a selective COX-2 inhibitor. Indicate preparation.

A. Celecoxib B. Analgin C. Aspirin D. Butadion E. Ibuprofen

29. When it was using of ethereal narcosis, which stage is not inherent in its clinical course?

A. Pain relief B. Excitation C. surgical anesthesia D. Awakening E. Paralysis

30. Define reflexes that persist with sufficient depth of narcosis for surgical interventions:

A. Corneal B. Pupillary C. Emetic D. Swallowing E. Knee

31. Define effects inherent in the stage of surgical narcosis:

A. Lack of consciousness B. Loss of all types of sensitivity
C. Absence of all reflexes D. Relaxation of skeletal muscles
E. Lack *of reflexes from proprial receptors*

32. 55-year-old man was taken to the intensive care unit without a joint. According to relatives, it became known that Patient had drunk an alcohol solution from an unknown manufacturer. According to the results of the survey diagnosed with methyl alcohol poisoning. What antidote it is need to use in this case?

A. Naloxone B. Ethanol C. Acetylcysteine D. Teturam E. Lidevin

33. Surgical intervention requires long-term anesthesia of the patient. What anesthetic medicinal agent has the longest lasting action?

A. Propanidide B. Ketamine hydrochloride C. Natrii oxybate
D. Sodium Thiopental E. Kalipsol

34. Injection of the anesthetic medicinal agents provided the patient with anesthesia for 5 minutes. and for the completion of the operation have introduced a dose of this preparation as well. What anesthetic medicinal agent has the same short action?

A. Propaneid B. ketamine hydrochloride C. Natrii hydroxybutyrate
D. Sodium Thiopental E. Kalipsol

35. Define anesthetic medicinal agent that does not reach stage III narcosis:

A. Ether for narcosis B. Ketamine hydrochloride C. Nitrogen nitrous oxide
D. Isoflurane E. Propanidide

36. For mouthwash with stomatitis applied tannin solution. What mechanism action is the basis of therapeutic benefits preparation?

A. Blockade sodium-potassium pump B. Adsorption on a large surface
C. Formation of dense albuminates D. Formation of colloidal compounds
E. The formation of temporary connections with proteins

37. What complication is most likely with the rapid introduction of sodium thiopental?

A. General arousal B. Hyperapic C. Vomiting
D. Fall of arterial pressure E. Strengthening spinal reflexes

38. For operation it is need to choose an anesthetic medicinal agento. What disease is an absolute contraindication for using ethereal narcosis?

A. Bronchitis B. Gastritis C. Heart tachyarrhythmia's D. Allergies
E. Glomerulonephritis

39. Patient for local analgesia applied preparation, a thiophene derivative that has high lipophilicity. Define this medicinal agent.

A. Anesthesin B. Trimecain S. Xycainin D. Bupivacaine E. Articain

40. For extending and enhancing the action local anesthesia adds preperation. Define additive to anesthetics, given that the patient has a tendency to cardiac arrhythmias.

A. Strophantin B. Adrenaline C. Mezaton D. Methacin E. Atropine

41. For long-term surgery it is need to choose a low toxic anesthetic medicinal agent. Which medicinal agent is most beneficial for basic narcosis?

A. Ether for narcosis B. Nitrous oxide C. Propanidid
D. Natrii hydroxybutyrate E. Isoflurane

42. For reducing the itching of the skin. Patient applied anesthetic paste. What is the feature of preparation and requires its appointment in a mild form?

A. Good absorbability B. Has a strong and long action m
C. Good solubility D. Poor solubility
E. High degree of dissociation

43. Patients must have surgery that lasts more than 2 hours. From the anamnesis: the patient has ventricular extrasystoles. What anesthetic should be administered?

A. Dicain B. Trimecain S. Novocain D. Anestesin
E. Cocaine

44. To a child with acute poisoning by the seeds of the Patient Datura stramonium, he assigned activated charcoal. Define mechanism of its action in case of poisoning.

A. Forms insoluble salts B. Coagulates mucosal proteins
C. Adsorbs alkaloids on its surface.
D. Creates a protective layer of colloid
E. Blocks sensitive skin receptors

45. When administered intravenously, local anesthetics it is to recall possible complications. What complication probability is possible if the preparation of the amide structure?

A. Gangrene B. Convulsions C. Bronchial spasm D. Hepatitis
E. Angina pectoris

46. Patients with gastroenteritis have been prescribed a pathogenetic medicinal agent. Define it if it has knitting and enveloping action.

A. Bismuth subnitrate B. Tanalbin S. Tannin D. Denol
E. Almagel

47. When the doctor carried out infiltration anesthesia with novocaine, it was developed in the patient anaphylactic shock. What emergency care must be in this situation?

A. Must be administered diuretic agent intravenously B. Must be narcosis for patient
C. Must be administered adrenaline intravenously
D. Must be administered subcutaneously preparations, which cause stimulation of respiration
E. Must be realization of lavage of stomach and de administered adsorbents for oral using

48. It was developed syncope. For termination of syncope patient uses preparation, which is

liquid with expressive odor. Define this prepararion.

A. Solution of ammonia B. Solution of menthe C. Magnesium sulphas
D. Tincture absinthe E. Olei ricini
E. Realize lavage of stomach and use adsorbents orally

Content module № 3	**Medicines that affect the function of the central nervous system. Psychotropic drugs**
Topic № 8	**Analgetics**

1. **Relevance of the topic**: The study of the pharmacology of pain is of great both medical and social importance. Control of pain perception must know doctors of different profiles: surgeons, anesthesiologists, oncologists, neurologists and other narrow specialties. The elimination of pain contributes to the improvement of the processes of self-regulation and the resumption of fubctions of the organism, ensuring the optimization of the psychological state in severe inoperable cancer patients. Knowledge of the pharmacology of narcotic analgesics is the needfor the prevention of a dangerous complication - drug addiction, as well as for the therapy of this disease.

Neuropharmacology of pain and drug anesthesia remain one of the urgent problems of medicine. Antipyretic, analgesic, antiplatelet, ulcerogenic, nephrotoxic, and hepatotoxic, as well as immunosuppressive and immunotoxic action — all of these types of non-opiate analgesic activities are characteristic for all medicinal agents of this pharmacological group. Therefore, the correct choice of an adequate medicinal agent in a given clinical situation requires a knoledge of the mechanism of action and a range of side effects of this pharmacological group.

2. The specific goals:

1. To summarize and analyze the Pharmacologycal effects of properties of general-and non-opioid analgesics, explain the mechanism of their action.
2. Classify opiate and non-opioid analgesics by chemical structure, origin and affinity for opiate receptors.
3. Interpret indications for using medicinal agents in accordance with knoledge of pharmacodynamics.
4. Evaluate the ratio of positive effect / risk after using analgesics.
5. Explain features of drug dependence, occurs in opiate analgesics, clinical manifestations.
6. Explain the dependance of the action of medicinal medicinal agents that depress COX from the features Pharmacokinetics in patients of various ages, concomitent diseases and their therapy.
7. To analyze the concept of withdrawal syndrome, treatment methods. Addiction, as a social-biologycal problem.
8. Write out and analyze recipes for pharmacological preparations, adequately restore the impaired function of the host and antinociceptive system.

3. Basic knowledge, skills, skills needed to study the topic (interdisciplinary integration):

The name of the previous disciplines	Skills acquired
1. Latin language	To have the skills of writing prescriptions.
2. Normal physiology	Study of the “Nociception. Mechanisms of formation of pain ”
3. Pathological physiology	The concept of a system of protective reflexes, participation in the regulation of the segmental apparatus, subcortical and cortical structures.

4. Tasks for independent work in preparation for the lesson and in the lesson.

4.1. List of main terms, parameters, characteristics, which should be taken by the student in preparation for the lesson.

Term	Definition
1. Nociceptive system	The system of perception of pain through non-encapsulated and receptors, afferent fibers, before flowing impulses through the posterior horns of the spinal cord to the reticular formation, thalamus, hypothalamus, limbus on the cerebral cortex, as well as the somatic and adrenergic peripheral system
2. Antinociceptive system	This is a complex of brain structures that provides inhibition of the effect on transmission of pain-induced stimuli from primary afferent fibers to intercalated neurons
3. Opiategic medicinal agentsa	Medicinal agents Medicinal agents, similar to endogenous peptides (endorphins, enkephalin) for action on opioid receptors, cause resorptive selective suppression of pain sensitivity.
4. Inflammatory process	Universal reaction of the body to the Action of damaging environmental factors: infectious, chemical, physical and the like.
5. Non-opioid analgesics	Medicinal agents, causes blockade in the focus of pain and inflammation, in the hypothalamus enzyme cyclooxygenase (COX), involved in the conversion of arachidonic acid to endoperoxides, from which prostanoids are synthesized (prostaglandins and thromboxane)
6. Three isoforms of COG	COG-1 - necessary in physiological processes, COG-2 - promotes the synthesis of inflammatory agents, TsOG-3 - functions in the central nervous system

PREPERATIONS

N	Name of the drug	Form release	How to use
OPIAT MEDICINAL AGENTS			
1.	Morphini hydrochloridum	Tablets 0,01 g Amp. 1% 1 ml	Orally 0,01-0,02 g Subcutaneusly 1 ml
2.	Omnoponum	Amp. 1% and 2% 1 ml	Subcutaneusly 1 ml 1% sol
3.	Codeini phosphas	Powder 0,01 g	Orally 0,01-0,03 g for one administration
4.	Trimeperidinum (Promedolum)	Tablets 0,025 g Amp. 1% and 2% 1 ml	Orally 0,025 g for one administration Subcutaneusly 1 ml
5.	Phentanylum	Amp. 0,005% 2 ml	I/m 0,05- 0,1 mg
6.	Pentazocinum	Tablets 0,05 g Supp. rect. 0,05 g Amp. 3% 1 ml and 2 ml	Orally 0,05 g for one administration Rectally Subcutaneusly 1 ml
7.	Naloxonum	Amp. 1ml (0,4 mg), 2 ml	I/v, subcutaneously 1-2 ml
8.	Tramadoli hydrochloridum	Tabl., Caps 0,05, 0,1 g Amp. 5% 1 and 2 ml Supp. rect. 0,1 g	Orally 0,05-0,1g every 5 hours. I/v,i/m, subcutaneously 1-2 ml Rectally
9.	Buprenorphinum	Tablets 0,2 g	Orally 0,2 g every 6-8 hours.
10.	Nalorphini hydrochloridum	Amp. 0,5% 1 ml	I/v,i/m, subcutaneusly 1-2 ml
NON-OPIAT ANALGETICS			
1.	Acidum acetylsalicylicum (Aspyrin)	Tabl. 0,1; 0,25 i 0,5 g	Orally 0,5 g every 4-6 hours.
2.	Ketoprophenum	Tablets 0,1 g Amp. 5% 2 ml	Orally 0,01 g for one using I/m 2 ml

		Gel 2,5% 50 g	For application on skin
3.	Ibuprofen	Tablets, covering by membrane 0,2; 0,4 and 0,6 g	Orally 0,2 g 3 times a day.
4.	Diclofenac-natrium (Voltaren,)	Tablets l, covering by membrane 0,025 and 0,015 g Amp. 2,5% 3 ml Supp. rect. 0,05 g	Orally 0,025 g 3 times a day I/m 3 ml Rectally
5.	Naproxen	Tablets 0,25 and 0,5 g	Orally 0,25 g 3 times a day
6.	Meloxicam (Movalis)	Tablets 0,015 g Supp. rect. 0,015 g	Orally 0,015 g for one using Rectally
7.	Nimesulidum	Tablets 0,1 g Supp. rect 0,2 g	Orally 0,1 g for one using Rectally
8.	Celecoxib	Caps 0,2 g	Orally 0,2 g for one using
9.	Paracetamolum	Tablets 0,2 g Suppository 0,2 g	Orally 0,2 g for one using Rectally
10.	Metamizolum natrium (Analgin)	Tablets 0,5 g Amp. 50% 1 and 2 ml	Orally 0,5 g for one using I/m 1-2 ml

4.2. Theoretical questions to the lesson:

1. The concept of pain, the system of noci- and antinociception, the nerve and its humoral regulators.
2. Classification of opioid analgesics by chemical structure, origin and affinity for opiate receptors: a) Opiate (Agonists): - morphine - morphine and hydro.chloride, codeine phosphate, omnophone; - Phenylpyridines - fentanyl, trimeperidine (promedol). b) Opiate-negative: - benzomorphans - pentazocine (lexir, fortral). (Agonists-antAgonists) - morphine s - nalorfin, buprenorphine (norfin) - cyclohexane - Tamadol (tramal) - phenanthrene - butorphanol- morphine any - nalbuphine c) Opiate negative (antagonists): - morphine ana - nalorphine hydro.chloride, naloxone (narcan), naltrexone.
3. Mechanism of anesthetic action of opioid analgesics.
4. Pharmacology morphine and hydro.chloride. Features of its influence on the central nervous system, respiratory system, intestines, blood circulation, pertussis and vomiting centers.
5. Comparative characteristic of codeine phosphate, trimeperidin, pentazocine, tramadol, buprenorphine, butorphanol, nalbuphine.
6. Indications and counterindications to using opioid analgesics.
7. Acute poisoning with opiate analgesics. Clinical manifestations and relief measures.
8. Pharmacological characteristic nalorfin hydro.chloride, naloxone, naltrexone.
9. Drug dependence of opiate analgesics, the concept of withdrawal symptoms, treatment methods.

Drug addiction as a socio-biological problem. The Law of Ukraine "On Narcotic Medicinal Agents, Psychotropic Substances and Precursors" of February 15, 1995, No. 60/95-BP of July 04, 2013N 406-VII (406-18)}. List No. 770 - List of narcotic medicinal agents, psychotropic substances and precursors, approved by the Resolution of the Cabinet of Ministers of 06.05.2000 No. 770, with amendments from 16.

10. Distinguishing of action of non-opioid analgesics compared to opiate.
11. Classification of non-opioid analgesics by chemical structure.
12. Mechanism of analgesic and antipyretic action of non-opioid analgesics.
13. Pharmacological characteristic preparations: metamizole Natrii (analgin), Paracetamol, ketoprofen, dexketoprofen, acetylsalicylic acid, diclofenac-sodium, nimesulide. Indications for using. Side effects.

4.3. Practical tasks that are performed in the lesson:

4.3.1. Prescribe recipes and conduct their pharmacotherapeutic analysis (indicate group affiliation, indications for use, possible complications):

1. Trimeperidine in ampoules.
2. Tamadolin tablets in ampoules.
3. Buprenorphine in tablets.
4. Morphine hydrochloride in ampoules.
5. Omnopon in ampoules.
6. Fentanyl in ampoules.
7. Codeine phosphate powders.
8. Naloxone in ampoules.
9. Ketoprofen in ampoules.
10. Metamizole natrii in ampoules and in tablets.
11. Ibuprofen.
12. Diclofenac-natrii in tablets and in ampoules.
13. Naproxen.
14. Paracetamol in tablets and in rectal suppositories.
15. Acetylsalicylic acid in tablets.
16. Celecoxib.
17. Meloxicam.

4.3.2. Practical tasks performed at the lesson:

1. To familiarize with the preparations on the topic, to determine their affiliation with the pharmacological group and indications for use. Fill in the table:

Preperations	Mechanism of action	Indications for using	Side effects
1. Morphine hydrochloride			
2. Omnopon			
3. Codeine phosphate			
4. Promedol			
5. Fentanyl			
6. Pentazocin			
7. Naloxon			
8. Tramadol hydrochloride			
9. Buprenorphine			
10.Acidi acethylsalicylici			
11.Naproxen			
12.Ibuprofen			
13.Diclofenac natrii			
14.Meloxicam			
15.Celecoxib			
16.Paracetamol			
17.Metamizole natrii			
18.Ketoprofen			

2. To substantiate the choice of the drug, its pharmaceutical form, dosage, concentration, route of administration and prescribe.

1. Synthetic analogue of morphine and for injections to a child of 5 years.
2. Piperidine analogue morphine a, which is a synergistic antagonist.
3. Medicinal agents, which are useful in patients with collaptoid condition.
4. Preparation for neuropanalgesia during biopsy.

5. Piperidine derivative for treatment of renal colic.
6. Medicinal agento with a strong dry cough in a postoperative patient.
7. Medicinal first aid for morphine poisoning.
8. Medicinal agents, a mixture of opium poppy alkaloids.
9. Antipyretic with fever for adults with gastric ulcer.
10. Antirheumatic medicinal agents in tablets.
11. Selective cyclooxygenase inhibitor in rheumatoid arthritis.
12. Analgesic with pronounced anti-inflammatory effect in candles.
13. Medicinal agents from the group of selective inhibitors of COX-2 for treatment of osteoarthritis.
14. Analgetic medicinal agento for toothache.
15. Medicinal agents for treatment of neuralgia injections.
16. Medicinal agent for treatment of myositis (choose an adequate dosage form).
17. Narcotic analgesic in ampoules for the pain of childbirth.

3. Instructions for conducting an experiments:

EXPERIENCE 1. General reaction to alkaloids.

Pour 2 ml of 1% solution of quinine hydrochloride, caffeine and papaverine hydrochloride into three tubes. Then add Lugol's solution, Lugol's solution, 0.1% solution of tannin, 0.1% solution of potassium permanganate to each tube. Monitor the intensity of reactions. Draw conclusions about the practical use of these reactions in medicine.

Materials for self-control.

A. Task for self-control:

Using of text books and operative insyructions, syudent must fill in table:

Table №1 "Classification of narcotic analgesics"

Put preparation in accordance to mechanism of action and expressiveness of action in respect of opiate receptors (+++ maximal action)					
Agonists	Agonists-antagonists	Antagonists	Opioid receptors		
			μ	δ	κ

Table № 2 "Comparative characteristic of narcotic analgesics"

Preparations	Expressiveness of action in therapeutic doses	Duration of action	Suppression of respiration	Constipation	Narcogenic potential
1. Morphine					
2. Omnopon					
3. Codeine phosphas					
4. Promedol					
5. Fentanil					
6. Pentazocin					
7. Naloxon					
8. Tamadol					
9. Buprenorphine					

Table №3 "Classification of non-steroid anti-inflammatory medicinal agents accordinning to suppression of isoforms of COX "

Put preparations in accordance with action			
Selective inhibitors of COX -3	Non-selective inhibitors (COX-1 and	Relatively selective inhibitors of COX-2	Selective inhibitors COX-2

	COX-2)		

Table № 4 «Main side effects of non-opioid analgesics"

Put preparations in accordance with side effects						
Ulcero-genic	Hema-toxic	Antiaggre-gant	Action on cartilage of joints			Immuno-depressive
			Chondrotoxic	Chondroneutral	Chondroprotective	

B. Self-control tasks:

Task1. A patient suffering from drug addiction entered a surgical clinic with symptoms of acute intestinal obstruction. After the introduction of atropine the Condition of the patient improved, the pain disappeared, the occurrence of stool indicated the elimination of obstruction.

A) Define preperation, which was used by a drug addict, his group belonging.

B) What is the reason for this complication? Ways to avoid this complication?

Task2. Patient was taken to hospital with a fracture of the lower limb and severe pain. For the prevention of pain shock introduced analgesic. The pain decreased, but vomiting began.

A) Define preparation, which was administered and its pharmacological group.

B) Explain mechanism of action and its prophylaxis. C) What can be a shock for pain shock?

Task3. It was called ambulance for patient, which was in coma condition. Patient was fined at his flat. Integuments are pale, mucous membranes of lips has cyanotic color, respiration is irregular, intermittent (Chain-Stokes), severe myosis, bradycardia, but tendon reflexes (knee, achilles) are preserved.

A) What caused the poisoning? B) What first aid should the doctor provide the patient?

C) Justify the main therapeutic measures.

C. Tests for self-control:

1. Patients with inoperable carcinoma of the stomach was prescribed promedol for relieving significant pain. Over time, Patient began to notice a decrease in the analgesic effect and duration of action preperation, a sharp increase in pain throughout the body. Patient explained this by saying that:

A. Promedol may accumulate B. Tachyphylaxis has arisen

C. Psychic staleness developed D. Addictive

E. The reabsorption of promedol in the tubules of the kidneys has decreased.

2. A patient with urolithiasis developed intolerable spasticboli. For the prevention of the pain shock of the Patient, a narcotic analgesic with antispasmodic effect was introduced with atropine. What is a medicinal agento?

A. Tamadol B. Promedol C. Procain D. Metamizole sodium E. Morphine and hydro.chloride

3. A 48-year-old male patient with symptoms of renal colic was admitted to the urology department. Which of the following medicinal medicinal agents for supression of attack the main effects is an analgesia and relaxation of smooth muscles?

A. Promedol B. Pipekuroniy C. Meliktin D. Analgin E. Atropine

4. After cranial trauma, an experienced physician has forbidden the introduction of morphine. Why?

A. Increases intracranial pressure B. Inhibits dying C. Reduces blood pressure

D. Causes cardiac arrhythmia E. Causes addiction

5. For analgesia when performing orthopedic surgery for a 4-year-old child, Patient used promedol. Why is this medicinal agent most shown in early ontogenesis?

A. Ultrashort action C. Provides long lasting analgesia

C. Weaker respiratory depression D. Not metabolized in the liver

E. Does not cause addiction

6. The patient after surgery for severe fracture was prescribed anestheticpreparation for a week. After it was canceled, the patient developed hyperthermia, bowel spasms and vomiting. What condition developed in a patient?

A. Allergy B. Idiosyncrasy C. Intoxication D. Abstinence E. Tachyphylaxis

7. A patient with severe traumatic brain injury developed a painful shock with respiratory depression and decreased arterial pressure. Indicate medicinal agentso care and prevention of shock complications?

A. Morphine hydrochloride B. Ketamine hydrochloride C. Cordiamin

D. Corglycon E. Fentanyl

8. Introduction of whatpreparation and is accompanied by a state of euphoria, and then drowsiness, violation of logical thinking, excitation of the centers of the analyzer (sight, hearing), the center of the vagus nerve?

A. Diazepam B. Ephedrine C. Difenin D. Omnopon E. Atropine

9. The patient in the postoperative period it is need to cope with acute pain. Preperations with which mechanism of action it is advisable to apply?

A. Opiate receptor inhibitors B. Prostaglandin synthesis inhibitors

C. Preparations causes stimulation of the receptor

D. Preparations causes stimulation of GABA-receptors

E. Preparations causes a stimulus of barbituric receptors

10. A strong cough in a patient who underwent surgery caused pain in the wound and bleeding. What medicinal agents it is need to apply in this state?

A. Methacin B. Codein C. Libeksin D. Omnopon E. Mezaton

11. The indications for narcotic analgesics (morphine, promedol) are only acute severe pains that threaten the life of the patient. What is the reason why the named group of drugs has such limited indications for practical use?

A. Medicinal dependence B. Hypersensitivity C. Cumulation D. Sensitization E. Potentiation

12. The introduction of morphine and effectively anesthetizes and prevents painful shock during injuries. What is the reason for the analgesic Action morphine?

A. With peripheral receptor unit

B. With a strong anti-inflammatory action m

C. With the inhibition of the formation of "mediators" of pain and inflammation in the tissues

D. In violation of the synaptic before achi in the pathways of pain sensitivity of the CNS

E. Impaired conduction of nerve fibers

13. Patients entered the intensive care unit with signs of acute morphine poisoning. What kind of medicinal agento it is needed in this case for gastric lavage?

A. Boric acid B. Natrii hydro.carbonate C. Solution Natrii chloride

D. Furacillin E. Potassium permanganate

14. For reduction of patient's chest pain, acute myocardial infarction was assigned topreparation from the group of narcotic analgesics. What type of therapy does this intervention belong to?

A. Symptomatic Therapy B. Etiotropic Therapy C. Substitution Therapy

D. Detoxification Therapy E. Elimination Therapy

15. After the diagnostic injection of naloxone, the young man developed severe psychosomatic disorders: tachyarrhythmia, changes in blood pressure, chills, tremor, vomiting, psychosis-like behavior, fear of death. What promoted negativity when naloxone was administered?

A. Drug dependency of narcotic analgesics B. Allergy of a non-slow type C. Idiosyncrasy

D. Tolerance to preparation in E. Acute poisoning

16. In patient it was diagnosed transmural myocardial infarction. Whatpreparation to him is it necessary to introduce for the prevention of cardiogenic shock?

A. Morphine and hydrochloride B. Reserpine C. Octadin

D. Phentolamine hydro.chloride E. Analgin

17. A patient after using of narcotic substance lacks consciousness, hypothermia, hypotension, sustained miosis. What help is most effective and will ensure patient survival?

A. Naloxone B. Nitrazepam C. Mezaton D. Etimizol E. Omeprazole

18. A woman of 63 years old was admitted with an acute attack of calculous cholecystitis. What analgesic is most appropriate to apply in this case?

A. Promedol B. Butadion C. Indomethacin D. Diclofenac-sodium E. Paracetamol

19. A patient has a severe polytrauma as a result of a car accident. Whatpreparation with anti-shock and universal anti-stress action m will prevent the development of traumatic shock?

A. Morphine and hydro.chloride B. Tubocurarin chloride C. Prednisolone hemisuccinate

D. Diclofenac sodium E. Adrenaline hydrochloride

20. After *consuming acetylsalicylic acid, the patient developed abdominal pain as a result of an aggravation of gastric ulcer. What is the basis of ulcerogenation aspirin*?

A. Antiprostaglandin Action B. Vasospasm

C. Immunosuppressive effect D. Choleretic diya E. Stimulate Action pepsin

21. A patient has pronounced pain syndrome in neuralgia. Medicinal agentso from the group of NSAIDs will reduce pain-perception?

A. Diclofenac sodium B. Codeine phosphate C. Ketamine D. Lidocaine

E. Droperidol

22. PatientM. 59 years old, with gouty arthritis, takes butadion. After analyzing the hemogram, the Patient canceled this preperation. What is a blood complication caused by butadione?

A. Leukemia B. Leucopenia C. Strengthening hemocoagulation

D. Reduced blood coagulation E. Eosinophilia

23. Patients with respiratory disease with constantly increased body temperature repeatedly used the antipyretic medicinal agent, which caused nausea, epigastric pain, right hypochondrium. Whatpreparation was patient?

A. Ortofen B. Vitamin C C. Analgin D. Indomethacin E. Spasmalgon

24. Patients angina uses acetylsalicylic acid in dose 100 mg 1 time a day. What is acetylsalicylic acid used in this case?

A. For lowering the level of prothrombin B. For lowering cholesterol

C. For reducing blood coagulation D. For reducing platelet aggregation

E. For expansion of the coronary vessels

25. For lowering the temperature (39.50 ° C), a non-narcotic analgesic, a derivative of pyrazolone, was introduced. It has a pronounced analgesic and antipyretic action, but weak anti-inflammatory activity. Whatpreparation was used?

A. Analgin B. Ibuorofen C. Ortofen D. IndoMethacin E. Celecoxib

26. A patient with chronic hyperacid gastritis developed joint pain. For their reduction, given concomitant pathology, celecoxib was prescribed. Selective Action on which enzyme will eliminate the negative impact on the gastric mucosa?

A. Cyclo-oxygenase 2 B. Cyclo-oxygenase 1 C. Phospholipase A2

D. Phospholipase C E. Kallikrein

27. A patient during the endoscopic examination of the gastric mucosa revealed several erosions. Which of these medicinal agents could cause such a complication?

A. Diazepam B. Atropine C. Diclofenac sodium D. Tamadol E. Anestesin

28. Patients with rheumatoid arthritis for the prevention of possible negative effects on the gastric mucosa assigned preparation from the group of non-steroidal anti-inflammatory medicinal agents - a selective COX-2 inhibitor. Indicate preparation.

A. Celecoxib B. Analgin C. Aspirin D. Butadion E. Ibuprofen

29. What medicinal agent is better to use for supression of pain in acute cholecystitis?

A. Nalorfin B. Omnopon C. Morphine D. Analgin E. Fentanyl

30. Patients with severe maxillofacial trauma entered the emergency department. Whatpreparation to him it is need to introduce for relieving a painful shock?

A. Midocalm B. Naloxon C. Ibuprofen D. Propranolol E. Promedol

31. A young man of 15 years old was taken to the emergency room in an unconscious state. Objectively: Patients do not respond to external stimuli, breathing is periodically the same as

Cheyn-Stokes, pupils are constricted, papillary reflex is absent. It was found that these symptoms are caused by the use of morphine as well. Indicate medicinal therapy about antidote therapy:

A. Unitiol B. Apomorphine C. Calcium chloride D. Naloxon
E. Ketamine

32. Indicate the properties inherent in promedol:

A. Severe central analgesic action
B. Blockade opiate receptors C. Blockade prostaglandins synthetase
D. Protective stress effect E. Antihistamine effect

33. In paediatric practice is widespread using pentazocine. Whereby?

A. Is a synergistic antagonist morphine B. Does not depress respiration.
C. Increases blood pressure D. Blocks the secretion of kinins E. Does not cause dependence

34. The patient has morphine poisoning. Define antidote relief measures.

A. Gastric lavage with potassium permanganate B. Artificial ventilation and oxygen
C. The appointment of saline laxatives D. Introduction of Tramadole hydrochloride
E. Decreased blood pressure by hypotensive medicinal agents

35. Indicate the morphine a pharmacodynamic trait, which determines thepreparation a to belong to the group of narcotic analgesics:

A. Spastic effect B. Activation an opioid receptors C. Blockade of prostaglandin synthesis
D. Depression of the respiratory centre E. Antispasmodic effect

36. What narcotic analgesic models Condition like neuroleptanalgesia?

A. Omnopon B. Pentazocin C. Promedol D. Fentanyl E. Tramadol

37. When poisoning with narcotic substances, naloxone is used to help. To note the mechanism of antidote action naloxone:

A. Is an antagonist of κ receptor B. Is an agonist of μ-receptors
C. Is an antagonist of δ-receptors D. Is an antagonist of M-receptors
E. Is a κ-receptors agonist

38. Chronically onkoPatientit is need anesthesia. Which narcotic analgesic long action is more expedient to appoint?

A. Tramadol B. Promedol S. Norfin D. Morphine E. Phentanil

39. What is a medicinal agent that can be prescribed for Patients with a peptic ulcer during a fever?

A. Analgin B. Paracetamol S. Aspirin D. Ibuorofen E. Indomethacin

40. A patient has chronic anaemia. What medicinal headache, which does not violate haematopoiesis, can be prescribed?

A. Analgin B. Butadion C. Acetylsalicylic acid D. Indomethacin E. Ibuprofen

41. The patient went to the doctor with complaints of pain and restriction of movement in the knee joints. Which nonsteroidal anti-inflammatory medicinal agents should be prescribed, given the history of chronic gastroduodenitis?

A. Promedol B. Diclofenac-sodium C. Acetylsalicylic acid D. Celecoxib E. Paracetamol

42. Patients with rheumatoid arthritis have been prescribed a non-steroidal anti-inflammatory medicinal agento. But, due to concomitant disease, after some time, the preparation was canceled. What disease is contraindicated to using this group of preparations?

A. Peptic ulcer B. Acute bronchitis C. Pneumonia D. Radiculitis E. Migraine

43. A patient has a pronounced pain syndrome in neuralgia. Which nonsteroidal anti-inflammatory medicinal agent will reduce pain perception?

A. Diclofenac sodium B. Codeine phosphate S. Ketamine hydro.chloride
D. Lidocaine hydro.chloride E. Pancuronium bromide

44. The patient, who is three months pregnant, has arthritis of the temporomandibular joint. What is a medicinal agent with an anti-inflammatory and anti-pain action? It is need to designate a patient?

A. Indomethacin B. Pentazocine S. Paracetamol D. Ibuprofen E. Butadione

45. A nonsteroidal anti-inflammatory medicinal agent is prescribed for pain in the craniofacial region, with the exception of:

A. Headache B. Fractures (injuries) of the jaws C. Neuritis of n. trigeminus
D. Arthritis of the temporomandibular joint E. Teeth pain in pulpits

Content module № 3	**Medicines that affect the function of the central nervous system. Psychotropic drugs**
Topic № 9	**Antipsychotics, tranquilizers, hypnotics and sedatives**

1. Relevance of the topic: Neuroleptics are neuronal depressants used in medicine mainly as antipsychotic agents. Tranquilizer agents are medicines, which are efficient due their ability to diminish anxiety and stress. Tranquilizers and sedative drugs are used for treatment of neurosis. Clinical using of neuroleptics, tranquilizers and sedatives possesses returning for normal social activity for many patients with psychotic diseases.

2. The specific goals:

1. Analysis of pharmacological properties of main psychotropic agents with deprivative action.
2. Understand classification of neuroleptic medicinal agent's accordining to chemical structure, origin and spectrum of influence on receptors.
3. Understand classification of tranquilizer agents accordining to chemical structer, origin, and features of mechanism of action.
4. Understand classification and take interpretation for using hypnotic drugs and sedative medicinal agents.
5. Take interpretation of indications for using psychotropic medicinal agents with deprimirative action in accordance with knowledge about pharmacodynamics of these preparations.
6. Describe mechanism of action and indications for using of lithium preparation.
7. Estimate ratio positive effect/risk of using psychotropic medicinal agents with deprimirative action.
8. Explain features of side effects of psychotropic medicinal agents with deprimirative action.
9. Write and make analysis of prescriptions for pharmacological prepaeations in accordance with disorders of psychoemotional condition.

3. Basic knowledge, skills, skills needed to study the topic (interdisciplinary integration):

The name of the previous disciplines	Skills acquired
1. Latin language	Take skills about writing of prescriptions
2. Normal physiology	Different CNS structures: limbic system, conception about small and great limbic cycle Using knowledge about hypnogenic, pyramid and extrapyramid brain structures. Make interptitation of mechanisms of sleeping and wakefulness and identification sleeping phase's and wakefulness. Student must estimate their significance in formation high nervous activity
3. Medical psychology	Main about definition about attention, cognitive property, memory, perception, mood, emotion and ideation

4. Tasks for independent work in preparation for the lesson and in the lesson.

4.1. List of main terms, parameters, characteristics, which should be taken by the student in preparation for the lesson.

Term	Definition

1. Neuroleptic medicinal agents	Medicinal agents, which cause suppression psychic (high) nervous activity, emotional condition and behavior (they cause suppression of delirium, hallucinations). But these medicinal agents have such side effects as disorder of congestive ability
2. Anxiolytic medicinal agents (tranquilizer drugs)	Psychotropic medicinal agents, which cause supptession of anxiety, sensitivity of terrible, restlessness, irritability, aggression. They cause loss of discomfort sensitivity
3. Hypnotic drugs	Medicinal agents, which cause suppression of function CNS and appearance of sleeping, which is like physiological.
4. Sedative medicinal agents	Medicinal agents, which have tranquilize action, because of increasing of retardate processes of in CNS
5. Normotimic medicinal agents (Lithium preparations)	Medicinal agents, which can remove clinic symptoms of acute maniacal excitation in mental patients and for prevention of affective disordes

PREPERATIONS

N	Name of the drug	Form release	How to use
NEUROLEPTIC MEDICINAL AGENTS			
1.	Chlorpromasin (Aminazin)	Dragee 0,025 and 0,05 g Tablets 0,01 g Amp. 2,5% 1, 2 and 5 ml	Inside after meal 0,05 g 1-3 times a day I/m , i/v1-5 ml
2.	Fluspirilenum (Fluspirilenum decanat)	Amp. 0,2% 2 ml	I/m 2 ml one time for one week
3.	Haloperidol	Tablets 0,0015 and 0,005 g Amp. 0,5% 1 ml; 0,2% 10 ml	Inside 0,005 g at once I/m 1-5 ml
4.	Droperidol	Amp. 0,25% 5 and 10 ml	Subcutaneutsly, i/m , i/v1-4 ml
5.	Clozapin (azaleptin, leponex)	Tablets 0,025 and 0,1 g Amp. 2,5% 2 ml	Orally 0,1 g 2-3 times a day I/m 1-2 ml during evening
6.	Chlorprothixen	Tabl., Dragee 0,05 g Amp. 2,5% 1 ml	Inside 0,05 g at once I/m 1-2 ml
7.	Sulpirid (Eglonil)	Tablets 0,2 g Amp. 5% 2 ml (100 mg) Flac.0,5% 200 ml	Orally 0,2 g 3 times a day I/m 2 ml Inside 0,025g (1 teaspoon)
8.	Phtorfenasin (Moditen, Mirenil)	Tablets 0,001 g; 0,0025 g and 0,005 g Amp. 0,25% 1 ml	Inside 0,005 g at once I/m 1 ml
9.	Risperidon	Tablets 0,001 g, 0,002 g and 0,004 g	Sublingually 0,001 g
10.	Olanzapin	Tablets 0,005 and 0,01 g	Inside 0,01 g at once
ANXIOLYTIC MEDICINAL AGENTS (TRANQUILIZER DRUGS)			
1.	Chlozepid (Elenium)	Tabl., dragee 0,005 g	Orally 0,005 g for one administration
2.	Diazepam (Sibazon)	Tablets 0,005, 0,001 Amp. 0,5% 2 ml	Inside 0,005 g at once I/m , i/v 1-2 ml
3.	Phenazepam	Tablets 0,00025 and 0,001 g	Inside 0,001 g at once
4.	Nitrazepam	Tablets 0,005 and 0,01 g	For 30 minutes before sleeping 0,0025- 0,01 g
5.	Gidasepam	Tablets 0,02 g	Orally 0,02 g for one administration

6.	Mebicarum	Tablets 0,3 g	Orally 0,3-0,6 g 3 times a day
7.	Aphobazol	Tablets 0,01 g	Orally 0,01 g 3 times a day
8.	Flumazenyl	Amp. 0,01% 2 ml	I/v 1-2 ml after dissolving in 5% sol of glucose
HYPNOTICS			
1.	Phenobarbital	Tablets 0,05; 0,1 g	Orally 0,05- 0,1 g before sleeping
2.	Nitrazepam	Tablets 0,005; 0,01 g	For 30 minutes before sleeping 0,0025- 0,01 g
3.	Zaleplon	Tablets 0,01 g	Orally 0,1 g for 30 minutes before sleeping
4.	Zopiclon	Tablets 0,0075 g	Orally 0,0075-0,015 g before sleeping
5.	Zolpidem	Tablets 0,01 g	Orally 0,01 g for 30 minutes before sleeping
6.	Donormilum	Tablets 0.015 g	Orally 0,015 g for 15-30 minutes before sleeping
7.	Suvorexant (Belsorma)	Tablets 0.01 g	Orally0,01 g for 1 hour before sleeping
8.	Melatonin	Tablets 0,003 g	For 30 min. before sleeping 0,003 g
SEDATIVE MEDICINAL AGENTS			
1.	Natrii bromidum	Tablets 0,5 g Flac. 3% 200 ml	Orally 0,5 g 3 times a day Orally 0,45 g (1 table spoon.)
2.	Valerianae	Tincture 30 ml Tablets 0,2 g Species 100 g	Orally 30 drops. for one administration Orally 0,2-0,4 g for one administration Preparing of innfusum for oral using
3.	Tinctura Paeoniae (Anomalae)	Flac. 50 ml	Orally 20 drops. for 10 minutes before meal
4.	Tinctura Leonuri	Flac. 25 ml	Orally 50 drops 3 times a day
5.	Corvaldinum	Flac. 25 ml	Orally 10-40 drops 3-4 times a day
NORMOTIMIC MEDICINAL AGENTS			
1.	Lithii hydroglutaminatum	Caps 0,3 g	Orally 0,3 g 2 times a day

4.2. Theoretical questions to the lesson:

1. Definition about morphological structure emotions, structure of big and small limbic circle, reticular formation.
2. Classification of psychotropic medicinal agents with deprimirative action.
3. Overall characteristic of neuroleptics. Definition about disleptics. Classufication of neuroleptics accodining to chemical structure.
4. Mechanism of antipsychotic action of neuroleptics. Pharmacologycal effects of chlorpromasinum, fluspirilenum decanat (fluspirilenum), droperidolum, haloperidolum, sulpiridum, clozapinum, risperidonum, olanzapinum, chlorpromasinum, phtorfenasinum. Indications for using. Definition about neuroleptanalgesia.
5. Side effects of neuroleptics.
6. Pharmacology of tranquilizer drugs. Classufication. Mechanism action of tranquilizer agents. Definition about benzodiazepine receptors.
7. Pharmacology of diazepam (sibazon), clonasepamum, phenazepanum, nitrazepamum, chlozepidum. Comparative characteristic. Daily tranquilizer agents (gidasepamum, medasepamum). Definition about atypic tranquilizer agents.
8. Anxiolytic medicinal agents Anxiolytic drugs of non-benzodeasepin structure (mebicarum, aphobazolum).

9. Indications and contraindications for using of tranquilizer drugs. Side effects of tranquilizer agents. Medicinal dependence. Definition about ataralgesia.
10. Antagonist of benzodeasepin receptors – phlumastnil. Drug dependence.
11. Hypnotic agents. Modern point of view about sleep nature. Main types of insomnia. Classufication of hypnotic agents accordinning to chemical structure. and their overall characteristic. Possible mechanisms of action of hypnotic agents.
12. Comparative characteristic of hypnotic agents of different group (phenobarbital, nitrazepam, doxilamin (donormil), zopiclon, zolpidem, zoleplon, suvorexant, melatonin). Indications for using of these preparations. Side effects (syndrome of abstinantion, afteraction , drug dependence).
13. Acute poisoning by barbiturate agents. Emergancy care in this condition.
14. Normotimics (lithium preparations). Pharmacokinetics and pharmacodynamics, indications for using . Side effects. Acute poisoning by lithium preparations. Emergancy care in this condition.
15. Sedative medicinal agents. Classufication and pharmacological characteristic Sedative medicinal agents (Natrii bromide, tincture pionae, tincturae valerianae tincture leonyri, combine preparation (corvaldin, persen, novopassit). Sedative medicinal agents with metabolic action (melatonin, glycesed).

4.3. Practical tasks that are performed in the lesson:

4.3.1. Prescribe recipes and conduct their pharmacotherapeutic analysis (indicate group affiliation, indications for use, possible complications):

1. Chlorpromasin (aminazine) in ampoules and draggee.
2. Droperidol in ampoules
3. Haloperidol
4. Respiredon
5. Olansapin
6. Diazepam in ampoules and in tablets
7. Phenazepam in tablets
8. Gidazepam in tablets
9. Nitrazepam
10. Zopiclon
11. Doxilamin
12. Phenobarbital
13. Tincture Valerianae
14. Corvaldin
15. Lithium.glutaminat in tablets

4.3.2. Practical tasks performed at the lesson:

1. To familiarize with the preparations on the topic, to determine their affiliation with the pharmacological group and indications for use. Fill in the table:

Preperations	Indications for using	Side effects
Chlorpromasin		
Droperidol		
Haloperidol		
Respiredon		
Olansapin		
Diazepam		
Phenazepam		
Phenobarbtal		
Gidazepam		
Nitrazepam		
Zopiclon		

Doxilamin		
Valeriana		
Corvaldin		
Lithium glutaminat		

2. To substantiate the choice of the drug, its pharmaceutical form, dosage, concentration, route of administration and prescribe.

1. Medicinal agents, which are need in disturbed sleep.
2. Day tranquilizer to the artist before going on stage.
3. Dopamine antagonist in mental disorders.
4. Normo-chemical medicinal agent, salt accordining to origin.
5. Medicinal agent, enhancing the inhibitory processes in the large limbic circle.
6. Sedative medicinal agent is of plant origin.
7. Medicinal agents from the phenothiazine group, which useful in alcoholic psychosis.
8. Medicinal agents possessing adrenergic, cholinergic, histamine-blocking properties.

3. Instructions for conducting an experiments:

EXPERIENCE 1. Pharmaceutical interaction between chlorpromazine and barbiturates.

Pour out 2 ml of solution of thiopental into the tube. Add 0.5 ml of 1% solution of chlorpromazine. Register the results and make conclusion.

EXPERIENCE 2. Potentiation of general anesthesia by chlorpromazine.

Administer chlorpromazine SC to albino mouse (2.5-3 mg / kg of body weight). 30 minutes after that. Register the development of general anesthesia and make conclusion.

EXPERIENCE 3. Cataleptic action of chlorpromazine.

Try to place albino rat on 4 cylinders. Register animal's reaction. Administer chlorpromazine intraperitoneally to the rat (40 mg / kg of body weight). 20 min after repeat attempt to place the animal on cylinders. For a long time

EXPERIENCE 4. Test for compatibility of amnazine with barbiturates.

In a test tube, pour 2 ml of a 2% solution of barbamil and add 0.5 ml of a 1% solution of chlorpromazine. Watch the reaction. Make a conclusion about the type of compatibility of substances.

EXPERIENCE 5. Solubility of hypnotic medicinal agents.

Add 0.1 g of nitrazepam, brobated and phenobarbital, each in 3 tubes (total 9 tubes). Next add solvents: each of the preparation Dissolve in cold water, alkaline pH water and alcohol. Draw conclusions.

Materials for self-control.

A. Tasks for self-control:

Using of text books and operative insyructions, syudent must fill in table:

Table "Types of neuroleptics action", to dtaw benzodiazepine of receptors.

Medicinal agents	Types of neuroleptic action						
	Antipsy-chotic action	Sedative	Hypoter-mic	Hypnotic	Antivomit ing	Antihysta minic	Potewntiat ion of action of action fnalgetics and somnolent agents
1. Aminazinum 2. Droperidolum 3. Triftazinum 4. Haloperidolum 5. Chlorprotixen 6. Sulpiridum 7. Closapin 8. Phtorphenasin							

B. Self-control tasks:

Task1. A patient in a state of psychosis with delusions and hallucinations was administered a neuroleptic medicinal agent. After some time, the phenomena of psychosis were eliminated, but if you want to get out of bed Patient lost consciousness.

A) What preparation was administered to the patient? Define his group of this preparation

B) What are the complications? Ways to avoid this complication?

Task2. A patient in various stressful situations often took a soothing medicinal agents. A month later, he noted that he had a need to constantly take this medicinal agent. With the abolition of pharmacological preparations, the patient's mood worsened, symptoms of general ailment appeared.

A) Define preparation, which was taken by the patient, define his group belonging.

B) How can explain the described complications and how to avoid it?

Task3. In the delusional hallucinogenic state, the Patients have been assigned an antipsychotic medicinal agent. However, the patient began to complain of dizziness, weakness, nausea, which after the study indicated a decrease in pressure.

A) How did the preparation be treated the patient?

B) Explain of the appearance of the complication.

C) How does the preparation it is needed to replace this?

Task4. The medicinal agent promotes the onset of sleep without disrupting its phase structure. Enhances GABA-ergic inhibition, but does not interact with benzodiazepine receptors.

A) Define preparation.

B) Indicate his indications for using.

C. Tests for self-control:

1. Patient schizophrenia prescribed chlorpromazine. Which of the pharmacodynamic effects is the basis for its purpose?

A. Antipsychotic B. Protirvotny C. Hypothermic
D. Miorelaxant E. Hypotensive

2. In a patient after injury, generalized tonic-clonic convulsions are periodically observed with a loss of skin disease, which are then changed by a general depression of the central nervous system. What is the medicinal agent about it is need to assign the patient?

A. Phenobarbital B. Tsiklodol C. Livodopa D. Teturam E. Midantan

3. Patient40 years in a state of excitement, aggression, delirium has been delivered to a psychiatric clinic. What preparation should enter the patient?

A. Valerian tincture B. Seduxen C. Reserpine D. Aminazin E. Natrii bromide

4. Neuroleptics have the ability to suspend delirium, hallucinations, reduce aggressiveness, weaken psychomotor excitation. This reaction is called:

A. Antipsychotic B. Antiineurotic C. anxiolytic
D. Antihysteric E. Hypodynamic

5. A patient who has recently experienced increased excitation, irritability, tearfulness, insomnia, was prescribed phenazepam. Indicate mechanism action of this medicinal agent?

A. Stimulation HAAM-receptors B. Stimulation Beta-adrenoreceptors
C. Stimulation benzodiazepine receptors
D. Stimulation M-cholinergic receptors E. Stimulation N-cholinergic receptors

6. During the in-patient operation, Patient for sedation, in order to reduce the patient's fear and for potentiation of the action of anesthetics, he appointed a tranquilizer, a benzodiazepine derivative. Which of the following medicinal agents was prescribed by a doctor?

A. Atropine B. Droperidol c. Aminazin D. Diazepam E. Sulpiride

7. Patient for short-term surgical intervention conducted neuroleptanalgesia by administering fentanyl and droperidol. Which of the following phenomena justifies the achievement of pain relief, sufficient for the operation?

A. Cumulation B. Potentiation C. Summation D. Sensitization E. Direct synergism

8. When prescribing preparation ov bromine for treatment epilepsy, Patient recommended for improving the therapeutic effect:

A. Exclude from the diet of Sira B. Lie down 2 hours after taking the medicinal agents

C. Restrict the use of salt D. Maintain body and mouth hygiene.

E. Maintain regular stools

9. In the premenstrual period, a woman often has increased nervous irritability, spasms in the gastrointestinal tract. Medicinal agents will warn of the development of these symptoms?

A. Phenazepam B. Phenobarbital C. Tincture valeriana

D. Natrii bromide E. Magnesium sulphas.

10. Diazepam refers to tranquilizers of prolonged action. Which pharmacokinetic feature causes duration of action preparation?

A. Formation of an active metabolite B. Absence of metabolism

C. Intensive metabolism D. Low lipid solubility E. Good solubility in water

11. In the dental office the patient had a convulsive seizure similar to epileptic. What medicinal agent is better to use for patient care?

A. Ditilin B. Droperidol C. Diazepam D. Dimedrol E. Difenin

12. A patient with a dislocated joint and acute pain in the emergency room had a fit of hysteria. What medicinal agent can prepare a patient for dislocation?

A. Use of sniff of ammonia for application on nasal cavity. Administer aminazin

C. Administer sibazon D. Administer corvalol E. Administer cordiamine

13. Owing to the treatment of disease by neurotropic medicinal agents, akinesis and tremor of the extremities arose. Medicinal agents which group was treated sick?

A. Tranquilizers B. Antidepressants C. Anti-park Lids

D. Prophylaptic E. Neuroleptics

14. In the complex treatment of delirium and hallucinations, Triftazin was prescribed. Mechanism action in the central nervous system determines the effectiveness of action preperation?

A. Stimulation adrenergic processes B. By pressure adrenergic processes

C. Stimulation dopaminergic processes D. Inhibition of dopaminergic processes

E. Stimulation of cholinergic processes

15. The student turned to the doctor with a request to help him overcome fear before dental procedures.preparation advised him to take a doctor?

A. Tamadol B. Aminazine C. Droperidol D. Dimedrol E. Diazepam

16. Patient 62 years old has insomnia. Which medicinal agent from the above it is advisable to appoint?

A. Nitrazepam B. Ethyl sodium C. Chloral hydrate

D. Natrii hydroxybutyrate E. Diphenhydramine

17. In a patient with neurosis, sleep is disturbed. A medicinal agent is prescribed that activates the benzodiazepine receptors. Define it.

A. Nitrazepam B. Chloralhydrate C. Natrii bromide D. Natrii Valproate E. Phenobarbital

18. The patient has disturbed sleep. A medicinal agent is prescribed that blocks the histamine receptors. Define it.

A. Donormil B. Nitrazepam C. Natrii bromide D. Natrii Valproate E. Phenobarbital

19. For treatment of a patient suffering from insomniait was administered nitrazepam. Insomnia disappeared for a while, but then reappeared, despite the use of the medicinal agents. What is the phenomenon associated with a decrease in the effect of nitrazepam?

A. Habituation B. Sensitization C. Cumulation D. Passion E. Idiosyncrasy

20. Patient for insomnia was prescribed phenobarbital for 1 Tablbe fore bedtime. On the 10th day, the Patient again went to the doctor with complaints that during the first days after the start of the prescription, the sleep came, and the last 2 days, despite taking sleeping pills, the patient was tormented by insomnia. What is the name of the weakening effect of the pharmacological medicinal agents after repeated administration?

A Tolerance B. Cumulation C. Sensitization D. Tachyphylaxis E. Idiosyncrasy

21. For termination of delirium and hallucinations in patient with schizophrenia it was administered aminazin. Explain mechanism antipsichotic action of thispreparation:

A. Stimulation of cholinergic processes in CNS

B. Blockade cholinergic processes in CNS

C. Stimulation of adrenergic and dophaminergic processes in CNS

D. Blockade adrenergic and dophaminergic processes in CNS

E. Blockade reversible re-uptake of catecholamine's

22. For treatment patient, which suffered from schizophrenia, it was administered aminazin. Find pharmacodynamic mechanism of action of this preparation. Due to this mechanism it was reduction psychoproductive symptomatic. Find such mechanism.

A. Antipsychotic B. Antivomiting C. Hypotermic

D. Myorelaxative E. Hypotensive

23. With help ambulance patient was delivered to the hospital. Patient was in condition of severe depression. It was suicidal attempt of patient. Diagnos: depressive psychosis. Preparation from what group must be administered for treatment of patient?

A. Tranquilizers B. Sedative C. Neuroleptics

D. Antidepressants E. Lithium salt

24. For realization operation it was used for patient one preparation with purpose ataralgesia. This preparation was administered together with second medicinal agent. What preparation, which is derivative of benzodiazepine, ir was administered?

A. Sulpirid B. Droperidol C. Trioxasin D. Diazepam E. Aminazin

25. A woman of 35 years went to the doctor complaining of irritability, rapid weakness, hypersensitivity, insomnia. To eliminate the patient's neurosis, he assigned the tranquilizer diazepam to the patient. Specify the pharmacodynamic effect of diazepam, which allowed to apply it in such conditions.

A. Anxiolytic B. Anticonvulsive C. Myorelaxative

D. Psychostimulative E. Antipsychotic

26. Before realization of surgical operation it was used ateralgesia. Combination of what preparations is need for ateralgesia?

A. Droperidol + phenobarbital B. Omnopon + nitrous oxide

C. Phentanil + droperidol D. Morphine + analgin E. Diazepam + morphine

27. Primary treatment with help diazepam was without desirable result. It is need to administer more efficient preparation:

A. Sibazon B. Clozapin C. Phenazepam D. Phtorfenasin E. Sulpirid

28. Define what effect is not typical for neuroleptics:

A. Antipsychotic B. Anxiolytic C. Antivomiting

D. Hypertonic E. Psychodepressive

29. It was waiting by patient at the age of 21 years old extraction of tooth. During waiting patient has terrible sensitivity. What preparation must be administered for liquidation of terrible sensitivity?

A. Ethimisol B. Diazepam C. Aminazin D. Analgin E. Carbamazepin

30. Define mechanism of sibazon action:

A. Interaction with central adrenergic receptors B. Interaction with batbiturate receptors

C. Interaction with dophamin receptors D. Interaction with benzodiazepine receptors

E. Interaction with central chemoreceptors

31. What effect is typical for somnolent medicinal agents?

A. Sedative B. Analgetic C. Antivomiting D. Hypertonic E. Somnolent

32. Somnolent action of zopiclon is connected with influence:

A. Local on anterior hypothalamus B. Local on frontal areas of new cortex

C. Diffuse on cortex and subcortical structures D. Local on posterior hypothalamus

E. Local on oblong brain

Content module № 3	**Medicines that affect the function of the central nervous system. Psychotropic drugs**
Topic № 10	**Anticonvulsants. Medicines for the treatment of neurodegenerative diseases**

1. Relevance of the topic: Anticonvulsants are useful for treatment patients with convulsions, which are appeared for epilepsy. These preparations cause significant reducing of the occupational cramp attacks. In patients with epilepsy can be degenerative changing's in the brain and decreasing memory and intelligence. For the prevention of these complications antiepileptic medicinal agents are applied. Some of them are used in convulsive states (status epilepticus), which is life threatening.

Parkinsonism - it turns out violations of functions of arbitrary muscles, occurs as a result of infectious diseases of the brain, atherosclerosis, and after treatment with help narcoleptics, etc. Parkinsonism reduces the quality of life of older people, may be the cause of disability. For the treatment of this disease anti- parkinsonian medicinal agents are used. Medicinal agents, which are useful for therapy of Alzheimer's disease, multiple sclerosis and amyotrophic lateral sclerosis are possesses reparative process in nerve tissue.

2. The specific goals:

1. To be able to identify the group of anti-epileptic and anti-parkinsonian medicinal agents.
2. Predict changes in functions of the CNS under the influence of antiepileptic and anti-parkinsonian medicinal agents in accordance with their pharmacodynamics and pharmacokinetics (in therapeutic and toxic doses).
3. Choose adequate medicinal agents for treatment of various forms of epilepsy, parkinsonism.
4. Put in practice analysis about possibility of the appearance side effects of the studied medicinal agents in order to prevent them.
5. Prescribe and conduct pharmacological analysis which was written preparation with anti-epileptic and anti-parkinsonian action.

3. Basic knowledge, skills, skills needed to study the topic (interdisciplinary integration):

The name of the previous disciplines	Skills acquired
1. Latin language	Taking the skills of writing prescriptions
2. Normal physiology	Using knowledge about hypnogenic, pyramidal and extrapyramidal structures of the brain
3. Biological chemistry	Interpret the structure and functioning of parts of the synapse

4. Tasks for independent work in preparation for the lesson and in the lesson.

4.1. List of main terms, parameters, characteristics, which should be taken by the student in preparation for the lesson.

Term	Definition
1. Somnolent medicinal agents	Medicinal agents, which cause suppression of CNS function and cause sleeping. Such effects are like physiological
2. Antiepileptic medicinal agents	Medicinal agents, which cause suppression of cramps, and others clinic symptoms of epilepsy
3. Antiparcinsonic medicinal agents	Medicinal agentsa, causes decreasing trembling paralysis (Parcinson desiase).

PREPARATIONS

N	Name of the drug	Form release	How to use
ANTIEPILEPTIC MEDICINAL AGENTS			
1.	Phenobarbitalum	Tablets 0,05 and 0,1 g	Orally 0,05 - 0,1g before sleeping
2.	Phenytoinum (Dipheninum)	Caps 0,1 g Tablets 0,117 g	Orally 0,1 g 3 times a day after meal
3.	Carbamazepinum	Tablets 0,1, 0,2 and 0,4 g	Orally 0,2 g 2-3 times a day
4.	Clonazepamum	Tablets 0,001 and 0,002 g	Orally 0,004-0,008 g 3-4 times a day
5.	Lamotriginum	Tablets 0,025, 0,05 and 0,1 g	Orally 0,025 g every second day in dose 1-2 tablets 2-3 times a day with graduel increasing of dose up to 0,1g
6.	Ethosuximidum (Suxilep)	Caps 0,25 g	Orally 0,75-1,5 g 4-6 times a day
7.	Natrii valproas (Acediprol)	Tablets 0,1, 0,2 and 0,5 g Dragee 0,1, 0,2 and 0,5g	Orally 1,0-2,5 g during taking food 3-4 times a day
ANTIPARKINSON MEDICINAL AGENTS			
1.	Levodopa	Tablets 0,25 and 0,5 g Caps 0,25 and 0,5 g	Orally 0,25 g for one dose, then dose can be increased till 3-5 g for 1 weak
2.	Amantadinum	Tablets 0,1 g	Orally 0,1 g at first 2, then3-4 times a day
3.	Biperidenum	Tablets0,002 g	Orally 0,002 g 3-4 times a day
4.	Selegilinum	Tablets 0,005 g	Orally 0,005 g 2 times a day
5.	Nacom	Tablets (levodopa 0,25g and carbidopa 0,025 g)	Orally 1 tablet 1-2 times a day, gradually increasing dose (1 tabl 3-6 times a day
6.	Cyclodolum (Trihexiphenidin)	Tabl.0,001, 0,002 and 0,005 g	Orally 0,005 g for one dose
MEDICINAL AGENTS FOR TREATMENT OF ALZHEIMER DISEASE			
1.	Donepezil	Tablets 0,005 g	Orally 0,005 g 1 time a day
2.	Rivastigminum	Caps 0,0015 g	Orally 0,0015 g 2 times a day
3.	Galanthamini hydrobromidum	Amp.0,5% and 1% 1ml	I/m 0,0025-0,01 g 1-2 times a day
4.	Choline alfoscerate	Caps 0,4 g Amp. 4 ml	Orally 0,4 g 3 times a day I/m, i/v in dose 1 g
5.	Memantini hydrochloride	Tablets 0,01 g	Orally 0,01 g times a day
6.	Glycinum	Tablets 0,1 g	Sublingually 0,01 g 3-4 times a day
7.	L-Lysini aescinatum	Amp. 0,1% 5 ml	Intravenously 5-10 ml 2-8 times a day
8.	Cerebrolysinum	Amp. 5, 10 and 20 ml	Intravenously 10 ml I/m 5 ml

4.2. Theoretical questions to the lesson:

1. Convulsions as symptoms of various pathological conditions. Use ofpreparation of different pharmacologycal groups for eliminating seizures (tranquilizers, muscle relaxants, hypnotics, narcotic medicinal agents, myotropic antispasmodics).
2. Antiepileptic medicinal agents (phenobarbital, phenytoin (difenin), carbamazepine, clonazepam, topiramate, Natrii valproate (acediprol), lamotrigine, levetiracetam, gabapentin). Classufication of antiepileptic medicinal agents according to indications. Comparative characteristic, side. Action of antiepileptic medicinal agents.
3. Antiparkinsonian medicinal agents (levodopa/carbidopa (nakom), selegolin, amantadine, ropinerol, pramipexol, piribedil, trihexyphenidyl). Classification, basic Mechanisms action. Use in clinical practice.
4. Medicinal agents for treatment of muscular spasticity (baclofen, mydocalm, benzodiazepines, GABA-ergic medicinal agents). General characteristics.
5. Medicinal agents that can be used in Alzheimer's disease, multiple sclerosis andamyotrophic lateral sclerosis. Cholinrsterase central blockers (donepezil, rivastigmine, galantamine), central M-, N-Cholinomimetics (choline alphoscerate), NMDA-receptorsinhibitors (memantine hydro.chloride) and metabolithotropic medicinal agents (glycine, L-lysine escinate, cerebrolysin).

4.3. Practical tasks that are performed in the lesson:

4.3.1. Prescribe recipes and conduct their pharmacotherapeutic analysis (indicate group affiliation, indications for use, possible complications):

1. Carbamazepine in tablets.
2. Phenobarbital in tablets.
3. Valproic acid (Natrii valproate) in tablets.
4. Levodopa in tablets.
5. Phenytoin capsules.
6. Donepezil in tablets.
7. Lamotrigine.
8. Levodopa/carbidopa (Nakom).
9. Trihexyphenidyl.

4.3.2. Practical tasks performed at the lesson:

1. To familiarize with the preparations on the topic, to determine their affiliation with the pharmacological group and indications for use. Fill in the table:

Preperations	Mechanism of action	Indications for using	Side effects
1. Carbamazepine			
2. Phenobarbital			
3. Natrii valproat			
4. Levodopa			
5. Phenytoin			
6. Donepezil			
7. Lamotrigine			
8. Levodopa/carbidopa (Nakom)			

2. To substantiate the choice of the drug, its pharmaceutical form, dosage, concentration, route of administration and prescribe.

1. Preparation for treatment insomnia.
2. Preparation for the prevention of large convulsive seizures of epilepsy.
3. Preparation for the prevention of small non-convulsive epilepsy attacks.
4. Preparation for eliminating of epileptic activity
5. Preparation with central cholinolitic action for treatment of parkinsonism.

6. Combine preparation for treatment parkinsonism.
7. Anticholinesterase medicine for the treatment of parkinsonism.
8. Preparation, having central cholinomimetic action for treatment of Alzheimer's disease.

3. Instructions for conducting an experiment:

EXPERIENCE 1. Solubility of hypnotic medicinal agents.

Add 0.1 g of nitrazepam, brome agent and phenobarbital, in each 3 test tubes (9 test tubes in total). Next add solvents: each of the preparation. Disolve preparations in each tube in cold water, alkaline pH water and alcohol. Draw conclusion.

Materials for selfcontrol.

A. Taskfor self-control:

Using of text books and operative insyructions, syudent must fill in table:

Table "Indications for using medicinal agents accordining to topic of class"

Medicinal agentsa	Grate convulsion attack	Small convulsion attack	Epileptic condition	Parkinsonism
Carbamazepine				
Phenobarbital				
Acediprol				
Diasepam				
Levodopa				

B. Self-control tasks:

Task 1. Medicinal agents which cause promotion of beginning of sleeping without disrupting its phase structure. It enhances GABA-ergic inhibition, but does not interact with benzodiazepine receptors.

A) Define preparation.

B) Indicate its indications for using.

Task 2. Medicinal agent, which cause acceleration of inactivation of sodium voltage-dependent channels. Effective for preventing attacks of clonic-tonic seizures and in case of neuritis of the trigeminal nerve.

A) Define preparation.

B) Indicate complications in its application

Task 3. Medicinal agents that can cause reducing of rigidity of skeletal muscles and tremor in the pathology of the extrapyramidal system of the brain. Indicate type of mediator in monoaminergic synapse.

A) Define preparations.

B) Indicate his indications for using.

B) Indicate complications with its use and measures of possible prevention.

C. Tests for self-control:

1. For treatment of patient it was administered cholinergic medicinal agents for delay of progressive current Alzheimer's disease. Which medicinal agent of the above is advisable?

A. Diazepam B. Donepezil C. Lamotrigine D. Levodopa
E. Diphenhydramine

2. In a patient with neurosis, sleeping is disturbed. It was administered medicinal agent that cause activation of the benzodiazepine receptors. Define it.

A. Nitrazepam B. Chloralhydrate C. Natrii bromide D. Natrii valproate
E. Phenobarbital

3. The patient has disturbed sleeping. For treatment of this disease it was administered medicinal agent that blocks the histamine receptors. Define it.

A. Donormil B. Nitrazepam C. Natrii bromide D. Natrii valproate
E. Phenobarbital

4. A patient suffering from insomnia, For treatment of this patient it was administered nitrazepam. Insomnia is disappeared, but then reappeared, despite of long-lasting the using of medicinal agents. What is the phenomenon associated with a decrease in the effect of nitrazepam?

A. Habituation B. Sensitization C. Cumulation D. Passion
E. Idiosyncrasy

5. For therapy of patient, which has suffered from epilepsy it was administered phenobarbital in dose 1 tablet (100 mg) before bedtime. At first cramps were disappeared, but for 10th day of treatment, epilepsy episodes renewed and insomnia was developed. What is about reason of weakening of effect of the pharmacological medicinal agents after its repeated use?

A. Tolerance B. Cumulation C. Sensitization D. Tachyphylaxis
E. Idiosyncrasy

6. What are the effects of hypnotic medicinal agents?

A. Hypertonic B. Anesthetic C. Anti-Anxiety D. Anticonvulsant
E. Antiemetic

7. What can I use to prevent epileptic seizures?

A. Phenobarbital B. Ethosuximide C. Natrii bromide D. Dobutaminum
E. Donormil

8. What are the effects of levodopa used in the treatment of parkinsonism?

A. Decreased skeletal tone muscles
B. Sleeping pills C. Sedative
D. Reduction of tremor E. Weakening of reflex vomiting

9. The action of zopiclone is associated with the effect of:

A. Local action in respect of hypothalamus
B. Local to the frontal areas of the new cortex
C. Diffuse the cortex and subcortical structures
D. Local on the posterior hypothalamus
E. Local action on the medulla oblongata

10. The antiepileptic activity of carbamazepine is conditioned by diminishment of possibility of cramp activity due to:

A. Strengthening of inactivation potential-depended channels
B. Blockade of ionophorm glutamate receptors
C. Allosteric sensibilization of $GABA_A$-receptors
D. Blockade of presynaptic A1-adenosine receptors
E. Activation of presynaptic opiate receptors

Content module № 3	**Medicines that affect the function of the central nervous system. Psychotropic drugs**
Topic № 11	**Antidepressants. Nootropic drugs. Psychotropic stimulants and analeptics**

1. Relevance of the topic: Widespread introduction into medical practice the preparation of this group began in the mid-20th century. Psychotropic medical agents are preparations that can influence the higher mental sphere of a person. They find widespread use in treating mental illnesses, as well as neurotic and psychosis-like disorders, accompanied by tension, fear, anxiety, and depression, which millions suffer each year. These include medicinal agents of general tonic action that increase the nonspecific resistance of the body to the harmful effects of various exogenous and endogenous factors (diseases, condition in the north climate, in the tropics, sports, space), stimulate the body's defenses in diseases of infectious and non-infectious nature. Psychotropic preparations, stimulation of CNS, diminishment of weakness, somnolent condition, drowsiness, increase mental and physical fitness. Analeptics operate at almost all levels of the central nervous system; however, each of the preparations is characterized by a more pronounced tropism relative to certain parts of the central nervous system. Bemegride, cordiamine, etimizol, Camphor have a predominant effect on the centers of the medulla oblongata, strychnine - on the spinal cord, caffeine acts as a psychostimulant and as an analeptic - on the cerebral cortex. Of greatest interest is the stimulating influence of aleptics on the vital centers of the medulla oblongata - the respiratory and vasomotor, especially clearly pronounced in their oppression.

2. The specific goals:

1. Analyze the pharmacological characteristic antidepressants.
2. Classify antidepressants, nootropic preparations by the mechanism of action and chemical structure.
3. Explain features of pharmacodynamics of monoamine monoamine inhibitors of indiscriminate and selective action; comparative characteristic monoamine oxidase (MAO) inhibitors indiscriminate and reversible; MAO inhibitors selectively reverse action.
4. Summarize and analyze the main ways of pharmacological correction of the reduction or inhibition of the central nervous system.
5. Summarize and analyze the pharmacological characteristic psychotropic stimulants and analeptics, Explain mechanisms action.
6. Interpret indications to using the features of comparative action preparation and interchangeability, speed of development of therapeutic effect and principles of cancellation of preparation;
7. Put in practice analysis on possible side effects of antidepressants, nootropic preparation, psychotropic stimulants and analeptics with purpose their prevention.
8. To analyze the pharmacological characteristic of nootropic drugs, medicinal agents, influencing the cerebral circulation and for treating migraine, Explain and Mechanisms action.
9. Interpret indications for using moles, medicinal agents, influencing the cerebral circulation and for treating migraines in accordance with with the guidelines of pharmacodynamics.
10. Summarize and analyze the pharmacological characteristic adaptogens (tonic medicinal agents), sources of their production (from plants and animals).
11. Assess the positive effect / risk after using ratio of antidepressants, nootropics, adaptogens, psychotropic stimulants and analeptics.
12. Student has to help patients with acute poisoning with caffeine and analeptics.
13. Prescribing on the preparations of antidepressants, nootropic medicinal agents, adaptogens, psychotropic Preparations and stimulants, to conduct a pharmacological analysis that was written preparation.

3. Basic knowledge, skills, skills needed to study the topic (interdisciplinary integration):

The name of the previous disciplines	Skills acquired
1. Latin language	To have the skills about writing prescriptions.
2. Normal anatomy	Use knowledge about localization of dopamine, adrenergic- and serotonergic receptors in brain structures
3. Normal physiology	Describe the interneuronal transmission and the functional role of the central dopamine, adrenergic- and serotonin receptors, the pituitary-adrenal system; Student must have knowledge about the types of receptors of the CNS (cholinergic -, adrenergic, dofaminergic-, serotonin, NMDA, AMPA, GABA, glycine, etc.).
4. Biological chemistry	4. Biological chemistry Use knowledge about the exchange of biogenic amines, the role of the MAO enzyme in their methyl's; about brain methyl's, mediators involved in the interneuron before excitement (Noradrenalin, acetylcholine, dopamine, serotonin, GABA, glycine, glutamate, aspartate, histamine), intracellular messengers (cAMP, cGMP, $Ca^{2+,}$ etc.).

4. Tasks for independent work in preparation for the lesson and in the lesson.

4.1. List of main terms, parameters, characteristics, which should be taken by the student in preparation for the lesson.

Term	Definition
1. Antidepressants	Medicinal agents that can eliminate the condition of depression - a mental disorder characterized by depressed mood, feeling of depression, fear, indifference, hopelessness, etc., bring a person out of this state.
2. Nootropic medicinal agents	Preparations, improving cognitive functions, memory and increase brain resistance to adverse outcomes.
3. Adaptogen (tonic) medicinal agents	Preparations mainly of plant and animal origin, providing a tonic action on the central nervous system and the function of the organism as a whole, increase the body's resistance to the harmful factors of a physical, chemical and biological nature; provide adaptation to changes in environmental conditions.
4. Psychostimulantive medicinal agents	The psychostimulative mmedicinal agents, which increase physical and mental performance, mood, reduce weaning, the need for food.
5. Psychodisleptic medicinal agents	Psychodisleptic medicinal agents, cause excitation of the central nervous system and causing significant mental disorders with delusions, hallucinations, loss of self-control (lysergic acid diethylamide (DLC-25, LSD-25), mexalin, psilocybin, preparations of Indian hemp (plan, marijuana, hashish), causing substance abuse.
6. Amphetamines	Phenamine as a strong psychostimulative agent, causing mental and physical dependence, is prohibited by doping.
7. Analeptic agents	Analeptic medicinal agents that stimulate the cerebral cortex (caffeine), the vital centers of the medulla oblongata (respiratory and vascular-motor) (cordiamin, camphor, etimisol, etc.), the spinal cord (strychnine), and their suppression.

PREPERATIONS

N	**Name of the drug**	**Form release**	**How to use**
ANTIDEPRESSANTS			

1.	Imizinum (Imipramin, Melipramin)	Tablets 0,025 g, in covering Amp. 1,25% sol 2 ml	Orally 0,075-0,1 g for one day Intramasulary 0,025 g
2.	Amitriptylinum maleas	Dragee 0,025 g Amp. 1 % 2 ml (20 mg)	Orally 0,05-0,075 g g one time a day Intramusculary or i/v (slowly) 0,025-0, 04 g (25-40 mg) 3-4 times a day
3.	Venlafaxinum	Tablets 0,075 g	Orally 0,075 g one time a day
4.	Nialamidum	Tablets (dragee) 0,025 g	Orally 0,05-0,075 for 1 week (during morning and during day)
5.	Fluoxetinum	Caps 0,02 g	Orally 0,02 g 3 times a day
6.	Sulbutiaminum	Tablets 0,2 g	Orally 2-3 tablets a day
7.	Sertralinum (asentra)	Tablets 0,05 g	Orally 0,05 g 2 times a day
8.	Pyrazidol	Tablets 0,025 and 0,05 g	Orally 0,025- 0,05 g 3 times a day
NOOTROPIC MEDICINAL AGENTSA			
1.	Aminalonum	Tablets 0,25 g	Orally 0,25 g 3 times a day
2.	Pyracetam (nootropil)	Tablets 0,2 and 0,4 g Caps 0,4 g Amp. 20% sol 5 ml	Orally 0,4 g 3 times a day during first part of day (before meal) I/m or i/v 5 ml one time a day
3.	Cavinton	Tablets 0,005 g Amp. 0,5% 2 ml	Orally 0,005 g 3 times a day Intravenously (for infusion) 10-20 mg one time a day after dissolving in 200 ml of isotonic solution of natrii chloridum
4.	Nicergoline (Sermion)	Tablets 0,01 and 0,03 g	Orally 0,01 g 3 times a day, during 2-3 months
5.	Pentoxyphylline (Trental)	Tablets 0,1 g Amp. 2% 5 ml	Orally 0,2 g 3 times a day during 2 weeks Intravenous infusion 0,1 g in 200 ml isotonic solution of natrii chloridum
6.	Nimodipinum	Tablets 0,03 g	Orally 0,03 g every 4 hours
ADAPTOGENS			
1.	Tinctura Schisandrae	Flac. 50 ml	Orally 20-25 drops 2-3 times a day before meal
2.	Tinctura Ginsengi	Flac. 50 ml	Orally 25 drops 3 times a day before meal
3.	Extractum Eleutherococci	Flac. 50 ml	Orally 30-50 drops 3 times a day
4.	Pantocrinum	Flac. 30 and 50 ml Amp. 1 ml Tablets 0,15g	Orally 25-40 drops. Subcutaneusly or i/m 1-2 ml a day Orally0,15-0,3 g 2-3 times a day
PSYCHOTROPIC STIMULATORS			
1.	Coffeinum-natrii benzoas	Tablets 0,1 and 0,2 g Amp. 10% 1 ml	Orally0,1-0,2 g 2-3 times a day Subcutaneously 1 ml
2.	Sydnocarbum	Tablets 0,01 g	Orally 0,005 g 1-2 times a day during morning before meal
3.	Meridilum	Tablets 0,01 g	Orally 0,01 g one time a day during morning
ANALEPTICS			
1.	Cordiaminum (Nicetamid)	Amp. 1 and 2 ml Flac.15 ml	Subcutaneously, i/v, i/m 1-2 ml Orally15-40 drops

2.	Camphora	Amp. 20% 1 and 2 ml (oil solution)	Subcutaneously 1-5 ml 1-3 times a day
3.	Sulfocamphocainum	Amp. 10% 2 ml	Subcutaneously, i/m, i/v2 ml
4.	Bemegridum	Amp. 0,5% 10 ml	I/v slowly 5-10 ml
5.	Aethimizolum	Tablets 0,1 g Amp. 1% and 1,5% 3 and 5 ml	Orally0,1 g 3 times a day I/m 2 ml 2 times a day; в i/v slowly 0,6-1 mg/kg of body mass
6.	Strychnini nitras	Powder 0,0005 g Amp. 0,1% 1 ml	Orally 0,0005 g Subcutaneously 0,0005-0,001 g

4.2. Theoretical questions to the lesson:

1. Classufication antidepressants on the mechanism of action and chemical structure (amitriptyline, fluoxetine, venlafaxine, sertraline, salbutiamine, mirtazapine, imizine, maprotiline, pyrazidol, nialamide). Pharmacologycal characteristic antidepressants. Side effects of antidepressants.
2. Nootropic medicinal agents. Classification of medicinal medicinal agents. Possible Mechanisms action, indications for using.
3. Pharmacologycal characteristic and comparison ofpreparation of piracetam, Aminalon, Vinpocetine, Nicergoline (Sermion), Pentoxifylline (Trental), Aminophenyl Butyl, Ginkgo Biloba, Cavinton, Cinnarizine, Picomlon, Nimodipine, Mexidol, Mexidola, Icnidol, Iqnidol, Nimodipine, Mexidola, Ixidola, Mexidola, Mexidola, Mexidola, Imexidola
4. Adaptogens. Classufication and pharmacological characteristic adaptogens of plant and animal origin (tincture, tincture, lemon, eleutherococcus extract liquid, extract levzey liquid, pantocrinum (cygapan), bemitil, carnitine).
5. Psychotropicmedicinal agents of exciting action. General characteristic group of psychostimulants. Pharmacokinetics and Pharmacodynamics of sodium and sodium benzoate. Indications for using.
6. The concept of psychodisleptics and amphetamines. Formation of addiction, social value. Medicinal agents that cause addiction, drug and substance abuse.
7. Analeptics. Classification of analeptic and pharmacological characteristic niketamide (cordiamin), bemegride, ethmyzole, caffeine citrate, sulfocamphocain, camphor, cytitonum, lobeline. Indications for using.

4.3. Practical tasks that are performed in the lesson:

4.3.1. Prescribe recipes and conduct their pharmacotherapeutic analysis (indicate group affiliation, indications for use, possible complications):

1. Amitriptyline in dragee and in ampoules.
2. Imizin in tablets.
3. Nialamide in dragee.
4. Fluoxetine in capsules.
5. Salbutiamine.
6. Venlafaxine.
7. Pyrazidol in tablets.
8. Piracetam in ampoules and tablets.
9. Pentoxifylline in dragees and ampoules.
10. Tincture of the little one.
11. Extract of eleutherococcus.
12. Pantocrin for injections.
13. CoffeesN-benzoate Natrii in ampoules.
14. Nicergolin in tablets.

15. Nimodipine in tablets.
16. Nicketamide (Cordiamin) in ampoules and for oral administration.
17. Sulfocamphocain (Sulfocamphoric acid + Procaine) in ampoules.
18. Ethimisole in ampoules.
19. Strychnine nitrate in ampoules.
20. Bemegrid in ampoules.

4.3.2. Practical tasks performed at the lesson:

1. To familiarize with the preparations on the topic, to determine their affiliation with the pharmacological group and indications for use. Fill in the table:

Preperations	Mechanism of action	Indications for using	Side effects
1. Amitriptyline			
2. Nialamide			
3. Fluoxetine			
4. Pyrazidol			
5. Nimodipin			
6. Piracetam			
7. Venlafaxine			
8. Extract of eleutherococcus.			
9. Pantocrin			
10. Cofein natrii benzoatis			
11. Niketamid			
12. Sulfocamphocain			
13. Ethimisole			
14. Bemegrid			
15. Strychnine nitrate			
16. Salbutiamid			

2. To substantiate the choice of the drug, its pharmaceutical form, dosage, concentration, route of administration and prescribe.

1. Preperations for treatment of depression, combined with increased excitability of the CNS.
2. Preparation combines an antidepressant effect with a stimulating action in depressive states with severe CNS retardation.
3. Preparation for the treatment of depressive states, does not have a sedative and cholino lytic action.
4. Medicinal agents, cause stimulation of the cognitive properties of mental activity (thinking, learning, memory) in case of its insufficiency.
5. Medicinal agents which cause dilation of blood vessels, reducing of platelet aggregation, improvement of microcirculation of substances.

3. Instructions for conducting an experiments:

EXPERIENCE 1. Solubility of caffeine and its salts.

In 2 test tubes, place 0.05 g of caffeine base and caffeine N-benzoate of sodium, add 2 ml of water. Shake the tubes and observe the results. Make conclution

EXPERIENCE 2. Set the action of caffeine on the rhythm of the human heart.

Volunteer students count the pulse before and after 10, 15, 20, 30 minutes after taking 0.05-0.1 g of caffeine. Make conclution/.

EXPERIENCE 3. The solubility of camphor crystal.

In 3 tubes add 0.1 g of camphor crystal and add 1-2 ml of water, alcohol and oil. Mark the result and draw conclusions for practical medicine. Make conclution.

Materials for self-control:

A. **Tasks for self-control**:

Using of text books and operative insyructions, syudent must fill in table:

Table №1 "Pharmacological effects specific to psychoactive drugs" (note "+" or "-")

Effects	Drugs			
	Caffeine	Amitriptyline	Piracetam	Fluoxetine
1. Psychostimulating, antiunconscious				
2. Antidepressant				
3. Analeptic				
4. Sympathomimetic				
5. Sedative				
6. Lecomania (indicate which type)				
7. Hyperacid				

Table № 2 "Classification of analeptics, depending on the predominant effect on the different parts of the central nervous system," indicate the drugs, according to the classification

Classification of analeptic and in depending on the predominant effect on different parts of the central nervous system		
Cortex	Medulla oblongata	Spinal cord

Table № 3 "Mechanisms of action of antidepressants" (note "+" or "-")

Mechanisms of antidepressants					
	Clomipramine	Amitriptyline	Fluoxetine	Mirtazapine	Nialamide
H1-blocking					
Serotonin block.					
M-holinoblock.					
Adrenoblocking					
Inhibitor of capture NA					
The inhibitor has captured serotonin					
MAO inhibitor					

Table № 4 "Pharmacological effects of nootropic drugs" (define "+" or "-")

Effects	Therapeutic effect	Nootropic drugs		
		Piracetam	Vinpocetine	Aminalone
Nootropic	Influence on development delay, violation of cortical functions			
Mnemotropic	Influence on remembering and learning			
Sedative, tranquilizing	Influence on irritability, emotional weakness			
Psychomotor-stimulating	The impact on apathy, weakness, lethargy, exhaustis ness			
Antihypoxic	Post- ischemic conditions (ischemic stroke)			

B. Self-control tasks.

Task 1. Improves mental and physical performance while tired. Lowers appetite. Increases the respiratory center's irritability. Causes narrowing of peripheral vessels, increase of arterial pressure. With prolonged use it cumulates, develops addiction (mental and physical)

A) Determine the substance. B) Explain the mechanism of action.

Task 2. Alkaloid, derivative xanthine . Combines the properties of a psychostimulant and analeptic . The cardiovascular system affects differently. Tonizes brain vessels, reduces swelling of the brain, is part of the combined pills for headaches and migraines. Increases gastric secretion, diuresis and major metabolism.

A) Identify the drug.

B) Explain the mechanism of action.

Task 3. The centers of the medulla oblongata (respiratory and vascular traumatic) are stimulated predominantly. In large doses, they violate the motor regions of the cerebral cortex. Their mechanism of action is associated with improved interneuronal transmission. Increase the frequency and depth of breath, pulmonary ventilation and gas exchange, the oxygen content and reduce the carbon dioxide in the blood, increase blood circulation. They are used for poisoning by means of anesthesia, hypnotics and ethyl alcohol.

A) Determine the group affiliation of drugs.

B) List what drugs are classified according to the classification.

Task 4. Biologically active substances of Marala Pantiv that stimulate (tonic) the nervous system and muscles, metabolism and basic physiological processes, promote adaptation and resistance of the organism to adverse environmental factors, increased physical and mental loads, infectious diseases.

A) Identify the drug.

B) Specify the release form and the input paths.

Task 5. Determine substances A and B for the main pharmacological effects.

A - a psychotonic agent, a derivative of phenylalkylamine, increases the blood pressure, causing drug dependence.

B - has psycho-stimulant effect, with original sidnonimin, does not increase blood pressure, cardiovascular system has virtually no effect, drug dependence is.

A) Specify the drugs.

B) List the indications for the prescription for the drug B.

Task 6. It belongs to tricyclic antidepressants of non-selective action, suppressing the capture of monoamine neurons. Antidepressant properties are combined with a weak sedative effect, and in some conditions - and psychostimulatory effects; has a peripheral M-cholin blocking effect.

A) Determine the drug, specify the features of pharmacokinetics.

B) Explain the principles of treatment, interaction with other drugs.

Task 7. It belongs to inhibitors of MAO non-selective and irreversible effects, is an antagonist of reserpine, has a timely effect on the function of the central nervous system, can cause euphoria, insomnia.

A) Identify the drug. B) Explain the mechanism of its antagonistic action with reserpine.

B) To substantiate the possibility of side effects when eating cheese, using coffee and chocolate.

Task 8. Drugs tonise the basic functions of the body, increase resistance to the adverse effects of infections, increase endurance at high physical and mental loads, activate a specific and nonspecific immunity.

A) Identify a group of drugs and key representatives from different sources of receipt.

B) Specify the rules of dosage, the features of chronopharmacology.

C. Tests for self-control.

1. Indicate a drug that combines the properties of analeptic and psychostimulant .

A. Clomipramine B. Etimizol C. Kordiamin D. Caffeine E. Sertralin

2. A patient with signs of fatigue, expressed in a decrease in mood and psychomotor activity, a decrease in mental and physical capacity, with concomitant arterial hypertension should be prescribed drug from the group of psychostimulants. What drug from the above list should be assigned to a patient taking into account the concomitant illness?

A. Ginseng B. Caffeine C. Amphetamine D. Clomipramine E. Fluoxetine

3. For the pharmacodynamics of a medicinal product characterized by increased mood and psychomotor activity, a decrease in the feeling of fatigue, an increase in physical and mental performance, a temporary decrease in need in a dream?

A. Caffeine B. Corvaldin C. Clonazepam D. Kordianin E. Kodein

4. Indicate the use of caffeine.

A. Sleepy B. Increased C. Atherosclerosis D. Hypertension tachycardia E. Neurosis

5. In the admissions department a patient with oppression of breath came in. What drugs in the pharmacological group can stimulate breathing?

A. Neuroleptics B. Tranquilizers C. Analeptics D. Antidepressants E. Analgesics

6. During aspiration of the dental patient, asphyxiation occurred. Which drug should be used to stimulate breathing?

A. Atropine sulfate B. Cordiamin C. Clomipramine D. Adrenaline hydrochloride
E. Corvaldin

7. During the removal of the tooth in the patienta collapse occurred , loss of consciousness. What preparation should be used for rapid withdrawal of the patient from this condition?

A. Amitriptyline B. Caffeine sodium benzoate C. Aminalone
D. Corvaldine E. Sodium oxybutyrate

8. Specify a functional antagonist when poisoned with barbiturates .

A. Amitriptyline B. Bemegride C. Droperidolum D. Aminalon E. Aminazin

9. During the audit of the wound in the patient, a collapse developed with a sharp drop in blood pressure with loss of consciousness. What drug can be used to remove the collapse?

A. Analeptic cortiamine B. Analgesic promedal C. Adrenergic anaprilin
D. Holinoblokator atropin E. Trikvilizator sibazon

10. In the receiving department delivered to the patient in an unconscious state with a sharp inhibition of respiration and cardiac activity, a decrease in tendon reflexes. According to relatives, the patient took sleep drug at night. What kind of emergency drug to introduce a patient?

A. Bemegride B. Bemityl C.Inderal D . Atropine sulfate E. Lithium carbonate

11. To restore respiration during surgery, doctors were injected a drug every 4-5 minutes. What remedy was given to the patient?

A. Atropine B. Droperidol C. Aminazin D. Piracetam E. Bemegride

12. An elderly patient constantly takes coffee to reduce frequent headaches and raise the overall tone. What is the mechanism of action of caffeine contained in coffee?

A. Purenergichny B. Analgesic C. Adrenoblocking D. Choline blocker E. Anxiolytic

13. During incoming anesthesia Tiopenthal the patient experienced a drop in blood pressure and respiratory depression. From which drug no turndown aid should expect the greatest effect in this case?

A. Lobeline B. Dypiroksymu C. Etimizol D. Naloxone E. Bemegrida

14. In order to facilitate the process of falling asleep patient took several pills of phenobarbital. He soon lost consciousness, blood pressure decreased incidence of respiratory sharply decreased. What specific antagonist should be used?

A. Atropine Sulphate B. Lobelin hydrochloride C. Caffeine D. Etimizol E. Bemegrid

15. A child born in a state of asphyxia, a doctor in the lead in the umbilical vein drug to stimulate breathing. What drug could I introduce a doctor?

A. Adrenaline B. Aminalon C. Etimizol D. Atropine E. Camphor

16. A child was diagnosed with reduction of intellectual development, difficulties in studying for 9 years. The use of drugs from which group of psychotropic drugs is appropriate in this case?

A. Nootropics B. Antidepressants C. Tranquilizers D . Neuroleptics E. Adaptogens

17. Determine the main effect of piracetam (Nootropil):

A. Increases the need for the brain to oxygen

B. Decreases the integration processes in the brain

C. Slows synthesis of GABA in the brain D. Improves memory and learning

E. Reduces resistance to hypoxia

18. Determine the drug shown in the reduction of mental activity associated with degenerative lesions of the brain:

A. Piracetam B. Sertraline C. Amitriptyline D. Bemegrid E. Bemitil

19. A patient 32 years was treated for a long time at the hospital for chronic hepatitis. At the moment, he complains of weakness, fatigue, hypotension and reduced immunity. What drug can be prescribed to the patient in order to improve their well-being?

A. Tincture of Valerian B. Infusion of valerian C. Sodium bromide

D. Mixture Pavlova E. Tincture ginseng

20. For the patient with depressive syndrome, the doctor prescribed the drug, stressing the need to exclude from the diet food containing tyranine (cheese, beer, smoked, etc.). However, after a while, the patient began to violate the diet and it emerged hypertensive crisis. What drug was prescribed to the patient?

A. Mirtazalin B. Sidnokarb C. Nivalamid D. Amitriptyline E. Sertraline

21. Ambulance to the hospital was delivered to a patient who, in a state of severe depression, tried to commit suicide. Diagnosis: depressive psychosis. Drugs of which pharmacological group should be prescribed for the treatment of the patient?

A. Sleepiness B. Sedative C. Antidepressants D. Anxiolytics E. Analeptics

22. A neurological department has received a patient with complaints about deterioration of memory and mental efficiency after a head trauma. Suggest a remedy for improving brain metabolism.

A. Korvaldin B. Sidnokarb C. Nootropil D. Caffeine E. Sertralin

23. In a man of 36 years with a craniocerebral trauma, respiration is weak, the pulse is thready, reflexes are absent. Which route of administration of piracetam is most appropriate in this case?

A. Intravenous B. Rectal C. Subcutaneous D. Oral E. Inhalant

24. Patient with manic-depressive syndrome in a stage of depression, who complained of anxiety, horror, was designed with concomitant antidepressant psyhosedatyvnym effect. What kind of drug was it?

A. Amitriptyline B. Fluvoxamine C. Melipramina D. Nivalamide E. Fluoxetine

25. A patient with senile depression and severe hypotension was prescribed an antidepressant of selective action. What is this remedy if it strengthens the pressor action of catecholamines (norepinephrine)?

A.Amitriptyline B.Mirtazapine C. Melipramina D. Nivalamide E. Fluoxetine

26. A depression patient has been treated for a long time and began to complain of diarrhea, muscular stiffness, hyperthermia, severe hypotension. The doctor established the development of serotonin syndrome. What remedy could cause this syndrome?

A. Piracetam B. Cavinton C. Fluoxetine D. Sermion E. Sertralin

27. To the neuropathologist turned patient with complaints of headache, memory impairment, rapid fatigability. The doctor prescribed piracetam. Which drug group belongs to this medicametion?

A. Neurometabolic cerebroprotectors B. Reflex analeptics

C. Anxoilitic drud D. Serotonergic antidepressants E. Psychomotor stimulators

28. After a stroke, a remedy was prescribed, which, due to adrenal blocking action, improves cerebral circulation. Determine this drug.

A.Nootropil B. Clomipramine C. Pentoxifylline D. Cavinton E. Nitsergolin

29. The pharmacological effects of antidepressants associated with blocking (inhibiting) their enzyme that catalyzes the disintegration of biogenic amines such as noradren as ling and serotonin in the mitochondria of brain neurons. What enzyme is involved in this process?

A. Peptidase B. Liaza C. Transaminaza D. Monoamine oxidase E. Decarboxilaza

30. A woman who wanted to commit suicide was summoned by a psychiatrist who revealed the state of endogenous depression. What preparation would be best to assign patients for treatment?

A. Aminalon B. Pantocrine C.Piracetam D. Caffeine E. Amitriptyline

31. For the patient with depressive syndrome, the doctor prescribed nialamide. What food products should be excluded from the diet in the treatment of patients to reduce the likelihood of side effects?

A. Cheese B. Apples C.Potatoes D. Cabbage E. Milk

32. A child has 9 years of decline in intellectual development, difficulty in learning. The use of drugs from which group of psychotropic drugs is the most appropriate in this case?

A.Nootropics B. Antidepressants C.Tranquilizers D. Neuroleptics

E. Adaptogens

33. Identify a drug that will improve the quality of treatment for periodontitis in a dental patient?

A.Camphor B.Valerian C.Caffeine D. Piracetam E. Ginseng tincture

34. Indicate the main effect of Piracetam (Nootropil).

A. Increases the need for the brain in oxygen

B. Lowers integration processes in the brain

C. Slows down the synthesis of GABA in the brain

D. Improves memory and learning E. Reduces resistance to hypoxia

35. To note the preparation shown at decrease of mental activity connected with degenerative lesions of a brain:

A. Piracetam B. Amitriptyline C. Paroksytyn D. Bemegrid E. Bemitil

36. In order to accelerate the mobility of the limb during the rehabilitation period, after removing the gypsum lunget, was prescribed drug of animal origin to improve muscle tone. Define it.

A.Paroksytyn B. Piracetam C.Bemityl D. Pantocrine

E. Bemegrid

37. A woman who tried to commit suicide was called to a psychiatrist who discovered. It was diagnosed condition which is accomponied with endogenous depression. Whatpreparation it is advisable for using of patient for the course of treatment:

A. Amitriptilin B. Pantokrin C. Piracetam D. Caffeine E. Sidnokarb

38. Grouppreparation which are used for stimulation of the central nervous system. They are characterized by tyramine (cheese) syndrome. Define this group:

A. Antidepressants - MAO inhibitors

B. Antidepressants - Monoamine Reuptake Inhibitors

C. Nootropic preparations D. Analeptic E. Adaptogens

39. A child of 9 years old showed a decrease in intellectual development, difficulties in learning. Using of preparations of which group of psychotropic medicinal agents is appropriate in this case?

A. Nootropics B. Antidepressants C. Tranquilizers

D. Neuroleptics C. Adaptogens

40. Define a medicinal medicinal agent, which will ensure an improvement in the quality of life and working ability of astronauts when flying into space?

A. Tincture Gengengi B. Sidnokarb C. Caffeine D. Piracetam E. Diazepam

41. It was administetred for patients with depressive syndrome preperation. However it should be taken in account that after using of this oreparation must be excluded from the diet foods containing tyramine (cheese, beer, smoked products, etc.). However, after some time, patient began to break the diet and he had a hypertensive crisis. Whatpreparation was administetred for the patient?

A. Imizin B. Amitriptyline C. Pirazidol D. Sidnokarb E. Nialamid

42. For improving results, the athlete was recommended to apply preperation, which includes carnitine. What process is most activated by carnitine?

A. Tissue respiration B. Transport of fatty acids into mitochondria
C. Synthesis of lipids D. Synthesis of ketone bodies E. Synthesis of steroid hormones

43. Define preparation, which is indicated in case of the reduction of mental activity associated with degenerative brain lesions:

A. Bemegrid B. Amitriptyline C. Pirazidol D. Piracetam E. Bemitil

44. For accelerating the mobility of the limb during the rehabilitation period after the removal of the gypsum splints, an medicinal agents of animal origin was administered for increasing of muscle tone. Define this medicinal agent.

A. Pantocrin B. Piracetam C. Bemitil D. Pirazidol E. Bemegrid

45. Patient at the age of 32 years old has been treated for a long time for chronic hepatitis. He has such complains as weakness, lethargy, hypotension and decreasing condition of immunity system. Whatpreparation can be administered for treatment patient for facilitation patient condition?

A. Natrii bromide B. Tincture of Valerian C. Mixture Pavlova
D. Nialamide E. Tincture of Ginsengi

46. During going into the office it was developt collaptoid condition with lost of consciousness. What preparation can be administered in this condition?

A. Adrenaline B. Bemegrid C. Sibazon D. Cordiamin E. Corglycon

47. It was developed a painful shock with respiratory depression and arterial pressure reduction. in patient with severe traumatic brain injury. Indicate medicinal agents for first care in this condition:

A. Morphine B. Ketamine C. Cordiamin D. Corglykon E. Fentanyl

48. Coffine has similar structure with one product of cell metabolism. Presens of this product is conditioned nootropic effects of cooffeine. Define such preparation:

A. Lactic acid B. Acetoacetic acid C. Uric acid D. Benzoic acid E. PABA

49. For improving mental and physical performance, reducing fatigue and drowsiness, improved mood it was administered sydnocarb. What action mechanism are associated with these effects?

A. Purinergic B. GABA-ergic C. Adrenomimetic D. Imipraminergic E. Cholinergic

50. For termination of collaptoid condition of patient it was administered medicinal agent with chemical structure, which is resemble to nicotinic acid. Indicate this medicinal agent.

A. Etimizol V. Camphor C. Caffeine D. Cordiamin E. Bemegride

51. During the painful manipulation, it was developed collaptoid state of patient which is accompanied with lost of consciousness. Whatpreparation it is need to use for quickly removing the patient from this state?

A. Adrenaline B. Analgin C. Cordiamin D. Amitriptyline E. Corvalol

52. Patient at the age of 38-year-ld was delivered to the neurological department with complaints of impaired memory and mental performance after suffering a head injury. Indicate medicinal agents, which is need for improveming of brain methabolism:

A. Sidnocarb B. Analgin C. Caffeine D. Piracetam E. Meridil

53. For termination of the action of narcosis, bemegride was administered. Define mechanism of action of this preparation:

A. Blockade GABA-receptors B. Blockade benzodiazepine receptors
C. Stimulation barbourtreceptors D. Blockade barbourtreceptors
E. Stimulation receptors

54. Patient stopped a trainee who wanted to introduce camphor intravenously. It was suggested by doctor using this help this agent method of administration of another medicinal agent, which has similar structure with camphor. Determine thepreparation which was suggested by doctor.

A. Cordiamin B. Bemegrid C. Camphor D. Sulfocamphocain E. Lobelin

Content module № 4	**Pharmacology of agents affecting function of cardio-vascular system**
Topic № 12	**Antiarrhythmic drugs. Cardiotonic drugs. Cardiac glycosides**

1. Relevance of the topic: Cardiotonic and antiarrhythmic drugs occupy an important place in the treatment of diseases of the cardiovascular system. They are used as a means of emergency, as well as for the purpose of long-term pharmacotherapy. Cardiotonic drugs are used to treat acute and chronic heart failure. Among them, one of the most important are heart glycosides. Antiarrhythmic drugs are used to treat heart rhythm disorders.

2. The specific goals:

1. To generalize and analyze the pharmacodynamics and pharmacokinetics of cardiotonic and antiarrhythmic drugs.
2. To interpret the indications for the use of cardiotonic and antiarrhythmic drugs in accordance with the knowledge of pharmacodynamics.
3. Evaluate the benefit / risk ratio when using cardiotonic and antiarrhythmic drugs.
4. To create an algorithm for the help to patients with intoxication with cardiac glycosides, to explain the principle of action of antidotes.
5. To explain the dependence of the action of cardiotonic and antiarrhythmic drugs on the characteristics of pharmacokinetics in patients of different age, concomitant diseases and their therapy.
6. Make judgments about the possibility of side effects when using cardiotonic and antiarrhythmic drugs and ways to prevent them.
7. Prescribe recipes for cardiotonic and antiarrhythmic drugs and conduct a pharmacotherapeutic analysis of prescribed dasgs.

3. Basic knowledge, skills, skills needed to study the topic (interdisciplinary integration):

The names of previous disciplines	Skills learned
1. Latin language	Have the skills of writing prescriptions.
2. Normal physiology	Apply knowledge of the mechanism of cardiac contraction and electrical activity of the heart.
3. Pathological physiology	To interpret the concept of heart failure, describe its manifestations, causes of development, types. Apply knowledge of the classification of arrhythmias and understand the mechanisms of their development

4. Tasks for independent work in preparation for the lesson and in the lesson.

4.1. List of main terms, parameters, characteristics, which should be learn by the student in preparation for the lesson:

Term	Definition
1. Cardiac glycosides	Herbal drugs, toxic, cardiotonically affecting the cardiovascular system, and are indicated for the treatment of heart failure (GOS, CHF) and tachystolic atrial fibrillation.
2. Cardiotonic means of non-glycosidic structure	Synthetic arylalkylamine derivatives, which through beta1-adrenoreceptors have a distinct inotropic effect in acute heart failure, and are selected for refractoriness or allergy to cardiac glycosides.

3. Antiarrhythmic drugs	This is a group of medicines used to treat and prevent heart rhythm disorders.

PREPERATIONS

N.	Name of the drug	Form release	How to use
HEART GLYCOSIDES			
1	Digoxin Digoxinum	Tablets 0.00025 g Amp. 0.025% 1 ml	Orally of 0.00025 g 1-3 times a day Intravenously 1-2 ml in 10 ml of a 5% solution of glucose
2	Strofantin K. Strophanthinum K	Amp. 0.025% ,0.05% 1 ml	Intravenously 0.5-1 ml in 10-20 ml isotonic sodium chloride solution
3	Korglikon Corglyconum	Amp. 0.06% 1 ml	Intravenously 0.5-1 ml in 20 ml of 5% glucose solution
4	Adonidis vernalis	Species 100 g	Preparing of innfusum for oral using (4.0-200.0 - 6.0-200.0) 3-4 times a day
CARDIOTONIC NON-GLYCOSID STRUCTURE			
1	Dobutamine Dobutaminum	Amp . 0, 25 g (50 ml)	Intravenously drip 50 ml of isotonic 500ml thof sodium chloride solution
ANTIARITIMIC MEANS			
1	Hinidine sulfate Quinidinum sulfas	Tablets 0.1 ; 0.2 g	Orally of 0.1 g 4 times a day
2	Novokainamid Novocaineamidum	Tablets 0.25 g Amp. 10% 5 ml	Orally of 0.5-1 g 3-4 times a day Intramuscle; intravenously 5-10 ml of 5% glucose solution or isotonic sodium chloride solution
3	Lidocain Lidocainum	Amp. 10% 2 ml	Intramuscle 2-4 mg / kg, intravenously 1-2 mg / kg
4	Trimecain Trimecainum	Amp. 1% 10 ml	Intravenously the drops, 80-120 mg 2% of the solution speed of 2 mg / min .
5	Diphenin (Phenytoin) Dipheninum	Caps. 0.1 g Tablets 0,117 g	Orally 0.1 g 3 times daily after eating
6	Ethacysin Ethacizinum	Tablets 0, 05 g	Orally of 0, 0 5g 2 - 3 times a day
7	Propafenone Propafenonum	Tablets 0.15 g	Orally of 0, 1 5g 3 times a day
8	Propranolol Propranololum	Tablets 0,01, 0.04 g Amp.1.1% 5 ml	Orally 0.01- 0.04 g 3-4 times a day Intravenously 5 ml in 20 ml of 40% glucose solution
9	Metropolol Metoprololum	Tablets 0,05, 0.1 g	Orally of 0,1- 0,2 g 2-3 times a day
10	Atenolol Atenololum	Tablets 0.1 g	Orally 0.1 g 2 times a day
11	Bisoprolol Bisoprololum	Tablets 0.005 and 0.01g	Orally 0.01 g a day
12	Amiodarone Amiodaronum (Cordaron)	Tablets 0.2 g Amp. 5% 3 ml	Orally of 0,2- 0,6 g a day Intravenously drops 0.6-1.2 g in 250-500 ml of 5% glucose solution
13	Verapamil Verapamilum	Tablets 0,04 , 0,08 g Amp. 0.25% 2ml	Orally of 0.04-0.08 g 3 times a day Intravenously slowly 2-4 ml 2 times a day

14	Ivabradin Ivabradinum	Tablets 0.005g	Orally 0, 005 g 2 times a day
15	Potassium chloride Kalii chloridum	Tablets 0,5 g Flac.10% 180 ml	Orally 0.5-1.0 g 3 times a day Orally of 15 ml 3-4 times a day
16	Asparkam (Panangin) Asparkam **(**Panangin)	Tablets Amp 10 ml	Orally of 2 tables. 3 times a day Intravenously 10 ml 0 20 ml of 5% glucose solution
17	Atropine sulfate Atropini sulfas	Tablets 0.0005 g Amp.1.1% 1 ml	Orally of 0.0005- 0.001 g Subcutaneous, intramuscle, intravenously 0,00025- 0,0005 g (0.25-0.5 ml)
ANTIDOTHES			
1	Unitiol Unithiolum	Amp. 5% 5 ml	Subcutaneous, intramuscule 5-10 ml of 5% solution 3-4 times a day

4.2. Theoretical questions to the lesson:

1. Classification of cardiotonic drugs (strophanthin, corglicon, digoxin, infusion of grass grass).
2. Pharmacokinetics and pharmacodynamics, indications and contraindications to the use of cardiac
   glycosis virgins Side effects of cardiac glycosides.
3. Acute and chronic cardiac glycoside poisoning, treatment measures and prevention.
4. Pharmacological characteristic of non-glycoside cardiotonic agents (dobutamine, dopamine hydrochloride, levosimendan) . Indications for use.
5. Indirect cardiotonic drugs (ACE inhibitors, angiotensin II receptor blockers; beta-blockers – metoprolol, bisoprolol, nebivolol, carvedilol; vasodilators of the nitrate group; diuretics – furosemide, torasemide, hydrochlorothiazide, spironolactone).
6. Classification of antiarrhythmics by indications for application and mechanism of action.
7. Pharmacological characteristic antiarrhythmic drugs.
8. Pharmacokinetics and pharmacodynamics of antiarrhythmics with membrane stabilizing action (blocker and Na + channels - Class I). Comparative characteristics of group IA (quinidine sulfate, novocainamide, aimalin), IV (lidocaine, trimecain, diphenin), IC (propafenone, ethacysin). Indications for use.
9. Pharmacological characteristics of beta-blockers (class II). Indications for use. Comparative characteristics of drugs (propranolol, metoprolol, atenolol, bisoprolol, nebivolol, carvedilol).
10. Pharmacokinetics and pharmacodynamics of potassium channel blockers (class III). Amiodarone, dronedarone, sotalol. Application in clinical practice.
11. Pharmacological characteristic of calcium channel blockers (class IV). Comparative characteristics of drugs (verapamil, diltiazem) and if- channels (ivabradine) in the treatment of heart rhythm disorders.
12. Mechanism of antiarrhythmic action of potassium drugs (potassium chloride, aspartic acid, ATP Long, rhythmocore, magnesium orotat) . Application in clinical practice.
13. Meaning of M-choline blockers (atropine) and adrenomimetics (isoprenaline) in the treatment of heart rhythm disturbances.

4.3. Practical tasks that are performed in the lesson:

4.3.1. Prescribe recipes and conduct their pharmacotherapeutic analysis (indicate group affiliation, indications for use, possible complications):

1. Strofanthin in ampoules
2. Korglikon in ampoules
3. Digoxin in tablets and in ampoules
4. Quinidine sulfate in tablets
5. Dobutamine in ampoules
6. Lidocaine in ampoules

7. Propranolol in tablets
8. Metoprolol in tablets
9. Amiodarone in tablets and in ampoules
10. Verapamil in tablets and in ampoules
11. Propafenone tablets and ampoules
12. Potassium chloride in solution for use inside
13. Potassium and magnesium asparaginate (Asparcam, Panangin)
14. Unitiol in ampoules.

4.3.2. Practical tasks performed at the lesson:

1. To familiarize with the preparations on the topic, to determine their affiliation with the pharmacological group and indications for use. Fill in the table:

Preperation	Mechanism of action	Indications for use	Side effects
1. Strofanthin			
2. Corglicon			
3. Digoxin			
4. Quinidine sulfate			
5. Dobutamine			
6. Lidocain			
7. Propranolol			
8. Metropolol			
9. Amiodarone			
10. Verapamil			
11. Propafenone			
12. Asparcam			
13. Unitiol			

. 2. To substantiate the choice of the drug, its pharmaceutical form, dosage, concentration, route of administration and prescribe.

1. Drug for the treatment of acute heart failure.
2. The drug for long-term treatment of chronic heart failure.
3. A remedy for the recovery of Na^+ / K^+ -ATPase activity with cardiac glycoside intoxication.
4. A remedy for correction of electrolyte disturbances with intoxication with digoxin.
5. A remedy for emergency aid for ventricular paroxysmal tachycardia, which detects local anesthetic activity.
6. A remedy for the treatment of atrioventricular blockade.
7. A remedy for mergency aid for atrial paroxysmal tachycardia.
8. A remedy for the treatment of ventricular tachycardia caused by the increased activity of the sympathetic nervous system.
9. A remedy for the treatment of ventricular tachyarrhythmia, which significantly prolongs repolarization, has both antiarrhythmic and antianginal activity at the same time.
10. Cardiotonic drug in a patient with acute heart failure and hypotension.

Materials for self-control.

A. Tasks for self-control:

Using of text books and operative insyructions, syudent must fill in table:

Table № 1. Influence of cardiac glycosides on the heart.

	Effect of cardiac glycosides
Heart strength	
Heart rate	
Conductance	
Automation	

Table № 2. Comparative characteristic of cardiac glycosides.

	Strofanthin	Digoxin	Korglikon
Fat solubility			
Bioavailability after per os introduction			
Input path			
Half life			
Interest that metabolism - liver etsya			
Ability to cumulate			

B. Self-control task:

Task 1. Patient 65 year admitted to hospital in communications with exacerbation of chronic heart failure. She has a low shock ejection and stable arterial hypotension. The doctor decided to introduce a highly adrenomimetic agent, which increases cardiac output, increases arterial pressure, while causing enlargement of the renal arteries and increasing diuresis.

A) Identify the drug. B) Explain the mechanism of its action.

Task 2. In a patient 70 years after myocardial infarction, a ventricular extrasystole appeared. The doctor prescribed the patient an antiarrhythmic drug for prolonged use, which weakens the effect of sympathetic innervation on the heart.

A) Identify the drug. B) Explain the mechanism of its action.

Task 3. In patients with heart failure treated with digoxin there were symptoms of intoxication with cardiac glucoside: weakness, nausea, discomfort in the stomach, headache, insomnia, palpitations. In an electrocardiographic study, ventricular extrasystoles were discovered with the threat of hemodynamic disorders. The doctor introduced a antiarrhythmic agent that acts by blockade of sodium channels. In addition to antiarrhythmic action, it also causes local anesthetic effect.

A) Identify the drug. B) Justify the choice of this remedy by a physician.

C. Tests for self-control:

1. At reception from the dentist, the patient at age 22 had a state of heart failure. What fast cardiac glycoside should be administered to a patient in this situation, taking into account his hyper-excitatory state of the nervous system?

A.Inflorescence adonis B.Digitoxin C. Strophanthin D.Lantoiside E. Asparkam

2. In a patient of 68 years who suffers from heart failure and for a long time drug digitalis drugs, there were phenomena of intoxication, which quickly managed to be eliminated by the use of a dopant sulfhydryl unithiol group. What is the mechanism of therapeutic action of this remedy?

A. Reacts natrium-potassium-ATPase of miocardiocytes
B. Reduces the accumulation of ionized calcium
C. Brakes the release of potassium from myocardial cells
D. Slows the flow of sodium into myocardiosite E. Increases myocardial energy supply

3. For a patient suffering from chronic heart failure, the physician recommended to conduct a prophylactic course of treatment with cardiotonic drug from the group of cardiac glycosides that are taken internally. Which of the medications was recommended to the patient?

A.Strofantin B.Digoxin C.Corglichon D.Cordine E.Amiodarone

4. A patient with chronic heart failure within several months received digoxin in an outpatient setting. At a certain stage of treatment, he had symptoms of overdose of the drug. What is the underlying development of this complication?

A. Acquisition B. Sensitization C. Material cumulation D. Functional cumulation
E. Tachyphilaciosis

5. A patient with flashing arrhythmia is assigned a digitoxin. What effect does the substance have on its antiarrhythmic activity?

A. Increasing the concentration of potassium in myocardium B. Reduced sympathetic effects
C. Reduction of calcium conductivity of the membrane

D. Decrease of sodium conductivity of the membrane

E. Increasing the tone of the vagus nerve

6. A patient with acute heart failure was given a fast-acting cardiac glycoside. Which of the following means was introduced?

A.Strofantin B.Adonizide C.Digitoxin D.Celanid E. Asparcam

7. Patient with acute heart failure with refractory to cardiac glycosides, dobutamine was injected. What is the mechanism of action in this drug?

A. Complex formation with phospholipids of the membrane

B. Blockade K +, Na + - ATPase C. Stimulation of β1-adrenergic receptors

D. Inhibition of phosphodiesterase activity E. Increasing the tone of n.vagus

8. A patient with heart failure and edema was prescribed digitoxin. What is the cardiotonic effect of cardiac glycosides?

A. By blocking Na + K + ATPase B. By stimulating Na + K + ATPase

C. Reflex effect on the heart D. Position of myocardial conduction

E. Indirect activation of adrenoreceptors

9. Patients with congestive heart failure were prescribed cardiac glucoside, which is characterized by high bioavailability, intense bonding with plasma protein, biotransformation in the liver, pronounced cumulusing. Identify this medication.

A. Inflorescence Adonis B. Corgliocon C. Celanid D. Digitoxin E. Strofantin

10. A patient with chronic cardiovascular insufficiency received digitoxin. After the appointment of additional therapy, the phenomena of intoxication with cardiac glycosides developed. Which drug prevents the development of intoxication with cardiac glycosides?

A. Potassium chloride B. Calcium chloride C. Magnium chloride D. Asparcum

E. Glucose solution

11. In a patient, 45 years old, with a transmural myocardial infarction, acute pancreatic insufficiency developed. What kind of medicinal product is appropriate to apply in this situation for improvement of the cardiac pump function?

A. Dobutamin B. Izadrin C. Ephedrine D. Eufilin E. Prodemol

12. A doctor was prescribed to a patient with acute heart failure, a non-glucosidic cardiotonic drug, which directly stimulates the β1-adrenergic receptors of the enlarged myocardium, diuresis. It is used only internally in drip due to rapid inactivation in the organism. What drug was prescribed by a doctor?

A. Anaprilin B. Dobutamin C. Digoxin D. Adrenalin E. Corglicon

13. A patient, 50 years old, with chronic heart failure and tachyarrhythmia was prescribed a cardiotonic drug. Specify the drug that was prescribed to the patient?

A. Amiodaron B. Anaprilin C. Digoxin D. Dopamine E. Diphenin

14. At a patient arrhythmia. A patient with heart rhythm disturbance to prevent angina attacks is assigned a potassium channel blocker. Identify this drug:

A. Nialamid B. Nakom C. Nickelamid D. Atrovent E. Amiodaron

15. A patient with acute heart failure prescribed digoxin. To which pharmacological group belongs to this drug?

A. Heart glycosides B. Neuroleptics C. Adrenoblockers D. Aminoglycosides

E. Holinomimetics

16. In a patient a background of taking digoxin, there was a bigeminia, a sharp muscular weakness, diarrhea, vomiting, visual impairment. What drugs can reduce the effects of poisoning?

A. Preparations of calcium B. Preparations of potassium C. Preparations of magnesium

D. Preparations of iron E. Preparations of sodium

17. The patient was treated at the cardiology department for decompensated chronic heart failure. He was prescribed digitoxin at a dose of 0.0001 g from the first day of hospitalization, but he noticed improvement only after a week. The slow onset of the effect of the drug the doctor explained:

A. Sustained binding of digitoxin to plasma proteins of blood

B. Not enough dose of digitoxin C. Inadequate absorption of the drug in the intestine
D. Increase diuresis E. Insufficient amount of carbohydrates in the diet

18. In the surgical department has arrived the patient with an absces shoulder. An additional study revealed ventricular extrasystole. What kind of anesthesia and what drug is most appropriate in this case?

A. Spinal anesthesia with sovacaine B. Hexenal anesthesia C. Ethereal anesthesia
D. Ketamine anesthesia E. Local anesthesia with lidocaine

19. In a patient, bronchial asthma attacks occur more often at night, accompanied by bradycardia, spastic pain in the intestine, and diarrhea. What drug group can eliminate these symptoms?

A. H-cholinoblockers B. H2-histamine blockers C. Alpha-adrenoblockers
D. M-cholinoblockers E. Beta-adrenoblockers

20. Provide the correct position regarding the mechanisms of action of drugs:

A. Digoxin inhibits Na + K + -ATP -ase B. Lidocaine blocks Ca2 + channels
C. Verapamil blocks Na + channels
D. Metoprolol blocks beta1- and beta2-adrenoreceptors
E. Propranolol (anaprilin) selectively blocks beta-1 adrenergic receptors

21. To determine the mechanism of antiarrhythmic action in relation to cardiac glycosides:

A. Have a negative inotropic action of B. They have a positive chronotropic effect
C. Strengthen the effect of the vagus nerve on the heart
D. Define oppression of automatism
E. Boost conductivity in a beam of Gissa and Purkinje fibers

22. In a patient of 68 years who suffers from heart failure and for a long time digitalis preparations, there were phenomena of intoxication, which quickly managed to be eliminated by the use of a dopant sulfhydryl groups of unithiol. What is the mechanism of therapeutic action of this remedy?

A. Reduces the accumulation of ionized calcium B. Slows down sodium in myocardiosite
C. Brakes the release of potassium from myocardium
D. Reactivates sodium-potassium-ATP-aza of membranes of myocardiosts
E. Enhances myocardial energy supply

23. A patient with a flashing arrhythmia, in the history of which a bronchial asthma, should be prescribed antiarrhythmic drug. What drug from this group is contraindicated for the patient?

A. Niefidipin B. Anaprilin C. Aimalin D. Verapamil E. Novokainamid

24. What drug stimulates only beta-1 adrenergic receptors of myocardium and is used to treat acute heart failure?

A. Adrenaline B. Acetylcysteine C. Corglicon D. Dobutamine E. Cordyamine

25. In patients with myocardial infarction and heart failure, ventricular tachyarrhythmia occurred. What drug is a means of choice?

A. Lidokain B. Hinidin C. Nifedipine D. Novokainimid E. Lipryl

26. What drug is used at full atrientricular blockade?

A. Novocainamid B. Atropine sulfate C. Amiodaron (Cordaron) D. Corglikon E. Anaprilin

27. In case of transport of potassium inside the cell, there is hypokaliigistia. Which preparation will provide the element necessary for the activity of K + _ membrane-ATP-aza?

A. Aspikard B. Almagel C. Asparkam D. Calcium lactate E. Calcium orthotate

28. Myocardiosclerosis in a 60-year-old patient is accompanied by chronic heart failure. Digoxin was used for digitilization and now it is administered in a small individual dose to maintain the heart in a state of compensation. What mechanism of action is responsible for the positive inotropic effect of this drug?

A. Blockade Na + - K + _ ATP-azuses B. Blockade of phosphodiesterase
C. Blockade of calcium channels D. Activation of calcium channels
E. Stimulation of beta-1 adrenergic receptors

Content module № 4	**Pharmacology of agents affecting function of cardio-vascular system**
Topic № 13	**Antianginal and lipid-lowering drugs**

1. Relevance of the topic: The disease of the cardiovascular system occupies one of the leading places of the pathology, which leads to significant disorders of the vital functions of the body - loss of ability to work and disability. The widespread prevalence of chronic ischemic heart disease and high mortality from this pathology of the cardiovascular system determine the significant relevance of antianginal drugs, which in our time are presented in a variety of mechanism of action groups. It is important to use this dasg group for emergency treatment in the case of an attack of angina and acute myocardial infarction.

Antianginal drugs are a large group of medicines that can actively treat patients with coronary heart disease and prevent complications of the disease, such as cardiosclerosis or myocardial infarction.

2. The specific goals:

1. To generalize and analyze the pharmacological characteristics of the main pharmacological agents, explain the mechanisms of action of individual groups of drugs (nitrates, adrenoblockers, calcium antagonists, myotropic vasodilators, reflex medications).
2. To interpret the indications for the use of antianginal drugs, respectively knowledge of pharmacodynamics.
3. Evaluate the benefit / risk ratio for the use of antianginal drugs that affect smooth muscle of coronary vessels and the general vascular network.
4. Create an algorithm for patient assistance in overdose with antianginal drugs.
5. Side effects of antianginal drugs and their elimination. Understand the possibility of using antidotes in each case.
6. To explain the dependence of antianginal drugs affecting smooth muscle of vessels and also on the smooth muscle organs, and features of pharmacokinetics in patients of different age, concomitant diseases and their therapy.
7. Make judgments about the possibility of side effects of drugs in order to prevent and eliminate side effects.
8. To prepare and analyze recipes for antianginal drugs (nitrates, myotropic action of coronary antics, adrenoblockers, reflex action of coronary angiogenesis, calcium channel blockers, energy-supplying agents, antihypoxants).

3. Basic knowledge, skills, skills needed to study the topic (interdisciplinary integration)

The names of previous disciplines	Skills learned
1. Latin language	Have the skills of writing recipes for the title section.
2. Normal physiology	Describe the impact of the central nervous system, peripheral nervous system, the tone of smooth 'muscles of blood vessels to maintain a stable blood supply system, pressure and vascular lumen.
3.Biological chemistry	Describe the biochemistry of the onset and nerve impulses on the adrenergic nerves. Determine the role of catecholamines in the transfer of the nerve impulse. Describe the ways of formation and destruction of catecholamines.Describe the mechanism of free radical oxidation.

4. Tasks for independent work in preparation for the lesson and in the lesson.

4.1. List of main terms, parameters, characteristics, which should be learn by the student in preparation for the lesson:

Term	Definition
1. Means that reduce the need for heart oxygen.	Drugs that affect the transfer of impulse in the synapse where the mediator is norepinephrine and adrenaline, which reduces the pre- and post-load on the heart and reduces its work.
2. Means that increase the delivery of oxygen to the heart.	Drugs that by various mechanisms relax the muscles of the vascular wall and expand the vessels.
3. Means that increase cardiac resistance to hypoxia, ischemia.	Drugs that suppress free radical oxidation in the myocardium and increase the absorption of oxygen.

PREPARATIONS

N	**Name of the drug**	**Form release**	**How to use**
ANTIANGINAL DRUG			
A. Means that reduce the need for heart oxygen			
1	**Organic nitrates** Glycerin trinitrate (Nitroglycerin) Nitroglycerinum	Tablets 0.0005 g Caps. 1%0.001 g	Under the tongue is 0.0005 g (0.001 g) with an angina attack
2	Sustac Sustac-forte	Tablets 0.0064 g	Orally 0,0064 g 3 times a day
3	Isosorbide dinitrate Isosorbide dinitratum (Nitrosorbidum)	Tablets 0.0 1 g	Orally 0.0 1 g 3 times a day
4	Isosorbide mononitrate Isosorbide mononitratum (Isomonitum)	Tablets 0.0 1 g	Orally 0.0 1 g 3 times a day
5	**Beta-adrenoblockers** Propranolol (Anaprilin) Propranolol (Anaprilinum)	Tablets 0.01 g Amp. 0.1% 5 ml	Orally 0,01 g 3 times a day I/v 5 ml in 20 ml of 40% sol. glucose
6	Metroprolol Metoprolol	Tablets 0.05, 0.1 g	Orally 0.05 g 2 times a day
7	Atenolol Atenololum	Tablets 0.1 g	Orally 0.1 g 2 times a day
B. Calcium channel blockers			
8	Verapamil Verapamilum	Tablets 0.04, 0.08g Amp. 0.25% 2 ml	Orally 0.04-0.08 g 3 times a day I/v slowly 2-4 ml 2 times a day
9.	Nifedipine Nifedipinum	Tablets 0.01 g	Orally 0,01 g 3 times a day
10.	Amlodipine Amlodipinum	Tablets 0.01 g	Orally 0.01 g 1 time a day
B. . Means that increase the delivery of oxygen to the heart			
Miotropic action of coronarylitics			
1	Papaverine hydrochloride Papaverini hydrochloridum	Tablets 0.04 g Amp. 2% 2 ml	Orally 0.04 g 3 times a day Intramuscles 2ml
2	Drotaverin (No-Shpa) Drotaverini (No-Spa)	Tablets 0.04 g Amp. 2% 2 ml	Orally 0.04 g 3 times a day Intramuscles 2ml
3	Dipyridamole (Kurantyl) Dipyridamolum	Tablets 0,025 g Amp. 0.5% 2 ml	Orally 0.025 g 3 times a day Intramuscles 2ml

	Reflex action of coronary antics		
4	Validol Validolum	Tablets 0.06 g Flac. 5 ml	Under the tongue 0,0 6 g at an attack Under the tongue, 5 drops on the crumbs of sugar
B. Medications that increase cardiac resistance to hypoxia, ischemia			
1	**Energy-saving means** ATP-long (ATF - long)	Tablets 0.01 g	Under the tongue is 0.0 1 g 3 times a day
2	**Antioxidants** Tocopherol acetate Tocopherol Acetas	Caps. 50% 0.2 ml Amp. 5%, 10%, 30% 1 ml	Orally 0.1 g 3 times a day Intrmuscles 1ml
3	Mexidol Mexidolum	Amp. 5% 5 ml	Intramuscles 5ml
4	**Antihypoxants** Trimetazidine (Preductal) Trimetazidum (Preductal)	Tablets 0.0 35 g	Orally 0.035 g 2 times a day

4.2. Theoretical questions to the lesson:

1. Anatomical and physiological properties of the cardiovascular system. Contemporary notions of nerve synapses, mediators and receptors. The notion of adrenoreceptors, adenosine receptors, nitro-receptors. The concept of the pathogenesis of coronary heart disease.
2. Classification and general pharmacological characteristic of antianginal drugs.
3. Pharmacokinetics and pharmacodynamics of nitroglycerin and a comparative characteristic with sustak, isosorbide dinitrate, isosorbide mononitrate, side effects.
4. Mechanism of action of blockers of calcium channels (calcium antagonists - verapamil, amlodipine, nifedipine). Pharmacological characteristics of preparaty.
5. Pharmacodynamics and mechanism of action of molsidomine. Indications for use.
6. Features of the use of beta-blockers (propranolol, atenolol, metoprolol) in the treatment of patients with coronary heart disease, vasodilating agents of myotropic action (dipyridamole, papaverine hydrochloride, drotaverine (no-spa), bradycardic drugs (ivabradine), reflex type of action (validolol) and funds (trimetazidine, mildronate, ATP-long), antioxidants (thiotriazolin, corvitin), antihypoxants. Indications and contraindications for use, side effects.
7. Concepts of the "stealing" syndrome, which drug causes.
8. Indications and contraindications for the use of antianginal drugs, their side effects.
9. Principles of complex therapy of myocardial infarction. General characteristics of pharmacological groups.

4.3. Practical tasks that are performed in the lesson:

4.3.1. Prescribe recipes and conduct their pharmacotherapeutic analysis (indicate group affiliation, indications for use, possible complications):

1. Glyceryl trinitrate (Nitroglycerin) in tablets and ampoules
2. Isosorbide dinitrate tablets.
3. Validol tablets.
4. Propranolol tablets and ampoules.
5. Metoprolol tablets.
6. Nifedipine tablets.
7. Amlodipine tablets.
8. Dipyridamole tablets.
9. Trimetazidine tablets.
10. Drotaverinum in tablets and in ampoules.

11. Tocopherol acetate capsules.

4.3.2. Practical tasks performed at the lesson:

1. To familiarize with the preparations on the topic, to determine their affiliation with the pharmacological group and indications for use. Fill in the table:

Drugs	Indications for use	Side effects
1. Nitroglycerin		
2. Isosorbide dinitrate		
3. Validol		
4. Propranolol		
5. Metoprolol		
6. Nifedipine		
7. Amlodipine		
8. Dipyridamole		
9. Trimetazidine		
10 . Drotaverin (No-Shpa)		
11 . Tocopherol acetate		

2. To substantiate the choice of the drug, its pharmaceutical form, dosage, concentration, route of administration and prescribe.

1. Preparation from a group of organic nitrates.
2. A drug for reflex action to relieve an angina attack.
3. A drug for treating angina pectoris from a group of calcium antagonists.
4. A drug for the treatment of angina pectoris from a group of nonselective beta-blockers.
5. A drug for treating angina pectoris from a group of selective beta-blockers.
6. A drug for the prevention of angina, which improves the supply of oxygen to myocardium
7. A drug that adapts the heart to hypoxia.
8. A drug for the treatment of angina pectoris from a group of antioxidants.

Materials for self-control.

A. Tasks for self-control:

Using of text books and operative insyructions, syudent must fill in table:

Table № 1. "Pharmacological characteristics of antianginal drugs"

	Nitroglycerin	Validol	Anaprilin	Metropolol	Amlodipine	Dipyridamole
Mechanism actions						
Side effects						

Table № 2. "Pharmacokinetic Characteristics of Means Organic Nitrate"

	Nitroglycerin	Sustak	Nitrogang	Trinitrolong	Isosorbide dinitrate	Isosorbide mononitrate
Input path						
Time of action						

Table № 3. Compare, indicating "+", the action and names of drugs for the relief of myocardial infarction

	Correction of acidosis	Prevention of pain shock	Fighting with thrombosis	Reducing the necrosis area	Prevention of renal failure
Heparin					
Nitroglycerin					
Promedol					
Prednisolone					

B. Self-control tasks.

Tasks 1. The patient with a chronic stable angina during an attack, the doctor suggested a sublingual drug, which manifested itself after 3 minutes. After the disappearance of pain in the heart, the patient was inquired about the remedy suggested by the doctor.

A) Identify the drug that has been prescribed.

B) What is the mechanism of action of the prescribed means.

Tasks 2. Patients with supraventricular tachyarrhythmia and chronic stable angina should be assigned a means to solve both problems, however, given that the history of the patient is insulin-dependent form of diabetes mellitus. Consulium of doctors reviewed the drugs: anaprilin and atenolol.

A) Identify the drug that is best suited.

B) What is the mechanism of action of this drug.

Tasks 3. In the post-myocardial infarction patient, in a complex therapy, a drug was prescribed that has antianginal and anti-aggregant effects. As a result, the patient's condition deteriorated: dizziness, dizziness, tachycardia and aphasia occurred. What drug was prescribed? As a result of which his actions have complications?

A) Identify the drug that was prescribed.

B) As a result of which his actions have complications.

C. Tests for self-control.

1. A 50 year old patient with an ICD diagnosis prescribed an antiplatelet drug. The patient drug the drug in larger doses and had nausea, vomiting, and pain in the stomach. What drug did the patient take?

A. Aspirin B. Indomethacin C. Dipyridamole D. Pentoxifylline E. Drotaverine

2. A patient 60 years of age with myocardial infarction to reduce the size of the heart attack was prescribed nitroglycerin. In what dosage form it is most appropriate to introduce it and how?

A. Plasters with nitroglycerin B. Sublingual capsules C. Inhalation
D. Water solution intravenously drip E. Alcoholic solution per os

3. A patient with unstable angina shows the use of antioxidants. Which drug will be the best?

A. Calcium pantothenate B. Isosorbide mononitrate C. Pyridoxine hydrochloride
D. Tocopherol Acetate E. Dipyridamole

4. A patient with ischemic heart disease suffers from frequent headache. Which of the antianginal drugs does not cause manifestations of headache?

A. Erinit B. Nitrogang C. C. Sustak D. Karbromen E. Trinitrolung

5. In a patient, a stenocardia attack of rest, in which more effective means, expanding coronary vessels. What drug does not have this action?

A. Niefidipin B. Anaprilin C. Verapamil D. Nitroglycerin E. Validol

6. Patients with an ischemic heart disease are shown anaprilin. Which of the concomitant illnesses is a contraindication to its appointment?

A. Glaucoma B. Tachyarrhythmia C. Hypertension D. Adenoma E. Bronchial asthma

7. Patients with ischemic disease were assigned tocopherol. What effect does a physician count on?

A. Hypotensive B. Spasmolytic C. Antihypoxic D. Cardiotonic E. Antioxidant

8. What effect can be observed in the use of validol?

A. Collapse B. Nausea C. Hypertension D. Headache E. Spasticity

9. A patient of 19 years at the admission to the dentist complained of a sharp pain in the heart, felt from fear. The doctor gave him a pill under the tongue and the pain disappeared in a few seconds. Which drug was taken by the patient?

A. Analgin B. Nitrazepam C. Nitroglycerin D. Validol E. Anaprilin

10.A patient 50 years old with a diagnosis: IBS, angina pectoris, cardiosclerosis, flashing arrhythmia. What drug should be assigned to the patient?

A. Atenolol B. Aspirin C. Digoxin D. Strofantin E. Panangin

11. Patient, suffering from attacks of angina, shows the use of long-acting nitrates. Define this drug.

A. Validol B. Verapamil C. Nefedipin D. Nitrogang E. Nitroglycerin

12. A patient with IBS complains of retrosternal pain with emotional and physical activity. What drug is better to appoint?

A. Panangin B. Strofantin C. Pantocrine D. Sustak E. Analgin

13. Patients were prescribed nitroglycerin. Due to which mechanism of action, he reduced the pain in the heart?

A. Blockade of calcium channels B. Activation of adenylate cyclase
C. Blockade of adenosine blockade D. Blockade of beta-adrenergic receptors
E. Supply of nitrogen oxide

14. In patients with ischemic heart disease, the doctor prescribed nitroglycerin tablets for relief of angina attacks. Why are nitroglycerin tablets prescribed only sublingually?

A. The drug is badly absorbed in the gastrointestinal tract
B. The drug is split into the stomach C. This way gives the least complications
D. Significantly cleaves at the first pass through the liver
E. It is reflex from the receptors of the oral cavity

15. A patient 55 years of age is treated with a diagnosis of coronary heart disease. Specify vascular remedy, the mechanism of action of which causes the syndrome of theft.

A. Dipyridamol B. Papaverin C. Drotaverin D. Nitroglycerin E. Prazozin

16. Determine a group of drugs that reduce the need for heart in oxygen, reduce afterload on the heart and inhibit lipolysis?

A. Sympatolytics B. Spasmolytics C. Beta-adrenoblockers D. Alpha-blockers
E. Beta-adrenomimetics

17. Determine a remedy for the prevention of angina attacks?

A. Digoxin B. Tselanid C. Strofantin D. Sustak E. Validol

18. Which of the drugs calcium antagonists simultaneously affects the myocardium, vascular wall and atrioventricular conductivity?

A. Nimodipine B. Amlodipine C. Nifedipine D. Verapamil E. Diltiazem

19. Patient was diagnosed with angina pectoris, paroxysmal tachycardia and arterial hypertension. Identify the drug and its pharmacological groups, effective in relation to all diagent conditions.

A. Calcium antagonist - nifedipine
B. Myotropic coronarolytic - carbromen
C. Beta-adrenergic agent - nanolazine
D. Beta-adrenoblocker - anaprilin
E. Peripheral vasodilators - nitroglycerin

20. The patient takes organic nitrates for a long time to treat angina pectoris. Diagnosed pharmacological anemia as a side effect of primary treatment. Determine the remedy for side effects.

A. Potassium chloride B. Panangin C. Chromosomon D. Unitiol E. EDTA

21. Patient A., 65 years old, was diagnosed with angina pectoris. What neurotropic agent can be prescribed to a patient?

A. Niefidipin B. Anaprilin C. Asparkam D. Amlodipin E. Nitrosorbide

22. After taking nitroglycerin, its maximum concentration in the blood is achieved through:

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

23. Patient has been diagnosed with angina and arterial hypertension, which are accompanied by cardiac tachyarrhythmia. Which means affect the pathogenesis of diagnosed conditions?

A. Niefidipin B.Anaprilin C. Asparkam D. Amlodipin E. Aspikard

24. Patient K., 60 years old, with ischemic heart disease is shown the purpose of anaprilina. Which of the concomitant illnesses is contraindication before its appointment?

A. Tachyarrhythmia B. Glaucoma C. Prostate adenoma D. Bronchial asthma
E. Hypertension

25. A patient, 50 years old, with a diagnosis: CHD, angina pectoris, cardiosclerosis, flashing arrhythmia. What drug should be assigned to the patient?

A. Niefidipin B. Atenolol C. Asparkam D. Digoxin Amlodipin E. Aspikard

26. Nitroglycerin reduces the tone of smooth muscles of the coronary vessels and increases the volume velocity of the coronary artery. The cleavage which of a molecular substrate in the cell eliminate the effect of nitroglycerin?

A. Phosphodiesterase B. Phospholipase C. C. Guanylate cyclase
D. Adenylate cyclase E. Calmodulin

27. In a patient chronic ischemic heart disease with rare attacks. What is the most effective action group of organic nitrates to be prescribed?

A. Isosorbide mononitrate B. Nitroglycerin C. Sustak-forte D. Celanid E. Milrinon

28. In a patient, angina and periodic arrhythmias are determined. Which drug from the group of calcium antagonists should be prescribed?

A. Amlodipin B. Atenolol C. Anaprilin D. Validol E. Verapamil

29. Patients with angina pectoris prescribed an antianginal agent, which reduces the need for myocardium into oxygen and increases the supply of oxygen to the myocardium. Define this tool.

A. Amiodarone B. Atenolol C. Nitroglycerin D. Niketamide E. Asparkam

30. Patient, 75 years old, took a vasodilator to treat angina pectoris. There was a complication that the doctor called "stil-sindrom". What tool did the patient take?

A. Digoxin B. Dipyridamole C. Atenolol D. Drotaverin E. Amiodaron

31. Patient several years ago I suffered a myocardial infarction. What antianginal medication should be prescribed for the prevention of myocardial ischemia?

A. Trimetazidine B. Dipiroxime C. Drotaverine D. Amlodipine E. Trimecain

32. Patient , suffering from attacks of angina, shows the use of long-acting nitrates. Define this drug.

A. Novocainamid B. Atenolol C. Nitrosorbide D. Nyketamid E. Nifedipine

33. Patient takes isosorbide dinitrate. What is its main cellular mechanism of action?

A. Activator of Ca-ATPase B. Donor of NO-groups C. Activator of guanylate cyclase
D. Donor of SH-groups E. Activator of adenylate cyclase

34. The use of a fat-soluble antioxidant is indicated for the treatment of unstable angina. Which drug will be the best?

A. Calcium pantothenate B. Isosorbide mononitrate C. Acid ascorbic acid
D. Acid acetylsalicylic E. Tocopherol acetate

35.Hvora V., 43 years old, with ischemic heart disease suffers from frequent headache. Which of the antianginal drugs does not cause manifestations of headache?

A. Kurantyl B. Nicketamide C. Nitron D. Trinitrolong E. Nitroglycerin

Content module № 4	**Pharmacology of agents affecting function of cardio-vascular system**
Topic № 13 (continued)	**Antianginal and lipid-lowering drugs**

1. Relevance of the topic: Often the cause of the disruption of the cardiovascular system is a change in the lipid metabolism - an increase in the content of low density lipoprotein, which leads to the development of atherosclerosis. The disease of the cardiovascular system is one of the leading places in the pathology, which leads to significant disorders of the vital functions of the body - loss of ability to work and disability.

The section "Antiatherosclerotic drugs and agents that affect the cerebral circulation. Hypolipidemic means and means improving the cerebral circulation "is one of the most important sections of pharmacology, because it includes drugs that are of paramount importance in the correction of the functions of all vital organs and systems of the body. These are medicines that cause lower cholesterol and improve blood flow. The action of antiatherosclerotic and hypolipidemic agents is directed at various links of the biochemical system of regulation of lipid metabolism and improvement of cerebrovascular circulation.

2. The specific goals:

1. To summarize and analyze the pharmacological characteristics of the main pharmacological agents, explain the mechanisms of action of individual groups of drugs (hypolipidemic, hypocholesterolemic agents).
2. To interpret the indications for the use of antiatherosclerotic medicines in accordance with the knowledge of pharmacodynamics.
3. Evaluate the benefit / risk ratio for the use of drugs hypocholesterolemic action and agents that affect the cerebral circulation.
4. To create an algorithm of assistance to patients in case of overdose with antiatherosclerotic drugs. Side effects of hypocholesterolemic drugs and their elimination. Understand the possibility of using antidotes in each case.
5. Explain the dependence of the action of hypocholesterolemic drugs that affect lipid metabolism and the pharmacokinetics of patients of different ages, concomitant diseases and their therapies.
6. To make judgments about possibility of occurrence of side effects of medicines with the purpose of their prevention and elimination of side effects.
7. To write and analyze recipes for preparations of antiatherosclerotic action and means, which influence on cerebrovascular flow.

3. Basic knowledge, skills, skills needed to study the topic (interdisciplinary integration)

The names of previous disciplines	Skills learned
1. Latin language	Have the skills of writing recipes for the title section.
2. Pathological physiology	Apply knowledge of development or promotion of regression of the atheromatous process. Focus on contemporary views on the pathogenesis of atherosclerosis, as a staged process with metabolic disorders of lipids and inflammatory and degenerative changes in the vascular wall. Draw a diagram of the pathogenesis of atherosclerosis. Describe the biochemistry of the onset and development of atherosclerosis.
3. Biological chemistry	Determine the role of lipids in the development of atherosclerosis.

4. Tasks for independent work in preparation for the lesson and in the lesson.

4.1. List of main terms, parameters, characteristics, which should be taken by the student in preparation for the lesson.

Term	Definition
1. Antiatherosclerotic drugs.	Drugs that affect cholesterol metabolism.
2. Means that affect the cerebral circulation.	Drugs that help improve blood circulation in the brain.

PREPARATIONS

N	Name of the drug	Form release	How to use
ANTIATEROSCLEROTIC DRUGS			
	Cholesterol synthesis inhibitors		
1	Lovastatin Lovastatinum	Tablets 0.01 g	Orally of 0,01 g in the evening
2.	Simvastatin Simvastatin	Tablets 0,0 2 g	Orally of 0,0 4 g in the evening
3.	Atorvastatin Atorvastatinum	Tablets 0,0 2 g	Orally 0,0 2 g in the evening
4.	Rosuvastatin (Crestor) Rosuvastatin	Tablets 0.01 g	Orally of 0,01 g in the evening
Medications that increase cholesterol withdrawal			
5.	Cholestyramine Cholestyraminum	Flac. 500 ml	Orally the powder with a spoon-dispenser on an empty stomach
Medicinal substances that reduce the level of triglycerides in the blood			
6.	Clofibrate Clofibrate	Caps. 0.25 g	Orally 0.25 g 3 times a day
7.	Fenofibrate Phenofibrate	Caps. 0.1 g	Orally 0.1 g 3 times a day
Medicinal substances that lower the content of cholesterol and triglycerides			
8.	Acid nicotine Ac. nicotinicum	Tablets 0.05 g	Orally 0.05 g 2 times a day
	Antioxidants		
9.	Tocopherol acetate Tocopherol acetas	Caps. 50% 0.1ml	Orally 1 capsule 2 times a day
10	Essentiale Essentiale	Amp. 5 ml Caps	Intravenously 5-10 ml a day For 2 capsules 3 times a day
	Angioprotectors		
11	Parmiden Parmindinum	Tablets 0.25 g	Orally 0.25 g 3 times a day
12	Ethamsilate Etamsilat	Tablets 0.25 g	Orally 0.25 g 3 times a day
13	Acid acetylsalicylic Ac. Acetylsalicylicum	Tablets 0.1 g	Orally 0.1 g once a day

4.2. Theoretical questions to the lesson:

1. Anatomical and physiological properties of the cardiovascular system. Modern ideas about cholesterol and beta-lipoprotein metabolism. The concept of inhibitors of cholesterol synthesis.
2. Classification and lipid-lowering drugs mechanism of action.
3. General pharmacological characteristic of hypolipidemic agents, direction of action.
4. Pharmacokinetics and pharmacodynamics of statins (lovastatin, simvastatin, atorvastatin, rosuvastatin).

5. Comparative characteristics of drugs other groups in the treatment hyperlipidemia (fibrates), a group of niacin (nicotinic acid), bile acid sequestrants (cholestyramine). Mechanisms of actions. Indications for used and side effects.
6. Medicinal products that activate metabolism and excretion of cholesterol from the body. Pharmacological characteristic of essentiale. Indications for use.
7. The concept of angioprotector and. Pharmacokinetics and pharmacodynamics of drugs. Pharmacological characteristic of angioprotectors of direct action (parmidine, etamzylate). Indications for use. Side effects.
8. Medications affecting platelet aggregation (acetylsalicylic acid, heparin, clopidogrel), features of action, indications for use.
9. Angioprotective action of antioxidants.

4.3. Practical tasks that are performed in the lesson:

4.3.1. Prescribe recipes and conduct their pharmacotherapeutic analysis (indicate group affiliation, indications for use, possible complications):

1. Cholestyramine in powders
2. Simvastatin in tablets
3. Atorvastatin tablets
4. Essentiale a capsules
5. Fenofibrate in capsules
6. Parmidin in tablets
7. Acetylsalicylic acid in tablets
8. Nicotinic acid in tablets

4.3.2. Practical tasks performed at the lesson:

1. To familiarize with the preparations on the topic, to determine their affiliation with the pharmacological group and indications for use. Fill in the table: :

Drugs	Mechanism of action	Indications for use	Side effects
1. Cholestyramine			
2. Simvastatin			
3. Atorvastatin			
4. Essentiale			
5. Fenofibrate			
6. Parmidin			
7. Acetylsalicylic acid			
8. Nicotinic acid			

2. To substantiate the choice of the drug, its pharmaceutical form, dosage, concentration, route of administration and prescribe.

1. A drug for course treatment of atherosclerosis.
2. Hypolipidemic drug for reducing triglycerides.
3. A drug for the treatment of hyperlipidemia.
4. Anti-arteriosclerotic drug that causes myalgia.
5. Antidiabetic drug.
6. In the complex treatment of atherosclerosis gepatoprotektor.
7. With thrombotic form of ischemic stroke.
8. A drug for improving cerebral circulation.

Materials for self-control.

A. Tasks for self-control;

Using of text books and operative insyructions, syudent must fill in table:

Table № 1. "Pharmacological mechanisms of angioprotectors"

Pharmacological mechanisms	Fenofibrate	Parmidin	Atorvastatin	Nifedipine
1. Antagonist of calcium. 2. Anti-bradicinin. 3. Inhibitor of GMG-CoA-reductase. 4. Stimulates proliferators with peroxide.				

Table №2. "Side effects of antiatherosclerotic drugs "

Side effects	Fenofibrate	Aspirin	Lovastatin	Acid nicotine	Cholestyramine

B. Self-control task.

Task 1 . White crystalline powder without odor. Easily soluble in water. The main pharmacological feature is the ability to block calcium channels. Under its action, the probability of formation of blood clots decreases, the muscles of the vessels relax and they expand.

A) Identify the drug. B) For which diseases it is used.

Task 2 . Means for improvement of cerebral blood circulation: alkaloid colorant, white powder. It manages a direct myotropic effect on the brain vessels, blocks neuronal sodium channels, improves the metabolism of the brain tissue.

A) Identify the drug. B) For which diseases it is used.

Task 3 . In the patient's family hypercholesterolemia. The medication prescribed for treatment reduces the concentration of atherogenic lipids by suppressing GMG-CoA reductase.

A) Identify the drug. B) What complications does he cause.

C. Tests for self-control.

1. What kind of lipoprotein class is most atherogenic?

A. Chylomicrons B. IDL C. HDL D. LDL E. VLDL

2. Specify the principle of antiatherosclerotic action of lovastatin:

A. Violation of the formation of peroxide radicals
B. Violation of suction exogenous cholesterol
C. Disorders of lipolysis in adipose tissue
D. Violation of atherogenic LP penetration into vascular intima
E. Inhibition of the synthesis of endogenous cholesterol in the liver

3. Patients with atherosclerosis were prescribed lovastatin at 0.04 g per night. What is the purpose of the drug prescribed?

A. In the evening it is better absorbed drug B. It gives the effect of drowsiness
C. Catabolism of cholesterol occurs at night
D. Cholesterol withdrawal occurs at night E. Synthesis of cholesterol occurs at night

4. Patient with arteriosclerosis was prescribed by a hypolipidemic drug , which reduces the synthesis of cholesterol by blocking the 3-hydroxy-3-methylglutaryl-co-reductase. Specify it.

A. Fenofibrate B. Probulol C. Cholestyramine D. Lovastatin E. Parmidin

5. Intended for the treatment of atherosclerosis, the drug caused dizziness, reddening of the face, hypotension. What is the patient receiving?

A. Fenofibrate B. Nicotinic acid C. Cholestyramine D. Lovastatin E. Parmidin

6. Patients with atherosclerosis have been assigned a clofibrate. What is the mechanism of action of this drug?

A. Suppresses the activity of 3-HMG-CoA-reductase B. Increases the output of bile acids
C. Antioxidant effect D. Angioprotective effect E. Genotropin decreases VLDL

7. The patient received the vitamin for violation of lipid metabolism. What is this drug if there is dizziness, reddening of the face, nausea?

A. Tocopherol acetate B. Acid ascorbic acid C. Acid acetylsalicylic
D. Acid nicotinic E. Nocotinamide

8. Considering the long-term treatment with anti-arteriosclerotic drugs, safety and efficacy of this treatment are important. Identify a group of drugs that meets these requirements.

A. Inhibitors of the synthesis of cholestersin B. Angioprotectors of direct action
C. Fibrati D. Inhibitors of Cholesterol Suction in the Gastrointestinal Tract
E. Reducing the level of common lipids

9. The patient was prescribed a drug that normalizes the bradykinin-prostacyclin system in the vascular wall. Define this drug.

A. Lovastatin B. Clofibrate C. Parmidin D. Cholestyramine E. Tsinarizin

10. A woman 58 years old, suffering from cerebral atherosclerosis, tocopheryl and ascorbic acid are included in complex therapy. What mechanism of action of these drugs is essential in the treatment of the disease?

A. Strengthen the formation of sex hormones B. Suppress the formation of glucocorticoids
C. Increase antitoxic function of the liver D. Improve coronary circulation
E. Brake free radical oxidation of lipids

11. A patient who has suffered a myocardial infarction is prescribed acetylsalicylic acid 75 mg daily. What is the purpose of the drug?

A. Reduction of platelet aggregation B. Reduction of inflammation
C. Reduction a pain D. Decrease in temperature E. Expansion of coronary vessels

12. A patient with an acute myocardial infarction was prescribed for 3 - 4 months take acetyllicylic acid 0.25 1 time in 2 - 3 days. What action is calculated a the treated ?

A. Vascular expansion B. Anti-inflammatory C. Antipyretic D. Analgesic
E. Antiagregant

13. The patient for atherosclerosis is appointed tocopherol acetate. What effect of the drug in the complex therapy is expected by the doctor?

A. Antihypoxic B. Hypotensive C. Spasmolytic D. Positive inotropic
E. Antiarrhythmic

14. In the treatment scheme for atherosclerosis in have included tocopherol acetate. What mechanism of its action has angioprotective action?

A. Antihypoxic B. Cardiotonic C. Spasmolytic D. Antioxidant
E. Antiarrhythmic

15. A patient with chronic progressive vascular disease receives a drug from a group of fibrate. On the exchange of an endogenous substance, the drug is affected?

A. Bradikinin B. Essentsiale C. Triglycerides D. Prostacycline
E. Phospholipids

16. Prolonged treatment of atherosclerosis caused the development of bile-stone disease. What kind of hypolipidemic action causes such a complication?

A. Fenofibrate B. Parmidin C. Fenitoin D. Pentoxifylline E. Preductal

17. In case of transport of potassium inside the cell, there is hypokaligistia. What preparation will provide the element necessary for the activity of K + membrane ATPase?

A. Calcium lactate B. Calium orotat C. Almagel D. Asparcam
E. Aspikard

18. Periodic use of the drug for the prevention of atherosclerotic process and improvement of blood circulation, caused bleeding. What drug could cause it?

A. Asparcam B. Parmidyn C.Aspirin D. Pentoxifylline
E. Atenolol

19. Used to treat atherosclerosis, the drug caused dizziness, reddening of the face, hypotension. What is the patient receiving?

A. Fenofibrate B. Parmidin C. Acid acetylsalicylic D. Nicotinic acid
E. Pentoxifylline

20. In the complex treatment of atherosclerosis, a hepatoprotective agent should be prescribed. What is the drug, given that it promotes the removal of cholesterol?

A.Fenofibrate B. Parmidyn C. Essentiale D. Cinarisin E. Pentoxifylline

Content module № 4	**Pharmacology of agents affecting function of cardio-vascular system**
Topic № 14	**Antihypertensive drugs. Angioprotectors**

1. Relevance of the topic: The disease of the cardiovascular system occupies one of the leading places of the pathology, which leads to significant disorders of the vital activity of the organism - loss of ability to work and disability.

Antihypertensive drugs are drugs that cause a decrease in systemic blood pressure. An important role in this play is neurotropic substances that reduce vasoconstrictor adrenergic effects. They can act on vasomotor centers and peripheral parts of sympathetic innervation. Reduction in blood pressure can be achieved by reducing the volume of circulating blood and changing the electrolyte balance.Reducing arterial pressure can be due to the influence on the neurohumoral mechanisms that regulate arterial pressure, namely, the blockade of the enzyme involved in the conversion of angiotensin-1 in angiotensin-2, as well as the blockade of angiotensin receptors. Hypertensive and antihypertensive drugs constitute a significant group of drugs that allow a wide range of pharmacological correction of blood pressure at various classes.

2. The specific goals:

1. To generalize and analyze the pharmacological characteristics of the main pharmacological agents, explain the mechanisms of action of certain groups of drugs (blockers of adrenoreceptors, ganglion blockers, angiotensin receptor blockers and angiotensin-converting enzyme, hypotensive agents of myotropic action, sympatholytics). To interpret the indications for the use of antihypertensive drugs according to the knowledge of pharmacodynamics.
2. Estimate the benefit / risk ratio in the use of hypo- and hypertensive drugs that affect the peripheral and central nervous system, as well as the smooth muscle of blood vessels.
3. To create an algorithm for patients with overdose with hypertension. Side effects of antihypertensive drugs and their elimination. Understand the possibility of using antidotes in each case.
4. To explain the dependence of hyper- and antihypertensive drugs affecting the peripheral part of the nervous system and the pharmacokinetics of patients of different age, concomitant diseases and their therapies.
5. To write and analyze recipes for drugs of hypertensive and antihypertensive activity (alpha- and beta-adrenomimetics, sympathomimetics, alpha and beta-adrenergic blockers, angiotensin-converting enzyme inhibitors, calcium channel blockers).

3. Basic knowledge, skills, skills needed to study the topic (interdisciplinary integration)

The names of previous disciplines	Skills learned
1. Latin language	Have the skills of writing recipes for the title section.
2. Normal physiology	Describe the impact of the central nervous system, peripheral nervous system, the tone of smooth 'muscles of blood vessels to maintain a stable system pressure.
3.Biological chemistry	Describe the biochemistry of the onset and nerve impulses on the adrenergic nerves. Determine the role of catecholamines in the transfer of the nerve impulse.Describe the ways of formation and destruction of catecholamines.

4. Tasks for independent work in preparation for the lesson and in the lesson.

4.1. List of main terms, parameters, characteristics, which should be taken by the student in preparation for the lesson.

Term	Definition

1. Hypertensive drugs.	Drugs that amplify pulses in adrenergic synapses, myotropic hypertension drugs.
2. Antihypertensive drugs	Drugs that suppress impulses in adrenergic synapses and suppress the activity of the central nervous system.Myotropic drugs and agents that affect the reninangiotensive system.

PREPARATIONS

N	Name of the drug	Form release	How to use
ANTIGIPERTENSIVE MEANS			
	Peripheral action:		
	Alpha-blockers		
1	Prazosin Prasosinum	Tablets 0.001 g	Orally 0,001 g 3 times a day
	Beta-adrenoblockers		
2	Anaprilin Anaprilinum	Tablets 0.01 g Amp. 0.1% 5 ml	Orally 0,01 g 3 times a day Intravenously 5 ml in 20 ml of 40% glucose solution
	Sympatolytics		
3	Reserpine Reserpinum	Tablets 0.00025 g	Orally 0,00025 g 2 times a day
	Central action:		
4	Klofelin Clophelinum	Tablets 0,00015 g Amp. 0.01% 1 ml	Orally 0,00015 g once a day Intravenously 0.5 ml in 10 ml of isotonic. sodium Na chloride
5	Methyldopha Methyldopha	Tablets 0.25 g	Orally 0.25 g 3 times a day
Angiotensin-converting enzyme inhibitors			
1	Captopril Captoprilum	Tablets 0.05 g	Orally 0.05 g 1-2 times a day
2	Enalapril Enalaprili	Tablets 0.01 g	Orally 0,01 g 1-2 times a day
3	Lisinopril Lisinoprilum	Tablets 0.01 g	Orally 0,01 g 1-2 times a day
Angiotensin receptor blockers			
	Lozartan Losartanum	Tablets 0.05 g	Orally 0.05 g 1 time a day
Calcium channel blockers			
1	Amlodipine Amlodipinu	Tablets 0.01 g	Orally 0.01 g 1 time a day
2	Nifedipine Nifedipinum	Tablets 0.01 g	Orally 0,01 g 3 times a day
4	Verapamil Verapamilum	Tablets 0.04 g Amp. 0.25% 2 ml	Orally 0.04 g 2 times a day Intramuscles 2ml
5.	Diltiazem Diltiasemum	Tablets 0.06 g	Orally 0.06 g 2 times a day
Peripheral vasodilators			
1	Sodium nitroprusside Natrii nitroprussidum	Amp. 0.05 g	Intravenously in 500 ml of 5% glucose solution
2	Apresin Apressinum	Tablets 0,025 g	Orally 0.025 g 3 times a day
3	Dibazole	Tablets 0.02 g	Orally 0.02 g 2 times a day

	Dibasolum	Amp. 1% 1 ml	Intramuscles 1ml
4	No-Shpa Nospanum	Tablets 0.04 g Amp. 2% 2 ml	Orally 0.04 g 2 times a day Intramuscles 2ml
5	Magnesium sulfate Magnesii sulfas	Amp. 25% 10 ml	Intramuscles 5ml
DIURETICS			
1	Furosemide Furosemidum	Tablets 0.04 g Amp. 1 % 2 ml	Orally 0.04 g in the morning Intramuscles (veins) 2 ml
2	Hydrochlorothiazide Hydrochlorthiazidum	Tablets 0,025, 0.1 g	Orally 0,025- 0.05 g
3	Clopamid Clopamidum	Tablets 0,02 g	Orally 0 , 04- 0.06 g
4	Ethacryn acid (Uregite) Acidum etacrynicum	Tablets 0,05 g	Orally 0 , 05- 0.2 g
5	Spironolactone Spironolactonum	Tablets 0, 025 g	Orally 0.075- 0.3 g
6	Triamterene Triamterenum	Caps. 0.05 g	Orally 0,05- 0,15 g
7	Diacarb Diacarbum	Tablets 0.25 g	Orally 0, 12 5- 0, 25 g
8	Manite Mannitum	Flac.15 % 200 , 400, 500 ml	Intravenously drops

4.2. Theoretical questions to the lesson:

1. Anatomical and physiological properties of the cardiovascular system. Contemporary notions of nerve synapses, mediators and receptors. The notion of adrenoreceptors, reninangiotensiv system, angiotensin receptors.
2. Modern clinical classification of antihypertensive drugs. Pharmacological characteristic of antihypertensive agents of the main group (β- adrenoblockers - propranolol (anaprilin), atenolol, metoprolol, nebivolol, bisoprolol; a1-adrenoblockers: prazosin, doxazosin; α- and β-blockers: labetolol, carvedilol; ACE inhibitors: captopril (capoten), enalapril (renitec), lisinopril, fosinopril; angiotensin II receptor blockers (losartan, telmisartan); calcium antagonists (nifedipine, amlodipine, verapamil, diltiazem); diuretics (hydrochlorothiazide, indapamide, furosemide, torasemide, spironolactone, eplerenone).
3. Medicines of an additional group. Pharmacological characteristics of α1-blockers: prazosin, doxazosin, urapidil; central α2-adrenergic agonists: clonidine (clofeline); sympatholytics: methyldopa; peripheral vasodilators: sodium nitroprusside, drotaverine (no-shpa), papaverine hydrochloride, magnesium sulfate, dibazole; imidazoline receptor agonists (moxonidine), renin inhibitors (aliskiren), ganglion blockers (pentamine, benzohexonium).
4. Principles of a combination of antihypertensive drugs.
5. Comparative pharmacological characteristics of the above groups, the rate of development of the hypotensive effect.
6. Medical aid in hypertensive crisis.
7. Classification of hypertensive drugs by the mechanism of action. Hypertensive drugs of adrenomimetic action (adrenaline, norepinephrine, mesatone, ephedrine hydrochloride). The mechanism of action, pharmacological effects, indications for use, side effects.
8. General pharmacological characteristics of drugs used in antihypertensive conditions. Features of the use of analeptics, adaptogens, adrenergic agonists, hormonal and cardiotonic drugs.

4.3. Practical tasks that are performed in the lesson:

4.3.1. Prescribe recipes and conduct their pharmacotherapeutic analysis (indicate group affiliation, indications for use, possible complications):

1. Clonidine in ampoules.
2. Enalapril tablets.
3. Propranolol tablets.
4. Reserpine tablets
5. Prazosin tablets.
6. Diltiazem tablets
7. Lisinopril tablets.
8. Losartan tablets.
9. Valsartan tablets
10. Sodium nitroprusside in ampoules
11. Drotaverine tablets
12. Magnesium sulfate in ampoules.
13. Furosemide tablets and ampoules
14. Spironolactone tablets
15. Hydrochlorothiazide tablets

4.3.2. Practical tasks performed at the lesson:

1. To familiarize with the preparations on the topic, to determine their affiliation with the pharmacological group and indications for use. Fill in the table:

Drugs	Indications for use	Side effects
1. Mesaton		
2. Clonidine		
3. Reserpine		
4. Propranolol		
5. Prazosin		
6. Nifedipine		
7. Enalapril		
8. Lisinopril		
9. Losartan		
10. Drotaverin (No-shpa)		
11. Magnesia sulfate		

2. To substantiate the choice of the drug, its pharmaceutical form, dosage, concentration, route of administration:

1. Calcium channel blocker for course treatment of hypertension.
2. A drug for the removal of hypertensive crisis.
3. A drug for treating pheochromocytomas.
4. The drug of central action for the treatment of hypertension.
5. Antihypertensive drug of myotropic action.
6. ACE inhibitor for the treatment of hypertension.
7. Antagonist of the angiotensin II receptor for the treatment of hypertension.
8. The drug is an aldosterone antagonist.
9. A drug of prolonged hypotensive and diuretic action.
10. A drug for the treatment of gout.
11. A drug of diuretic action of anthranilic acid derivative.
12. The drug is potassium-sparing diuretic

Materials for self-control.

A. Tasks for self-control:

Using of text books and operative insyructions, syudent must fill in table:

Table "Pharmacological effects of antihypertensive drugs"

Pharmacological effects	Lisinopril	Prazosin	Anaprilin	Clofelin	Reserpin
1. Effect on adrenoreceptors. 2. Vascular tone 3. Condition of the cardiovascular system: b.p.m., AP 4.Functional state of the central nervous system					

B. Self-control task.

Task 1. Alkaloide contained in the plants of the family of the Ephedra. White crystalline, or granular, odorless powder. Easily soluble in water and alcohol. The main pharmacological feature is an adrenomimetic of indirect action. Under its action: pupil expands, intraocular pressure decreases, bronchial muscle relaxes, tachycardia develops, arterial pressure rises.

A) Identify the drug. B) For which diseases it is used.

Task 2. Sympatholytic, which penetrates well through the blood-brain barrier, and when overdosed it is noted: myositis, sweating, salivation, increased secretion of bronchial glands, bronchospasm, bradycardia, lowering of blood pressure, suppression of the central nervous system, spastic abdominal pain.

A) Identify the drug. B) Measures of assistance.

Task 3. The patient with arterial hypertension was prescribed one of the antihypertensive drugs. Blood pressure normalized, however, the patient began to disturb the constant dry cough.

A) Identify the drug. B) What mechanism of action of the drug gives a hypotensive effect.

C. Tests for self-control.

1. In an isolated vessel, animals were affected by a number of antihypertensive drugs. Which of the following substances will reduce the tone of smooth muscle of the vessels in these conditions?

A. Klofelin B. Enalapril C. Verapamil D. Prazozin E. Anaprilin

2. In the receiving department a patient with a hypertensive crisis has arrived. What should be administered to the patient to normalize blood pressure?

A. Magnesium sulfate, intramuscularly B. Rezerpine C. Enalapril
D. Magnesium sulfate inside E. Anaprilin inside

3. In a patient with hypertension in the course of systematic treatment with antihypertensive drugs, a cough arose. Which of the drugs can cause this side effect?

A. Prazosin B. Dichlotiazid C. Enalapril D. Klofelin E. Verapamil

4. A patient with 55 years of age had hypertension with elevated levels of renin in the blood. What antihypertensive drug should be preferred when treating a patient?

A. Papaverin B. Enalapril C. Nifedipine D. Anaprilin E. Prazozin

5. A patient with hypertonic disease treated with hydrochlorothiazide complains of general weakness, loss of appetite, palpitations. There is hypotonia of muscles, flabby paralysis, fastening. What could be the cause of this condition?

A. Hyponatremia B. Hyperuricaemia C. Hypokalemia D. Hypercalemia
E. Hypercalcemia

6. A 52-year-old woman suffering from diabetes, appealed to a doctor with complaints of headaches, fatigue, and insomnia. At inspection the high level of AT 200 \ 100 mmHg is established. What drug is most appropriate to use for fast normalization of blood pressure?

A. Anaprilin B. Reserpine C. Prazosin D. Papaverine E. Captopril

7. The animal was induced by an experimental hypertensive syndrome due to the activation of the renin-angiotensin system. What substance can specifically counteract this phenomenon?

A. Isadrin B. Ephedrine C. Prazosin D. Mezatone E. Captopril

8. At examination of the patient with the phenomena of hypertension it became clear that it is most appropriate for him to use a drug that acts on arterial pressure through the system of renin-angiotensin. What is this drug?

A. Anaprilin B. Oktadine C. Dibazol D. Prazosin

E. Apresin

9. In a patient with hypertension after receiving the antihypertensive agent and taking the vertical position, fatigue arose. Which of the preparations could cause a similar effect?

A. Reserpine B. Benzoycexone C. Anaprilin D. Captopril

E. Papaverine

10. A 45-year-old patient with hypertension, 4 days treated with antihypertensive drugs, indicates normalization of blood pressure, but complains of drowsiness and inhibition. What drug takes patient?

A. Klofelin B. Prazosin C. Captopril D. Enalapril

E. Apresin

11. In the therapeutic department has arrived patient with an increased arterial pressure, caused by spasm of the peripheral vessels. What is a hypotensive drug from the group of alpha-blockers, is it best to appoint a patient?

A. Anaprilin B. Captopril C. Aminazine D. Prazosin

E. Klofelin

12. Patient due to significant increase in blood pressure was subcutaneous injection of antihypertensive drug. After some time, when trying to get out of bed, the patient felt dizziness, darkening in the eyes and lost consciousness. Which of the following hypotensive drugs can cause orthostatic collapse?

A. Papaverine B. Benzoycexone C. Dibazole D. Furosemide

E. Drotaverin

Modul 1	**Pharmacology of agents affecting function of cardio-vascular system**
Topic № 15	**Final module control**

1. Relevance of the topic: In clinical practice, widely used neurotropic agents, agents that affect the afferent, efferent and central nervous system. Many of these drugs are used in acute emergency conditions. It is important to keep in mind the general principles of pharmacokinetics and pharmacodynamics of medicines in order to make the right choice in treatment and to avoid the adverse effects of drugs. And the ability to issue a prescription form and to properly prescribed out the drugs in any form will certify the professionalism of the doctor

2. The specific goals:

1. To be able to prescribe medicinal products in any medical form. Define methods and ways of writing dosage forms.
2. To define the general principles of pharmacokinetics and pharmacodynamics of medicinal products.
3. To determine the pharmacological effects , indications and contraindications , the mode of dosage of the means,
affecting the afferent, efferent and central nervous system.
4. To determine the pharmacological effects , indications and contraindications for the use of drugs that
affect the afferent, efferent and central nervous system.
5. To be able to classify drugs that affect afferent, efferent and central nervous system systems.
6. To analyze the action , indications and contraindications to the use of drugs affecting afferent, efferent and central nervous system.
7. To analyze the pharmacokinetics and pharmacodynamics of drugs affecting the afferent, efferent and central nervous system.

3. Basic knowledge, skills, skills needed to study the topic (interdisciplinary integration):

The name of the previous disciplines	Skills learned
1. Latin language	Have the skills of writing prescriptions.
2. Normal physiology	Describe the functioning of the central, efferent and afferent nervous systems, the cardiovascular system in the regulation of physiological functions of the organism.
3.Biororganic chemistry	Describe the structure and synthesis of neuropeptides, mediators, substances for the regulation of vascular tone.
4. Pathological physiology	To explain the pathological mechanisms of diseases of the nervous and cardiovascular systems, hypo and hyperfunction in the work of the nervous system, tissue mechanisms of states of excitation and suppression of the central nervous system, afferent and afferent nervous system; development of heart failure, angina pectoris, atherosclerosis, hypertension and hypotension.

4. Tasks for independent work in preparation for the lesson and in the lesson.

4.1. List of main terms, parameters, characteristics, which should be taken by the student in preparation for the lesson.

The list of preparations for prescribing recipe with indication of pharmacological affiliation and in response to questions on pharmacotherapy to Module 1:

1. Alloxime Amp. 2. Amitriptyline Dragee, Amp. 3. Amiodarone Tab., Amp. 4. Amlodipine Tab. 5. Atorvastatin Tab. 6. Atropine sulfate Amp. 7. Acetylsalicylic acid Tab. 8. Activated carbon Tab. 9. Bismuth subcitrate Tab. 10.Bisoprolol Tab. 11.Caffeine benzoate sodium Amp. 12.Carbamazepine Tab. 13.Carvedilol Tab. 14.Celecoxib Caps. 15.Chlorpromazine Amp., Dragee 16.Clonidine Tab. 17.Diazepam Amp., Tab. 18.Digoxin Tab., Amp. 19.Diclofenac sodium Tab., Amp. 20.Doxazosin Tab. 21.Doxylamine Tab. 22.Droperidol Amp. 23.Drotaverine Tab., Amp. 24.Dobutamine Fl. 25.Enalapril Tab. 26.Enterosgel Paste 27.Epinephrine hydroarthritis Amp. 28.Ethanol (Ethyl alcohol) bottle with mixture alcohol with water 90%, 70% 29.Etimisol Amp. 30.Fenofibrate Tab. 0,1 g 31.Fentanyl (Phentanylum) Amp. 32.Phenylephrine Amp. 33.Phenazepam Tab. 34.Phenobarbital Tab. 35.Fluoxetine Tab. 36.Furosemide Tab., Amp. 37.Galantamine hydrobromide Amp. 38.Gidazepam Tab. 39.Glycerol trinitrate Tab. 40.Haloperidol Tab., Amp. 41.Hydrochlorothiazide Tab. 42.Ibuprofen Tab. 43.Isadrin Flac. for inhalation 44.Isosorbide dinitrate Tab. 45.Ketamine Amp. 46.Korglikon Amp. 47.Lamotrigine Tab. 48.Levodopa / Carbidopa (Nacom) Tab. 49.Lidocaine Amp. 50.Lisinopril Tab. 51.Losartan Tab. 52.Magnesium sulfate Amp., powder 53.Menthol ointment for nose	54.Methyldof Tab. 55.Meloxicam Tab. 56.Metamizole Sodium Amp., Tab. 57.Metoprolol Tab., Amp. 58.Morphine Amp. 59.Naloxone Amp. 60.Neostigmine methylsulfate Tab., Amp. 61.Niketamide Amp. 62.Nicotinic acid Tab. 63.Nifedipine Tab. 64.Nitrazepam Tab. 65.Norepinephrine hydroarthritis Amp. 66.Paracetamol Tab. 67.Pilocarpine hydrochloride eye drops 68.Pirenzepine Tab., Amp. 69.Piracetam Amp., Tab. 70.Propofol Amp. 71.Propranolol Tab. 72.Potassium / Magnesium Asparaginate Tab., Amp. 73.Reserpine Tab. 74.Salbutamol Aerosol 75.Sodium nitroprusside Amp. 76.Sodium Valproate Tab. 77.Spironolactone Tab. 78.Solution of ammonia Amp., Flac. 79.Suxametonium Amp. 80.Sulfocamphocain Amp. 81.Tocopherol acetate Caps. 82.Thyotropy bromide Caps. for inhalation 83.Tramadol Tab., Amp. 84.Trihexyphenidyl Tab. 85.Trimeperidine Amp. 86.Ultracain Amp. 87.Valerian tincture Flac. 88.Verapamil Amp., Tab. 89.Zopiclone Tab.

4.2. Theoretical material for preparation for test control:

Content module I. ***Medical prescriptions. General pharmacology*****.**

Content module 2. ***Medicines that affect the peripheral nervous system***

Content module 3. ***Medicines that affect the function of the central nervous system. Psychotropic drugs***

Content module 4. ***Pharmacology of agents affecting function of cardio-vascular system***

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4. Mosby's Dental Drug Reference / ed. A. H. Jeske. – 12th ed. – Philadelphia : Elsevier, 2018. – XVI, 1494 p.

5. USMLE. Step 1. 2018. Pharmacology: lecture notes / ed.: C. Davis, S. R. Harris; contributor: L. Kerecsen, B. R. Krishna. – New York: Kaplan Medical, 2018. – 321 p.

Information resources

1. Basic Pharmacokinetics and Pharmacodynamics: An Integrated Textbook and Computer Simulations
https://www.pdfdrive.com/basic-pharmacokinetics-and-pharmacodynamics-an-integrated-textbook and-computer-simulations-e186712191.html

2. Basic Pharmacology Understanding Drug Actions and Reactions By Maria A. Hernandez, Appu Rathinavelu https://doi.org/10.1201/9781315272672

3. Lippincott Illustrated Reviews: Pharmacology Karen Whalen
https://www.pdfdrive.com/lippincott-illustrated-reviews-pharmacology-e190057379.html

4. Pharmacokinetics and Adverse Effects of Drugs
http://www.freebookcentre.net/medical_books_download/Pharmacokinetics-and-Adverse-Effects-of-Drugs.html

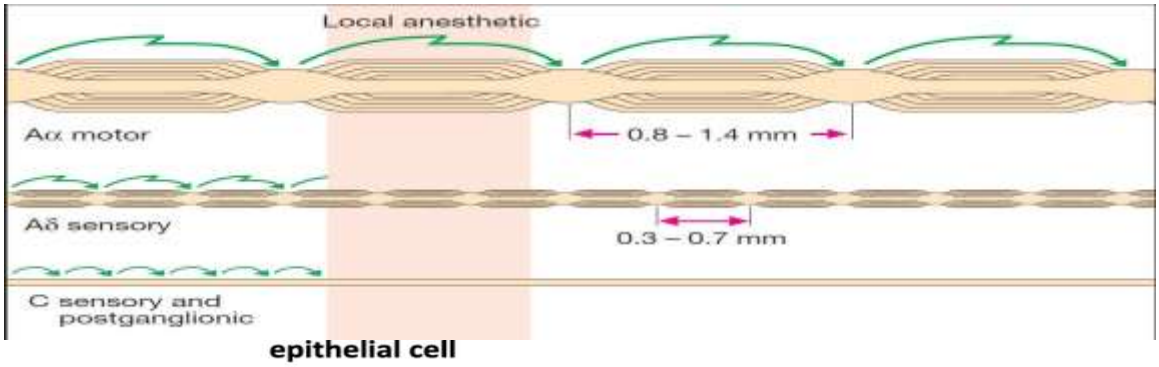
5. Antihypertensive drug
http://www.freebookcentre.net/medical_books_download/Antihypertensive-drug.html

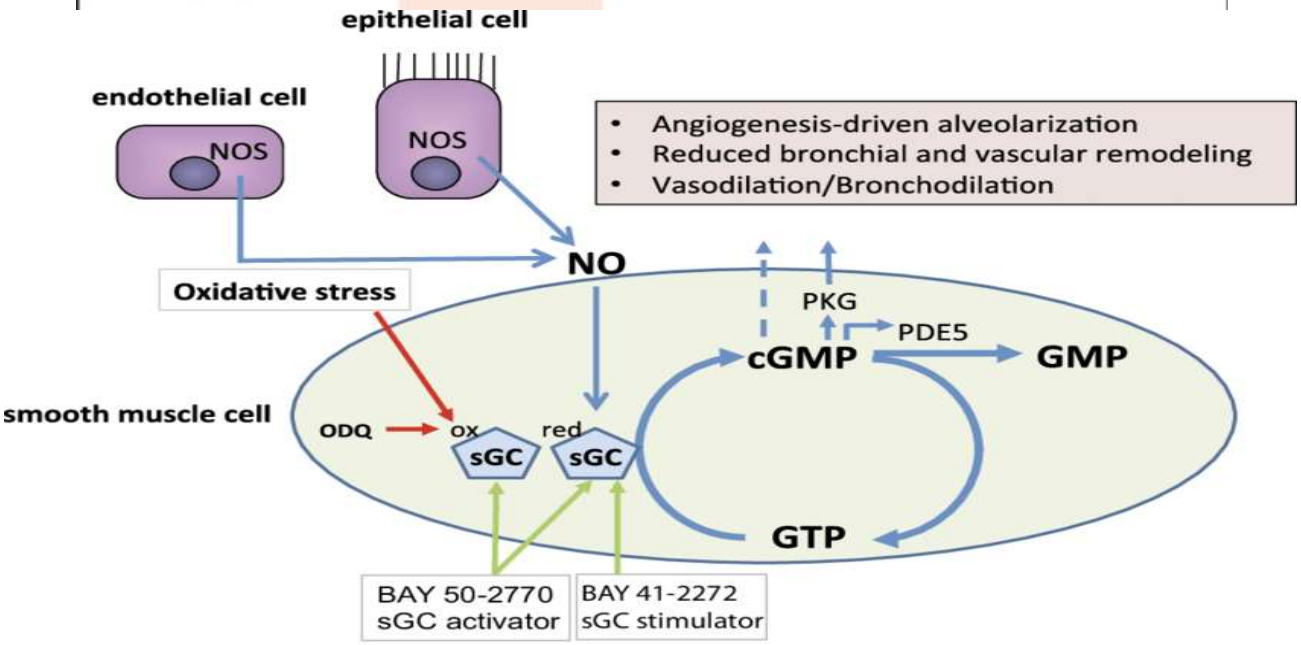
6. Pharmacology Anticoagulants & Antiplatelet blood thinners explained clearly by Mike Linares from https://simplenursing.com/nursing-school-desktop/

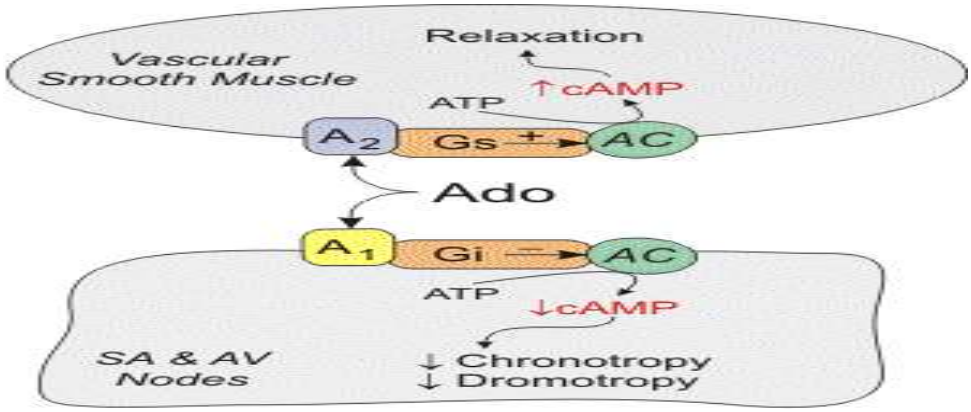
7. Antimicrobial drugs
http://www.freebookcentre.net/medical_books_download/Antimicrobial-drugs.html

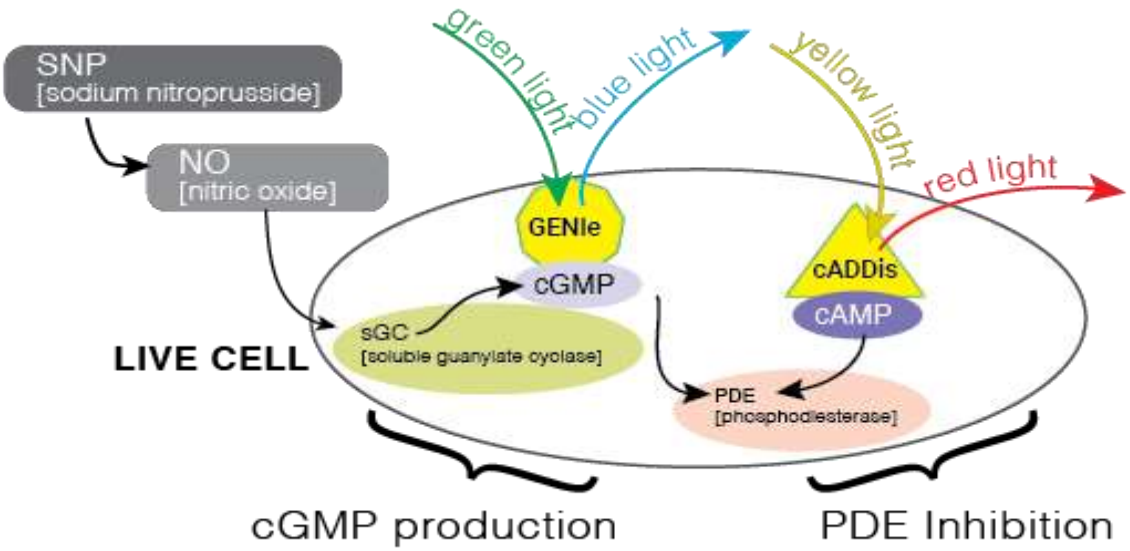
Methodical guidelines prepared by **Ass. Prof. Shakina (Kolot) EG**

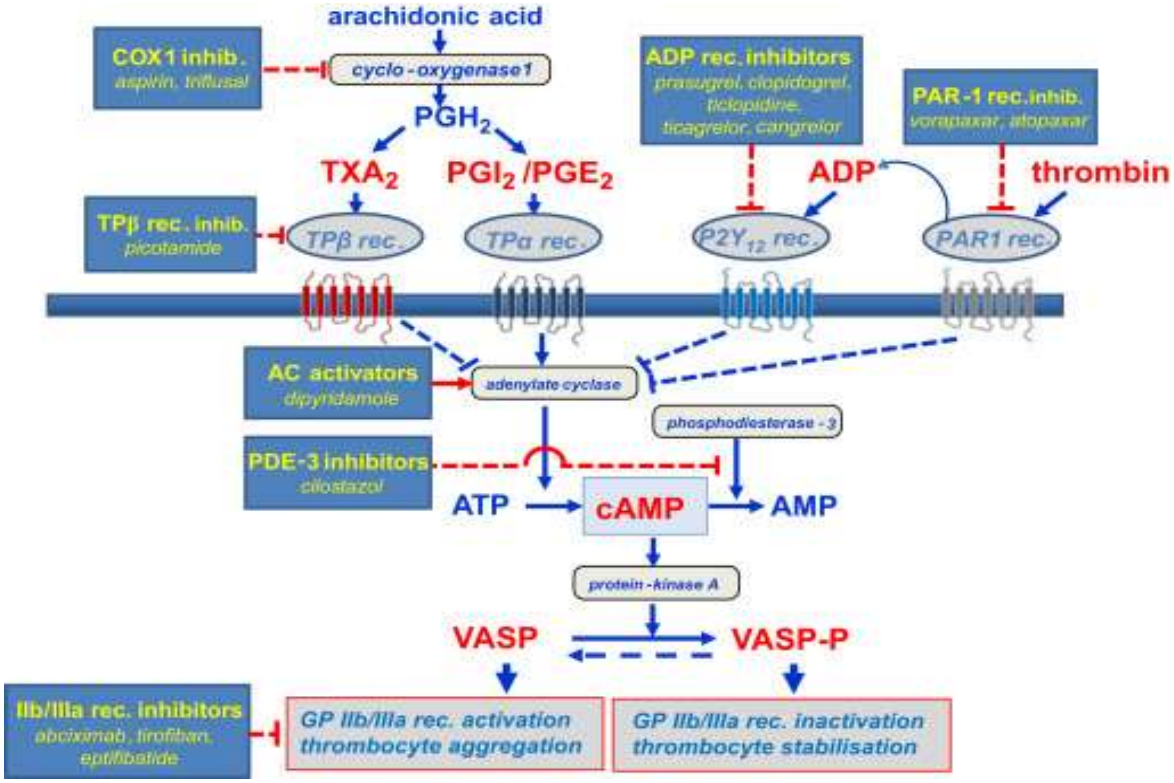
Graph of logical structure.








SNP
[sodium nitroprusside]
NO
[nitric oxide]
green light
blue light
yellow light
red light
GENIe
cGMP
cADDis
cAMP
sGC
[soluble guanylate cyclase]
LIVE CELL
PDE
[phosphodiesterase]
cGMP production
PDE Inhibition


arachidonic acid
COX1 inhib.
aspirin, triflusal
cyclo-oxygenase1
PGH2
TXA2
PGI2 /PGE2
ADP rec. inhibitors
prasugrel, clopidogrel, ticlopidine, ticagrelor, cangrelor
PAR-1 rec.inhib.
vorapaxar, atopaxar
ADP
thrombin
TPβ rec. inhib.
picotamide
TPβ rec.
TPα rec.
P2Y12 rec.
PAR1 rec.
AC activators
dipyridamole
adenylate cyclase
phosphodiesterase - 3
PDE-3 inhibitors
cilostazol
ATP
cAMP
AMP
protein-kinase A
VASP
VASP-P
IIb/IIIa rec. inhibitors
abciximab, tirofiban, eptifibatide
GP IIb/IIIa rec. activation
thrombocyte aggregation
GP IIb/IIIa rec. inactivation
thrombocyte stabilisation