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**STATE UNIVERSITY OF MEDICINE AND PHARMACY**

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**Pharmacology and Clinical Pharmacy Department**

**METHODICAL INDICATIONS  
FOR PRACTICAL WORK IN PHARMACOLOGY**

**(Faculty of Dentistry)**

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Intended for third year university students from the Faculty of Dentistry and elaborated in accordance with the curriculum in pharmacology.

## C O N T E N T

Introduction.....	4
General medical prescription. Solid and semisolid drug forms (soft) .....	7
General medical prescription (part II). Liquid forms and injections.	10
General Pharmacology .....	11
Cholinergic agonists and anticholinesterases.....	14
Cholinergic antagonists.....	16
Adrenergic agonists and antagonists. Sympathomimetics.....	17
<b>Summarizing the theme: «Drugs influencing efferent innervation» .....</b>	<b>19</b>
Local anaesthetics, demulcents, astringents, adsorbents and drugs irritating the receptors.....	21
Opioid and non-opioid analgesics.....	23
Ethanol. hypnotics. symptomatic anticonvulsants.....	24
Psychotropics (neuroleptics. tranquilizers. sedatives)	26
Antihypertensives.....	28
Antihypotensives .....	30
Antianginals.....	32
Thrombolytics. haemostatics.....	34
Enzymes and antienzymes used as medicines .....	36
Pharmacology of vitamins.....	38
Hormones and hormonal drug.....	40
Non-steroidal anti-inflammatory drugs.....	43
Antiallergic drugs.....	45
Disinfectants and antiseptics.....	47
Antimicrobial chemotherapeutic agents.....	50
Antifungal drugs.....	53
Antiviral drugs.....	54
<b>Summarizing the theme: „chemotherapeutic agents”.....</b>	<b>55</b>
Medicinal therapy complications	57
First aid measures in case of acute intoxication with drugs	58
Bibliography .....	

## INTRODUCTION

The methodological indications for dental college students have the task to unify the teaching principles in the department of pharmacology, to enhance the object of study by students, to help the students while working independently, to perfect knowledge assessment.

☒ Five years have passed from previous editing instructions. During this period, the study plan was amended, the number of hours being essentially reduced from 101 to 68. As that number of hours is required, which accounts about 40% of university curricula for medical students, a number of issues that dentist meets rarely are omitted. Methodological indications are composed in accordance with the plan of study and discipline program, revised and supplemented. On the whole, dentist must obtain essential information necessary for the pharmacology of any specialist doctor, in the same time, taking into consideration the discipline profile, which is reflected in the statement.

The methodical elaborations include the following sections: pharmacography general pharmacology, special pharmacology, pharmacotherapy complications and first aid measures in poisoning with drugs and other xenobiotics. Indications for practical work include, primarily, actuality of the topic and training and teaching purposes, which have the aim to raise awareness and to motivate the need to study that topic. Secondly, it included the initial level of knowledge necessary for the appropriation of the pharmacology, as an integrated interdisciplinary science. Thirdly, control questions are displayed; characterization of essential and vitally important drugs; compulsory exercises at general and medical prescription. The control questions are exposed succinctly, they are accessible and contain specific profile elements, directed towards the needs of clinical disciplines. They correspond to the topic's plan and contain a certain amount of actual information.

The characterization of compulsory drugs (tabular form) of each pharmacological group will focus the student's attention on the typical representatives of that group, which is used frequently in work by professionals.

The exercises of general prescription provide the training and the strengthening of practical skills into the prescription of compulsory medicines in different required formulations. The medical prescription is designed to build skills in the selection of drugs for specific diseases and pathological conditions, including the dental ones. In this compartment, all cases of emergency and most typical states are highlighted.

Methodological indications are designed to organize and optimize the independent work in laboratory, to train and to strengthen the practical skills of medical prescription and of literature use.

## **GENERAL PRESCRIPTION. SOLID AND SEMISOLID DRUG FORMS (SOFT)**

**A. Actuality of the topic.** Patient treatment of any profile, including the dental one, requires the use and the prescription of drugs in recipes. Hence the need for knowledge of the prescription forms adopted in Republic of Moldova and of the pharmaceutical methods of prescription used in medical practice.

**B. Aim of the unit.** To inform students of prescription forms used in our country, contents and requirements of the State Pharmacopoeia for medicinal substances, purity, maintenance and their dosage.

### **C. Educational purposes:**

a) The student should know: recipe structure, concepts about drug material, drug substance and pharmaceutical form, officinal prescription in accordance with the State classification of medicines, chemical and trade names, international (INN) and officinal (pharmacopoeial) names of drugs; abbreviations of Latin words and signs used in recipes.

b) Students must be able: to prescribe correctly the solid and semi solid pharmaceutical (soft) forms, to distinguish a correct prescription of a wrong one.

**D. Language basics.** Latin. Conjugation of nouns, prepositions used in prescriptions main abbreviations and signs.

### **E. Control questions.**

1. General prescription. Definition and its tasks. Recipe and recipe forms. Auxiliary words and signs used in the recipe. The main abbreviations. Concept dosage (drug dosage). Keeping of prescription forms.

2. State Pharmacopoeia. International Pharmacopoeia. Content and their importance.

3. Medicine. Storage, components.

4. Types of drugs prescription. Dosage. Name and State classification of drugs.

5. Raw material for making medicines, pharmaceutical forms and their classification. Components of the product.

6. Solid forms and their therapeutic importance.

7. Capsules.

8. Powders for internal use. Minimum mass, maximum and average dose of powder. Granulated powders (granules). Envelopes (package).

9. Powders for external use (powder) and their destination.

10. Tablets, pills. Variety of tablets.

11. Dragees.

12. Plaques.

13. Suppositories.

14. Species.
15. Other solid dosage forms: caramels, pencils
16. Semisolid forms (soft ones) and their intended use.
17. Ointments. Excipients for ointments. Eye ointments, nasal. Variety of ointments: conditioners, gels, pomades, creams.
18. Pasta.
19. Suppositories. Their use therapeutic
20. Emplastrums.

#### **F. List of practical work.**

Prescribe prescriptions

##### **a) Powders for internal use.**

1. 20 powders containing salicylic acid in dose of 0,25g. One powder 2 times a week.
2. Powders containing fenasal in dose of 2g. Single outlet.
3. 10 powders containing ascorbic acid in dose of 0,05g. One powder 3 times daily.
4. 10 powders containing nicotinic acid in dose of 0,05g. For internal administration.
5. 24 powders containing pancreatin in dose of 0,6g. One powder three times daily before meals.
6. 30 powders containing rifampicin in dose of 0,15g. One powder three times daily.
7. 12 powders containing routine in dose of 0,03g and ascorbic acid in dose of 0,05g. One powder three times daily.
8. 10 powders containing bromisoval in dose of 0,5g. One powder with ½ hour before sleep.
9. 10 powders containing magurlit in dose of 2 g of granulated powder in packets. One packet to a glass of fruit juice three times daily.
10. Granules of 100 g containing urodan. One teaspoon of granules in ½ cup water.
11. 30 grams of magnesium oxide. ½ teaspoon each of two times per day.

##### **b) Powders for external use**

1. Sulfacetamidum 10% - 20g.
2. „Galmanin” 50g.

##### **c) Capsules:**

###### **- in shell**

1. 10 capsules in shell containing loperamide in dose of 0,002g. One capsule after each liquid stool up to six times daily.
2. 20 capsules in shell containing doxycycline hydrochloride in dose of 0,05g. 2

capsules two times each day.

3. 20 capsules in shell containing piracetamum in dose of 0,4g. One capsule 3 times daily.

**- for inhalation**

1. 10 capsules containing „Intal” in dose of 0,02g. One capsule 4 times daily for inhalations.

**- elastic**

1. 10 capsules containing castor oil in dose of 1,5g. To administer all in a pinch as purgative.
2. 12 capsules containing chiniofonum in dose of 0,6g. One capsule twice a day.

**d) Tablets**

1. 20 tablets containing diazepamum in dose of 0,005g. 1-2 pills 30 minutes before the dental treatment.
2. 10 tablets containing acetylsalicylic acid in dose of 0,5g. One tablet three times daily after meals.
3. 6 tablets containing „Citramon”. One tablet three times daily.
4. 10 tablets containing metamizolum in dose of 0,5g. One tablet two-three times daily.
5. 20 tablets containing chlorpiraminum in dose of 0,025g. One tablet twice daily after food over 10 days.
6. 10 tablets containing „Teofedrin”. One tablet three times daily.

**e) Dragees**

1. 10 dragees containing chlorpromazinum in dose of 0,025g. One dragee three times daily.
2. 20 dragees containing mebhydrolinum in dose of 0,05g. 1-2 tablets 1-2 times daily after meals.

**f) Plaques**

1. 10 plaques containing pilocarpinum in dose of 0,0027g. One plaque retropalpebral daily.
2. 20 plaques containing trininolongum in dose of 0,001g. To affix to the upper gum mucosa (after meals).

**3. g) Ointments**

1. Linetol – 5%, in dose of 50g. To embrocate the lips and buccal mucosa 2-3 times per day.
2. 25g of ointment containing aspirin and precipitated sulfur in dose of 0,5g. To embrocate the lips in hyperkeratosis.
3. 10g of ointment containing hydrocortisonum – 10%. To embrocate the lips 2 times per day over 5-7 days.
4. 20 g of ointment containing clotrimazol – 1%. To embrocate buccal mucosa and lips 3-4

times a day in candidiasis mouth and lips.

5. 10g of ointment containing oxolinic – 0,25%. To embrocate affected portions of herpes 2-3 times per day. The cure - 4-7 days.

#### **h) Pasta**

1. Oxid de zinc – 25% in dose of 30g. To apply on the affected parts of skin.
2. Dermatol – 10% in dose of 15g. To apply on the affected parts of skin.

#### **j) Suppositories**

1. 10 rectal suppositories containing procainum in dose of 0,1g. One suppository 2 times daily.
2. 10 rectal suppositories “Betiol”. One suppository 2 times daily.
3. 10 rectal suppositories containing metronidazol in dose of 0,5g. One suppository 2 times daily.

### **GENERAL MEDICAL PRESCRIPTION (part II).**

#### **PHARMACEUTICAL LIQUID FORMS AND INJECTIONS**

##### **E. Control questions.**

1. Solutions for internal use (drinkable solutions). Dose calculation methods and their concentration.
2. Solutions for external use. Methods for expressing their concentration. Excipients for such solution.
3. Suspensions. Difference of solutions.
4. Drops for internal use. Calculation of their concentration.
5. Drops for external (or eyewash ophthalmic, otic, nasal). Vehicles for them.
6. Injections. Requirements of injectable forms.
7. Main solutions (off-prepared). Prescribing methods.
8. Injections forms in separate packages: ampoules, vials. Their prescribing (solutions, suspensions, lyophilized powders). Calculation of dose administration.
9. Extractive aqueous solutions (infusions, decoctions), alcoholic (tincture, extract), oil (medicinal oil).
10. .Emulsions, syrups, aromatic waters, juices medicinal mixtures, aerosols.
11. Liniments.

##### **F. General recipes exercises.**

###### **Solutions for internal use**

1. Calcii chloridum. Dose for once - seventy-five centigrammes. One tablespoon three times daily.
2. Natrii bromidum. Dose for once - one hundred and fifty mg. One tablespoon three times a



day.

### **Solutions for external use**

#### **- aqueous solutions**

1. Argintum nitras 4% - 10 ml. For impregnation of dentin and tooth root canal.
2. Psoralen 0,1% - 50 ml. For anointing the damaged portions of the skin (2-3 hours before irradiation).
3. Nitrofurazolum 1:5000 – 500 ml. To wash wounds.
4. Iodinolum 1% - 200 ml. Antiseptic processing of the cavity decay and root canal dentar.
5. Chloraminum 4% - 50 ml. Cavity processing and decayed dental root canal.
6. Aethacridini lactas 0,2% - 100 ml. To lavage the cavity decay, root canal dentistry, oral mucosal application, instillation in pathological gingival pockets.

### **Suspension for internal use**

1. Magnesium oxydatum 20% - 150 ml. Shake well before use.
2. Co Trimoxazole 100 ml. For internal use 2 tablespoons 2 times a day.
3. Cortizoni acetat 2,5% - 10ml. For application to once daily oral mucosa.

### **Drops for internal use**

1. Kalii iodidum in dose of 25 centimiligrams (0,00025 g). By 5 drops 3 times a day.
2. Nitroglycerinum 1% - 5 ml. One drop on a piece of sugar under the tongue.
3. Pilocarpinum 1% - 10 ml. 10 drops three times daily over 2-3 days.
4. Atropinum 0,1% - 10 ml. 5-8 drops three times daily in hypersalivation.

### **Drops for external use**

#### **- aqueous solutions**

1. Pilocarpinum 1% - 10 ml. Eye drops (eyewash). One drop of seven times a day.
2. Nafazolinum 0,1% - 10 ml. In the nasal cavity 1-2 drops 2-3 times daily.

#### **- alcoholic solutions**

1. Resorcinum 2% - 20 ml. To apply on the damaged portions of the skin.

#### **- oily solution**

1. Chlofosfol 5% - 10 ml.

#### **- glycerol solutions**

1. Phenolum 5% - 10 ml. Otic drops.

### **The principal injection solutions**

1. Natrii salicylas 15% - 50 ml. The principal injection solutions
2. Procainum 0,25% - 500 ml. For infiltration anesthesia

## Official injections

### Ampoules

#### - *Aqueous injections*

1. Calcii chloridum 10% - 10 ml. 10 ml intravenously.
2. Chlorpyraminum 2% - 1ml. By 1-2 ml intravenously (IM)
3. Lidocainum 10% - 2 ml. By 2 ml intramuscularly.

#### - *Oily injections*

1. Hexestrolum 2% - 1ml. By 1 ml intramuscularly.
2. Hydroxiprogesteronum 12,5% - 1 ml. By 1 ml intramuscularly once on week.
3. Nandrolonum 5% - 1ml. By 1ml intramuscularly once in 2-3 weeks.

#### - *injectable aqueous suspensions*

1. Desoxycorticosteroni acetat 2,5% - 1 ml. By 1 ml intramuscularly once in two weeks.

#### - *oily suspension for injection*

1. Biihionolum 10 ml. By 3 ml intramuscularly once in three days.

#### - *-powders in the ampoules*

1. Vinblastinum 0,005 g. Vial contents are dissolved in 5 ml isotonic sodium chloride. By 1ml intravenously once a week
2. Hyaluronidasum 0,1 g. Vial contents are dissolved in 1 ml 0.25% procainum. By 1ml subcutaneously.

### Bottles

#### - *aqueous solutions*

1. Insulinum Actrapid HM 10 ml (in 1 ml – 40 UA). By 15 AU subcutaneously 3 times daily 15 ml before meals.

#### - *suspensions*

1. Cortisoni acetat 2,5% -10 ml. by 1-2ml intramuscularly 1-2 times per the day.

#### - *sterile solutions*

1. Acidum aminocaproicum 5% -100 ml. For intravenous infusion once daily with speed 100ml/h
2. Manitolum 15% - 400 ml. Infusion. 400 ml intravenously once a day with speed 100ml/h

#### - *freeze-dried powders*

1. Benzilpenicilină sodică – 500 000 UA. The content is dissolved in 2 ml of 0.25% procaine. 500 000 AU intramuscularly 6 times per day.

### **Suspensions for external use**

1. Dexametasonum 0,1% - 10 ml. Ophthalmic drops. One drop in each eye 2 times a day.

### **Emulsions**

1. Semen Cucurbitae 150 ml. One tablespoon three times per day.
2. Amigdalarum 200 ml. To take in spoons during 30 minutes.

### **Mixtures**

1. Codeinum 180 mg (0,18 g), natrii bromidum 6 g in volume of 180 ml. .One tablespoon 3 times per day.

### **Syrups**

1. Syrup of brier 200 ml. One tablespoon 3 times per day (with water).
2. Natrii bromidum 4 g, aqua rosae ad 150 ml. One tablespoon a day.

### **Decoctions**

1. Decoction of oak bark 20,0 – 200 ml. For mouth rinse.
2. Frangula shell decoction in report of 1:10 for 10 receptions. A tablespoon per night.

### **Infusions**

1. Infusion of chamomile leaves in the dose of 0,05 g. One tablespoon 3 times per day.
2. Infusion of termopsis herba – 100 ml. one tablespoon 3 times per day.

### **Tinctures**

1. Valerianum 25 ml. 25 drops 3 times per day.
2. Strophanthum 5 ml and valerianum 10 ml. 15 drops 3 times per day.

### **Fluid extracts**

1. Frangulum 30 ml. 30 drops 3-4 times per day
2. 50 tablets of fluid extract of Valerianum 0,05 g. One tablet 3 times per day.

## **GENERAL PHARMACOLOGY**

**A.Actuality.** General pharmacology studies the basic regularities body drug interaction, the pharmacokinetics and pharmacodynamics. Their knowledge of pharmacology is necessary to acquire special election will allow more successful and safe rational pharmacotherapy. Regularities underlying pharmacokinetics and pharmacodynamics of experimental and clinical research of new drugs.

**B. Aim of the unit.** Acquiring basic legalities of pharmacokinetics and pharmacodynamics (absorption, distribution, treatment, interaction with receptors principles dosage dependence of the specific organism, drug interactions, adverse effects, etc.). To carry out effective pharmacotherapy with minimal risk of unwanted reactions.

### **C. Educational purposes:**

a) Students should know: pharmacokinetic parameters, the general principles of absorption, transport and treatment of drug distribution, interaction with exogenous ligands receptors, basic mechanisms and types of action, principles of drug dosing, interactions drug incompatibilities, side effects and complications of pharmacotherapy.

### **D. The initial level of knowledge required for interdisciplinary integration.**

**General chemistry.** Ionization degree dependence of ionization constant pKa and pH environment. Chemical reactions of oxidation, reduction, hydrolysis and conjugation. Notion about ionogene surfactants, and amphoteric neionogene.

**Molecular Biology and Human Genetics.** Cellular membranes and transmembrane transport. Genetic mutations, enzymatic pathologies.

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

**Histology.** Cell membranes and their structure. Receptors on the postsynaptic membrane substrate. Physicochemical properties and molecular structure of the cytoplasmic membrane. Getting on physiological barriers (blood, placenta, etc.).

**Human Physiology.** Biomembranele. Ion pumps. Transport across cell membranes. Blood circulation, digestion and absorption. Hepatic and renal function. Receptors, mediators. Biological rhythms.

**Biochemistry.** The structural organisation of the biologic membranes . Biochemistry of digestion. Transport of the substances in the body. Biochemistry of blood. Biochemistry of the liver and kidneys. Enzymes. Chemical mediators. Still resting membrane polarization.

**Pathophysiology.** Membrane processes and their disorders. Synaptic transmission disorders. Pathophysiology of gastrointestinal tract, blood, liver failure, renal and acid-base balance.

### **E. Questions for selfinstruction.**

1. Pharmacology, definition. Pharmacology as a discipline. Its relations with other disciplines. The importance of pharmacology to practice medicine. Special and general pharmacology.

2. Notion of drug. Classification by origin and principle of systemic drugs. Sources for obtaining drugs. State Classification of drugs.

3. The major stages of developing of new drugs, evaluating their effectiveness and safety. Experimental and Clinical Pharmacology. Pharmacology departments

4. Definition and brief characterization of the pharmacokinetics and

pharmacodynamics.

5. Description of the routes of drug administration. Classification. Peculiarities of enteral routes of administration (sublingual, oral, rectal). Notion about bioavailability. Parenteral and injectable routes of administration (subcutaneous, intramuscular, intravenous, inhalation, electrophoresis, etc.).

6. The transit of the drugs through biological barriers. Factors that influence membrane permeability to drugs. Characterization of biological barriers.

7. Absorption of the drugs. Absorption mechanisms. Factors affecting intestinal absorption. Interaction medicinal substances with food components. Influence of food on drug absorption and effect. The role of pH and its ionization constant pKa drug molecule, the absorption of acidic and basic drugs. Peculiarities of absorption of substances from their associated administration.

8. Distribution of the medicinal drugs in the body (transmission, distribution and storage). Free and bound drug fraction in blood and tissues. Peculiarities of drug crossing the blood-brain barrier, placenta, etc. Drug storage in teeth and bone.

9. Transformation of the drug biochemical substances in the body. Biotransformation pathways.

10. Notion about treatment and drug excretion. Main routes of excretion of drugs. Renal excretion. Importance of urine pH for the disposal of drug substances. Elimination of drugs by the digestive tract, lungs, skin, milk, saliva. Biological half-time ( $t_{1/2}$ ) blood concentration of drugs and its importance.

11. Pharmacodynamics. Primary action of medicinal drugs. Pharmacological agents interacting with their receptors. Notion about the receptors. Types and subtypes of receptors. Typical mechanisms of drug action Primary (mimetic, lithic, allosteric etc.). Types of medicinal substances action (local action, resorptive, light, direct, indirect, primary and secondary, selective and non-selective, reversible and irreversible, unintended action (effect) and toxic drugs). Concept on placebo.

12. Notion about dose and its varieties. Therapeutic dosage (minimum, average, maximum, for an outlet for 24 hours, the dose of attack, support dose, dose of treatment). Toxic and lethal dose. The safety, therapeutic index. Principles of drug dosage in children and the elderly. Biological Standardization.

13. Pharmacogenetics. Involvement of genetic factors in drug effects. Enzymatic pathologies. Microsomal liver enzymes induction and suppression. Examples of drugs that cause enzyme induction or suppression

15. The drugs and the factors that influence their action: gender, age, body condition,

heredity, biorhythms. Notion about Chronopharmacology.

16 Interaction of the medicinal substances. Synergism (directly, indirectly and potentially additive) and antagonism (directly, indirectly, the uni- and bilateral physiological, chemical, competitive). Indifference.

17. Adverse reactions observed to repeated administration of drugs..

**F. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

## **DRUGS INFLUENCING EFFERENT INNERVATION**

### **CHOLINERGIC AGONISTS (CHOLINOMIMETICS) AND ANTICOLINESTERASICS**

**A. Actuality.** Autonomic drugs possess the synaptic action. This defines their use for correction of different organs and systems functions. Cholinergic agonists are used for treatment of glaucoma, intestinal atonia, myasthenia, reflector arrest of breathing.

**B. Aim of the unit.** To know the principles of mediators, cholinergic, specifically, transferring stimulation in synapses. To acquire the knowledge of pharmacology of cholinomimetic agents. To know how to ground your choice and to protect the cholinergic drugs in different forms.

#### **C. Educational purposes:**

a) The student should know: main drugs, their general characterization, description, classification, mechanism of action, presentation and routes of administration, dosage, indications and contraindications, side effects.

b) Students should be able to: prescribe mandatory drugs in different formulations.

#### **D. Initial level of knowledge required for interdisciplinary integration.**

**Human physiology.** Ultrastructure of neuromuscular synapses. The mechanism of transmission of nerve impulses through synapses. The role of acetylcholine in the process. Importance of acetylcholinesterase in the transmission of nerve impulses. Postsynaptic potential of the terminal plate. Structural and functional peculiarities of nervous system (sympathetic and parasympathetic). The mechanism of transmission of nerve impulses in vegetative ganglia. Mediators of nervous system, their characterization. Adrenergic and cholinergic structures. Sympathetic and parasympathetic nervous system influence on organs innervated by them.

**Biochemistry.** Mediators of nerve impulses transmission (acetylcholine, noradrenaline etc. ). Biogenic amines and nervous system.

**Histology.** Synapses, their role in transmission of nerve impulses through neural chain. Structure and histochemical characterization of synapses. Classification of synapses.

#### **E. Control questions.**

1. Structure and function of synapse. Metabolism of acetylcholine. General notions about cholinoreceptors, their classification ( $M_1$ ,  $M_2$ ,  $M_3$ ,  $M_4$ ,  $M_5$  - and N-cholinoreceptors ( $N_n$ ,  $N_m$ )). Localization of cholinoreceptors and their functional importance.

2. Classification of cholinergic drugs.

3. Classification of cholinergic agonists.

4. Pharmacodynamics of M-cholinergic agonists (pilocarpine, aceclidine). The action on the eye (pupil diameter, intraocular pressure, accommodation), heart, smooth muscle of hollow organs (bronchi, digestive tract, bladder, etc.), secretion of glands (stomach, intestines, sweat, etc.).

5. Indications and contraindications for use of M-cholinergic agonists. Their use in dentistry. Toxic action of muscarine (clinical picture of spotted sponges poisoning, first aid measures).

6. N-cholinergic antagonists (lobeline, cytisine). The importance of physiological and toxic action. The action on breathing center, vegetative ganglia, adrenal medulla. Indications. The use of N-cholinergic antagonists to combat smoking.

7. Ways and methods to combat smoking. Smoking tobacco. Components of cigarette smoke and their action on body. Diseases caused by smoking. Active and passive smokers.

8. Anticholinesterase agents. (neostigmine, physostigmine etc.). Definition, classification, mechanism of action. Interaction with cholinesterase. Peculiarities of organophosphorus compounds action. Indications of anticholinesterase agents. Their use in dentistry.

9. Side effects and toxic action of anticholinesterase agents. The clinical picture of poisoning, its prevention, first aid measures. The use of atropine and cholinesterase reactivators in organophosphorus compounds poisoning.

#### **F. Brief characterization of the main drugs.**

**Vertical.** The international name of drug. **1. Pilocarpine. 2. Aceclidine.** 3. Proserine. 4. Galanthamine. 5. Physostigmine. 6. Neostigmine. **7. Salagen.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

#### **G. Exercises of prescription.**

**Prescribe** these pharmaceutical drugs in all possible forms: 1. Pilocarpine. 2. Aceclidine. 3. Neostigmine. 4. Galanthamine 5. Physostigmine.

**Indicate drugs used in (for):** glaucoma, bladder atony, paralysis, paresis, intestinal atony, stimulating respiration, myasthenia, dry mouth, residual

phenomena of cranio-cerebral trauma and peripheral nervous system, residual phenomena of poliomyelitis.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

### **CHOLINERGIC ANTAGONISTS (CHOLINERGIC BLOCKERS)**

#### **E. Control questions.**

1. Classification of cholinergic antagonists.
2. Classification of M- cholinergic antagonists (atropine, pirenzepine, ipratropium).
3. The action of M-cholinergic antagonists on the cardiovascular system, central nervous system, bronchial tone, gastrointestinal tract, biliary and urinary tract, bronchial secretion glands, sweat, gastric, intestinal and salivary glands.
4. Eye function changes after M-cholinergic antagonists administration.
5. Main indications for drugs of atropine group. Their use in dentistry.
6. The clinical picture of poisoning with atropine and plants containing this alkaloid. Urgent care in the poisoning.
7. N-cholinergic blockers. Definition. Classification.
8. Ganglionic blockers (hexamethonium, azamethonium, pentamethonium). Definition. Classification by chemical structure and duration of action. Location and mechanism of action. Peculiarities of absorption depending on the chemical structure.
9. The action of ganglionic blockers on the cardiovascular system, digestive system, uterus. Indications and contraindications. Side effects.
10. Neuromuscular blockers with peripheral action (suxamethonium, tubocurarine etc.). Definition. Principles of classification. The mechanism of action of nondepolarizing (competitive) blockers, and depolarizing blockers. Indications. Side effects. Neuromuscular blockers antagonists.
11. Notion about central cholinergic blockers (trihexyphenidyl). Using.

#### **F. Brief characterization of the main drugs.**

**Vertical.** The international name of drug. **1. Atropine. 2. Scopolamine. 3. Platyphyline. 4. Hexamethonium. 5. Suxamethonium. 6. Mellicine. 7. Pirenzepine. 8. Ipratropium. 9. Tubocurarine. 10. Propantheline. 11. Trihexyphenidyl.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

#### **G. Exercises of prescription.**

**Prescribe** these pharmaceutical drugs in all possible forms: 1. Atropine. 2. Scopolamine. 3.



Platyphyline. 4. Hexamethonium. 5. Suxamethonium. 6. Mellictine. 7. Ipratropium. 8. Pirenzepine.

**Indicate drugs used in (for):** mushroom poisoning, asthma, hypersalivation, intestinal spasm, peptic ulcer, eye examinations, premedication, prophylaxis of anti-motion sickness, skeletal muscle relaxation, intubation.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

### **ADRENERGIC AGONISTS (ADRENOMIMETICS), ADRENERGIC ANTAGONISTS (ADRENOLYTICS), SYMPATHOLYTICS**

**A. Actuality.** Adrenergic agonists (adrenomimetic drugs) act in the region of adrenergic synapse, mimic the activity of sympathetic nervous system. Adrenergic antagonists influence in opposite way, decreasing activity of sympathetic nervous system. Physicians can correct functions of different inner organs and systems. Adrenergic drugs are prescribed in case of cardiovascular pathology: collapse, shock, heart arrest, hypertensive disease, endarteritis, ischemic disease of the heart, arrhythmia and bronchial asthma. All mentioned above means great importance of this unit, inclusive in dentistry.

**B. Aim of the unit.** To acquire the mechanisms of action, side effects, indications and contraindications for use of adrenergic drugs. To know how to ground your choice and to prescribe adrenergic drugs.

#### **C. Educational purposes:**

a) The student should know: adrenomimetics, adrenolytics and sympatholytics general characterization, the origin and chemical structure of the drugs, the principles of their classification, designation and routes of administration of main drugs, mechanism of action, indications and contraindications, side effects, symptoms of acute and chronic poisoning with some drugs, its assistance.

b) Students should be able to: prescribe mandatory drugs in different formulations, to indicate adrenergic drugs in different disease, primarily in states of emergency, including dental..

#### **D. Initial level of knowledge required for interdisciplinary integration.**

**Biochemistry.** Mediators of nerve impulses in adrenergic synapses (adrenaline, noradrenaline, dopamine). Structure, biosynthesis and inactivation adjusting their action on lipid, carbohydrate and protein metabolism.

**Histology.** Sympathetic autonomic system, morpho-functional features. Adrenergic synapse structure.

**Human physiology.** Disorders of sympathetic and parasympathetic autonomic system functions. The action on the innervated organs functions.

**Pathophysiology.** Disorders of neuronal excitability and conduction. Disturbances of synaptic conduction. Autonomic nervous system pathology.

#### **E. Control questions.**

1. Adrenergic sinaps. Adrenergic receptor types and subtypes. Effects of adrenergic receptor activation in innervated and noninnervated tissues by SNV.
2. Principles of classification of adrenergic blockers: mechanism of action, the main type of action.
3. Alfa-adrenergic agonists (phenylephrine, etylephrine, naphazoline, clonidine). Pharmacodynamics. Indications, contraindications. Side effects.
4. Beta-adrenergic agonists (isoprenaline, dobutamine, salbutamol, fenoterolul). Classification. Pharmacodynamics. Indications, contraindications. Side effects.
5. Alpha- and beta-adrenergic agonists (epinephrine, norepinephrine, dopamine). Pharmacodynamics. Contraindications, side effects.
6. Indirect simpatomimetics (ephedrine). Pharmacodynamics. Indications, contraindications, side effects.
7. Alpha-blockers (phentolamine, prazosin, dehydroergotamine, nicergoline). Classification. Pharmacodynamics. Indications, contraindications. Side effects.
8. Beta-blockers (propranolol, oxprenolol, atenolol, acebutalol, metoprolol, talinolol, pindolol). Classification. Pharmacodynamics. Indications, contraindications. Side effects.
9. Alpha- and beta-blockers (labetalol). Pharmacodynamics. Indications, contraindications, side effects.
10. Simpatolytics (reserpine, guanethidine). Pharmacodynamics. Indications, contraindications. Side effects.
11. Dopaminergic drugs. Pharmacodynamics. Using.

#### **F. Brief characterization of the main drugs.**

**Vertical.** The international name of drug. **1. Norepinephrine. 2. Epinephrine hydrochloride. 3. Isoprenaline. 4. Salbutamol. 5. Dopamine. 6. Phentolamine. 7. Propranolol. 8. Reserpine. 9. Guanethidine. 10. Dihydroergotamine. 11. Dobutamine. 12. Prazosine. 13. Metoprolol. 14. Talinolol. 15. Atenolol. 16. Phenylephrine. 17. Naphazoline. 18. Nicergoline. 19. Bisoprolol.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

#### **G. Exercises of prescription.**

**Prescribe** these pharmaceutical drugs in all possible forms: 1. Norepinephrine. 2. Isoprenaline. 3. Salbutamol. 4. Epinephrine hydrochloride. 5. Phentolamine. 6. Propranolol. 7. Reserpine. 8.

Dopamine. 9. Ephedrine hydrochloride. 10. Phenylephrine. 11. Naphazoline. 12. Dihydroergotamine. 13. Atenolol. 14. Prazosine.

**Indicate drugs used in (for):** severe hypotension, shock, rhinitis, conjunctivitis, cardiogenic shock, myocardial infarction, migraine, acute cerebral circulatory insufficiency, pheochromocytoma, vascular spasm, hypertension, angina, cardiac arrhythmias, hyperthyroidism, endarteriite, hypoglycemic coma, cardiac arrest, intensification and prolongation of local anesthesia in dentistry.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

### **SUMMARIZING THE THEME:**

#### **« DRUGS INFLUENCING EFFERENT INNERVATION »**

**A. The aim** is to consolidate the knowledge of students according to pharmacodynamics of groups acting on peripheral innervation, their choice as indications, the knowledge of side effects and first aid measures in case of overdose of such drugs.

#### **C. Educational purposes:**

a) The student should know: main drugs, their general characterization, description, classification, mechanism of action, presentation and routes of administration, dosage, indications and contraindications, side effects.

b) Students should be able to: prescribe mandatory drugs in different formulations, to indicate adrenergic drugs in different disease, primarily in states of emergency, including dental.

#### **C. Intrebări pentru autoinstruire.**

1. Structure and function of synapse. Metabolism of acetylcholine. General notions about cholinoreceptors, their classification ( $M_1$ ,  $M_2$ ,  $M_3$ ,  $M_4$ ,  $M_5$  - and N-cholinoreceptors ( $N_n$ ,  $N_m$ )). Localization of cholinoreceptors and their functional importance. Classification of cholinergic drugs.

2. Pharmacodynamics of M-cholinergic agonists (pilocarpine, aceclidine). The action on the eye (pupil diameter, intraocular pressure, accommodation), heart, smooth muscle of hollow organs (bronchi, digestive tract, bladder, etc.), secretion of glands (stomach, intestines, sweat, etc.). Indications and contraindications for use of M-cholinergic agonists. Their use in dentistry. Toxic action of muscarine.

3. N-cholinergic antagonists (lobeline, cytidine). The importance of physiological and toxic action. The action on breathing center, vegetative ganglia, adrenal medulla. Indications. The use of N-cholinergic antagonists to combat smoking.

4. Ways and methods to combat smoking. Smoking tobacco. Components of cigarette smoke and their action on body. Diseases caused by smoking. Active and passive smokers.

5. Anticholinesterase agents. (neostigmine, physostigmine etc.). Definition, classification, mechanism of action. Interaction with cholinesterase. Peculiarities of organophosphorus compounds action. Indications of anticholinesterase agents. Their use in dentistry. Side effects and toxic action of anticholinesterase agents. The clinical picture of poisoning, its prevention, first aid measures.

6. Classification of M- cholinergic antagonists. The action of M-cholinergic antagonists on the cardiovascular system, central nervous system, bronchial tone, gastrointestinal tract, biliary and urinary tract, bronchial secretion glands, sweat, gastric, intestinal and salivary glands. Eye function changes after M-cholinergic antagonists administration. Main indications for drugs of atropine group. Their use in dentistry. The clinical picture of poisoning with atropine and plants containing this alkaloid. Urgent care in the poisoning.

7. N-cholinergic blockers. Definition. Classification. Ganglionic blockers (hexamethonium, azamethonium, pentamethonium). Definition. Classification by chemical structure and duration of action. Location and mechanism of action. Peculiarities of absorption depending on the chemical structure. The action of ganglionic blockers on the cardiovascular system, digestive system, uterus. Indications and contraindications. Side effects.

8. Neuromuscular blockers with peripheral action (suxamethonium, tubocurarine etc.). Definition. Principles of classification. The mechanism of action of nondepolarizing (competitive) blockers, and depolarizing blockers. Indications. Side effects.

9. Adrenergic receptor types and subtypes. Effects of adrenergic receptor activation in innervated and noninnervated tissues by SNV. Principles of classification of adrenergic drugs.

10. Alfa-adrenergic agonists (phenylephrine, etylephrine, naphazoline, clonidine). Pharmacodynamics. Indications, contraindications. Side effects.

11. Beta-adrenergic agonists (isoprenaline, dobutamine, salbutamol, fenoterolul). Classification. Pharmacodynamics. Indications, contraindications. Side effects.

12. Alpha- and beta-adrenergic agonists (epinephrine, norepinephrine, dopamine). Pharmacodynamics. Contraindications, side effects.

13. Alpha-blockers (phentolamine, prazosin, dehydroergotamine, nicergoline). Classification. Pharmacodynamics. Indications, contraindications. Side effects.

14. Beta-blockers (propranolol, oxprenolol, atenolol, acebutalol, metoprolol, talinolol, pindolol). Classification. Pharmacodynamics. Indications, contraindications. Side effects.

15. Alpha- and beta-blockers (labetalol). Pharmacodynamics. Indications, contraindications, side effects.

16. Dopaminergic drugs. Pharmacodynamics. Using.

17. Sympatolytics (reserpine, guanethidine). Pharmacodynamics. Indications, contraindications. Side effects.

### **G. Exercises of prescription.**

**Prescribe** these pharmaceutical drugs in all possible forms: **1. Pilocarpine. 2. Aceclidine. 3. Cytisine. 4. Neostigmine. 5. Galanthamine. 6. Atropine. 7. Scopolamine. 8. Platyphyline. 9. Hexamethonium. 10. Suxamethonium. 11. Mellicine. 12. Norepinephrine. 13. Isoprenaline. 14. Salbutamol. 15. Epinephrine hydrochloride. 16. Phentolamine. 17. Propranolol. 18. Reserpine. 19. Dopamine. 20. Phenylephrine. 21. Prazosine. 22. Guanethidine. 23. Dihydroergotamine. 24. Ephedrine hydrochloride 25. Physostigmine. 26. Pirenzepine. 27. Ipratropium. 28. Salagen. 29. Trihexyphenidyl. 30. Dobutamine. 31. Metoprolol. 32. Nicergoline. 33. Bisoprolol.**

**Indicate drugs used in (for):** glaucoma, bladder atony, paralysis, paresis, intestinal atony, stimulating respiration, myasthenia, dry mouth, residual phenomena of cranio-cerebral trauma and peripheral nervous system, residual phenomena of poliomyelitis, mushroom poisoning, asthma, hypersalivation, intestinal spasm, peptic ulcer, eye examinations, premedication, prophylaxis of anti-motion sickness, skeletal muscle relaxation, intubation, severe hypotension, shock, rhinitis, conjunctivitis, cardiogenic shock, myocardial infarction, migraine, acute cerebral circulatory insufficiency, pheochromocytoma, vascular spasm, rhinitis, hypertension, angina, cardiac arrhythmias, hyperthyroidism, endarteriite, hypoglycemic coma, cardiac arrest, intensification and prolongation of local anesthesia in dentistry.

## **LOCAL ANAESTHETICS, DEMULCENTS, ASTRINGENTS, ADSORBENTS AND DRUGS IRRITATING THE RECEPTORS**

**A. Actuality.** Local anesthetics are widely used for pain relief (in surgery, dentistry, urology, gastroenterology, ophthalmology, otorhinolaryngology etc). Astringents and demulcents protect the sensitive receptors against various irritant agents. Adsorbents retain the absorption of toxic substances in the body (in acute poisoning, asthma, diabetes, hemo- and limfosorbition etc). Irritants are used as revulsives.

**B. Aim of the unit.** Study of the pharmacological methods of pain relief and protection of sensitive receptors against harmful excitants.

### **C. Educational purposes:**

a) The student should know: definition, classification principles, mechanism of action of local anesthetics, the principle of action and utilization of demulcents, astringents, adsorbents and irritating drugs, especially in dentistry.

b) Students should be able to: prescribe the mandatory drugs in all pharmaceutical drugs available.

**D. Initial level of knowledge required for interdisciplinary integration.**

**General Surgery.** Local anesthesia. Forms of local anesthesia (surface, infiltration, regional and spinal anesthesia). The mechanism of revulsive action.

**E. Control questions.**

1. Local anesthetics (procaine, tetracaine, lidocaine, benzocaine, bupivacaine etc). Principles of classification. Types and methods of local anesthesia.
2. Location and mechanism of action of local anesthetics. Comparative characterization by solubility, strength and duration of action, toxicity. The principles of choice of drugs for different types of local anesthesia.
3. Indications of local anesthetics. Side effects. Acute and chronic cocaine poisoning..
4. Astringents (tannin, bismuth sub-nitrate, decoction of oak bark, infusion of sage leaves, grass, St John's herb). Classification. Principles of action. Indications, including dentistry.
5. Demulcents (starch mucilage). Principles of action. Utilization.
6. Adsorbents (activated charcoal, calcium carbonate, aluminum silicate). Classification. Principles of action. Indications. Notion about haemo-sorbents.
7. Irritants (ammonia solution, menthol, oil of turpentine, mustard plaster). Their action on skin and mucous membranes. The importance of reflexes caused by them. Revulsive effect. Indications.

**F. Brief characterization of the main drugs.**

**Vertical.** International drug name. **1. Procaine. 2. Lidocaine. 3. Benzocaine. 4. Tetracaine. 5. Piromecaine. 6. Trimecaine. 7. Bupivacaine.** 8. Activated charcoal. 9. Mustard plaster. **10 Mepivacaine. 11. Articaine.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

**G. Exercises of prescription.**

**Prescribe** the following pharmaceutical drugs in all existing forms: 1. Procaine. 2. Lidocaine. 3. Benzocaine. 4. Mustard plaster. 5. Activated charcoal. 6. Tetracaine. 7. Piromecaine. 8. Trimecaine. 9. Bupivacaine.

**Indicate drugs used in (for):** surface anesthesia, pain sensitivity of the mouth mucosa for surface anesthesia, spinal anesthesia, epidural anesthesia, infiltration anesthesia, regional anesthesia, dental extraction (infiltration and regional anesthesia), wound and combustion processing, enema with mucilaginous substance, treatment of myositis, inflammatory, diseases of the mouth - for painting and gargle, stomatitis and gingivitis - for reducing the pain

sensitivity of the mouth, acute poisoning (non-specific therapy).

**H. Exercises for self-control of the level of understanding of the material must be accomplished in written form.**

## **OPIOID AND NON-OPIOID ANALGESICS**

**A. Actuality.** The pain feeling accompanies most processes and pathological states. Pain causes discomfort and suffering for the patient and when it becomes unbearable and generates pathological disorders it must be combated. Treatment of pain includes measures to remove its cause and analgesics (substances that can attenuate or suppress this feeling). Analgesics have an important role in dentistry.

**B. Aim of the unit.** To start training dental students with opportunities for relief or pain relief with medicinal substances.

### **C. Educational purposes:**

a) the student should know: overall characterization of analgesics, origin and chemical structure, principles of classification, pharmaceutical forms and routes of administration of the main drugs, mechanism of analgesic action, indications and contraindications, side effects, symptoms of acute and chronic poisoning with opioid analgesic drugs and their assistance.

b) Students should be able to: prescribe analgesic drugs, indicate adequate analgesics in various diseases and pathological conditions accompanied by pain.

### **D. Initial level of knowledge required for interdisciplinary integration.**

**Human physiology.** Biological importance of pain. Pain as an integral reaction of the body. Contemporary conceptions about the reception of nociceptive irritation. Ways of conduction of the pain excitation. Central mechanisms of pain. The role of bark, subcortical formations, humor factor in the formation of the responses to pain.

**Pathophysiology.** Role of the pain syndrome in the development and evolution of pathologic process. The importance of central and peripheral mechanisms in the formation of pain sensation. Concept of opioid receptors. Chemical mediators of pain, the anti-nociceptive system. Endogenous and exogenous ligands of opioid receptors: enkefalins, endorphins and dinorfins

### **E. Control questions.**

1. Analgesics. Principles of classification. The main features of opioid and non-opioid analgesics.

2. Opioid analgesics (morphine, omnopon, trimeperidine, fentanyl, pentazocine etc). Classification. Influence on CNS. The mechanism of analgesic action of morphine. Use. Side effects and contraindications.

3. Influence of morphine on visceral organs (respiratory system, cardiovascular system, gastrointestinal tract).

4. Comparative characterization of morphine and synthetic opioid analgesics. Notion about neuroleptanalgesia.

5. Acute morphine poisoning. Urgent medical care. Tolerance. Pharmacodependence. Drug addiction. Ways of prevention and treatment principles.

6. Agonist-antagonists and antagonists of opioid analgesics (naloxone, naltrexone, nalorphine hydrochloride). Mechanism of action. Use.

7. Antipyretic analgesics (metamizole, acetylsalicylic acid, acetaminophen). Classification. Mechanism of analgesic action. Indications for administration. Side effects. Use in dentistry.

8. Features and mechanism of antipyretic action of non-opioid analgesics. Indications.

9. Non-opioid analgesics with central action (clonidine, ketamine, diphenhydramine, baclofen, levomepromazine etc).

#### **F. Brief characterization of the main drugs.**

**Vertical.** International drug name. **1. Morphine hydrochloride.** 2. Omnopon. **3. Trimeperidine.** **4. Fentanyl.** 5. Pentazocine. 6. Tilidine. 7. Tramadol. **8. Acetylsalicylic acid.** **9. Metamizole.** **10. Acetaminophen.** 11. Baralgine. 12. Naloxone. **13. Ketorolac.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

#### **G. Exercises of prescription.**

**Prescribe** the following pharmaceutical drugs in all existing forms: 1. Morphine hydrochloride. 2. Trimeperidine. 3. Pentazocine. 4. Tramadol. 5. Naloxone. 6. Metamizole. 7. Acetylsalicylic acid. 8. Baralgine. 9. Acetaminophen. 10. Tilidine.

**Indicate drugs used in (for):** myocardial infarction, pain caused by trauma, headaches, renal colic, liver and intestinal hyperpyrexia, neuralgia, myositis, acute dental pain relief, pre- and postoperative pain, morphine poisoning, muscle and articular pain.

**H. Exercises for self-control of the level of understanding of the material must be accomplished in written form.**

### **ETHANOL. HYPNOTICS. SYMPTOMATIC ANTICONVULSANTS**

**A. Actuality.** The use of ethylic alcohol in medicine and the medico-social aspects of it requires a serious study. A serious problem is the interaction between alcohol and drugs. Insomnia medication demands a very detailed study of the physiological processes of sleep and the influence



of hypnotics on it. The main requirement to these drugs is that they must produce a sleep maximally close to the physiological one. Solving these problems will make it possible to effectively treat insomnia without the side effects of the currently used drugs. Insomnia medication and a profound knowledge of the pharmacology of hypnotic drugs should be known by every student regardless of specialty, as it is both a medical and social problem. The extensive spread of acute and chronic poisoning with ethanol and hypnotics implies all doctors to know the clinical picture and urgent medical care for them. Convulsions require urgent medical attention and deep knowledge of symptomatic anticonvulsant drugs.

**B. Aim of the unit:** to comprehend the pharmacological properties of hypnotics, symptomatic anticonvulsant drugs and alcohol.

**C. Educational purposes:**

a) Students should know: absorption, distribution, metabolism of ethanol and its action on organs and systems. Alcohol use in therapy, especially in dentistry, principles of treatment of acute and chronic alcohol intoxication. Classification, mechanism of action, side effects of hypnotics and treatment of acute and chronic intoxication with these drugs.

b) Students should be able to: prescribe the mandatory drugs in all pharmaceutical drugs available.

**D. Initial level of knowledge required for interdisciplinary integration.**

**Human physiology.** Phases and levels of the physiological sleep. Sleep theories. The interaction between cortex, hypothalamus and reticular formation during sleep and wakefulness. Dreams. Physiological processes of hypnosis.

**E. Control questions.**

1. Hypnotics. Principles of classification (by chemical structure and duration of action).
2. Barbiturates (phenobarbital, amobarbital etc). Classification by the duration of action. Pharmacokinetics. Mechanism of action. Influence on sleep structure. Indications. Side effects. Tolerance, drug dependence. Use in dentistry.
3. Benzodiazepines (nitrazepam, flunitrazepam, thiazolam). Classification by duration of action, mechanism of action, influence on sleep structure, indications, side effects.
4. Aliphatic compounds (chloralhydrate, bromizoval). Characterization. Use in dentistry.
5. Hypnotics of other chemical structure (zolpidem, zopiclone, glutetimide). Peculiarities of action.
6. General principles of insomnia medication.
7. Acute and chronic poisoning with hypnotics. Principles of treatment. Drug dependence.
8. Pharmacokinetics of ethanol (absorption, distribution, metabolism and elimination).

9. Pharmacodynamics of alcohol (effects on CNS, cardiovascular system, digestive organs, the local, antiseptic and energetic actions). Indications. Use in dentistry.
10. Principles of treatment of acute ethanol poisoning and chronic alcoholism.
11. Interaction of ethanol with other drugs.
12. Symptomatic anticonvulsants. Classification. Characterization of groups. Use in dentistry.

#### **F. Brief characterization of the main drugs.**

**Vertical.** International designation drug. **1. Phenobarbital.** 2. Pentobarbital sodium. **3. Flunitrazepam.** **4. Phenazepam.** 5. Nitrazepam. 6. Oxazepam. 7. Chloralhydrate. 8. Flumazenil. **9. Zopiclon.** **10. Diazepam.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

#### **G. Exercises of prescription.**

**Prescribe** the following pharmaceutical drugs in all existing forms: 1. Phenobarbital. 2. Pentobarbital. 3. Diazepam. 4. Nitrazepam. 5. Zopiclon. 6. Cloralhidrat. 7. Flumazenil.

**Indicate drugs used in (for):** sleep disturbance, decrease in sleep duration, superficial sleep, convulsions of unknown genesis, major bouts of epilepsy, trigeminal nerve neuralgia, processing of cariotic cavities.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

### **PSYCHOTROPS (Neuroleptics. Tranquilizers. Sedatives)**

**A. Actuality.** Antipsychotics (neuroleptics) are drug substances that have the following pharmacodynamic properties: antipsychotic, sedative-hypnotic, anxiolytic and other actions. These drugs have dramatically improved the effectiveness of psychiatric treatment and have also found wide use in therapy, anesthesiology, neurology etc.

**B. The aim of the unit** is to familiarize students with the opportunities of psychotropic medication.

#### **C. Educational purposes:**

a) Students should be aware of the psycholeptic medicines, their general characterization, origin, chemical structure and principles of classification, names, pharmaceutical forms and routes of administration of main drugs, mechanism of action, indications and contraindications, side effects, acute and chronic poisoning symptoms and treatment. Dental students need to know the use of this group of drugs in dentistry.

b) Students must be able to: prescribe the psychotropic drugs in all existing pharmaceutical forms and indicate psychosedative drugs in different diseases and pathological conditions, including dentistry.

#### **D. Initial level of knowledge required for interdisciplinary integration.**

**Human physiology.** The reflex principle of CNS activity. CNS neurons structure, basic properties of neurons. The role of thalamus and hypothalamus in the regulation of functions of the human autonomic system. Participation of the limbic system in regulation of the activity of internal organs. CNS mediators (acetylcholine, norepinephrine, serotonin, glutamine, GABA, glycine).

**Histology.** Notions about the cyto- and mieloarchitecture of the cortex. Analytical and synthetic activity of the brain. Gray substance of the brainstem. Structure of the reticulated formation.

**Biochemistry.** Composition of the nervous tissue. Peculiarities of energy metabolism, importance of aerobic glycolysis. Mediators of the nerve impulse transmission: acetylcholine, adrenaline, noradrenaline. Importance of the transformations of glutamine, glutamic acid and GABA in the nervous tissue.

**Pathophysiology.** Pathophysiology of subcortical centers of brainstem. Peculiarities of the limbic system pathology.

#### **E. Control questions.**

1. Psychotropics. Classification (psycholeptics, psychoanaleptics, psychodisleptics).
2. Neuroleptics (chlorpromazine, levomepromazine, etaperazine, droperidol, haloperidol, clozapine). Classification. Pharmacokinetic and pharmacodynamic properties. Comparative characterization of neuroleptics. Indications, contraindications, side effects. Use in dentistry.
3. Tranquilizers (chlordiazepoxide, diazepam, phenazepam, mebicar, trimetazine, meprobamate). Definition. Classification. Pharmacodynamics. Pharmacokinetics. Indications, contraindications, side effects. Use in dentistry. Concept of balanced anesthesia. Acute poisoning with tranquilizers and its urgent medical care.
4. Sedatives (bromines, drugs of *Leonurus cardiaca* (Sole goose), *Passiflora incarnata* (Suffering flower), *Valeriana officinalis* (heal)). Definition. Classification. Pharmacodynamics. Indications, contraindications, side effects.

#### **F. Brief characterization of the main drugs.**

**Vertical.** International drug name. 1. **Chlorpromazine.** 2. **Levomepromazine.** 3. **Perfenazine.** 4. **Droperidol.** 5. **Haloperidol.** 6. **Diazepam.** 7. **Phenazepam.** 8. **Clozapine.** 9. **Flumazenil.** 10. **Meprobamate.** 11. **Buspirone.** 12. **Sodium bromide.** 13. **Heal extract.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

**G. Exercises of prescription.**

**Prescribe** these pharmaceutical drugs in all possible forms: 1. Chlorpromazine. 2. Perfenazine. 3. Levomepromazine. 4. Phenazepam. 5. Diazepam. 6. Clozapine. 7. Droperidol. 8. Meprobamate. 9. Sodium bromide. 10. Heal drugs. 11. Sulpiride. 12. Flumazenil.

**Indicate** drugs used in (for): schizophrenia, psychomotor agitation, acute mania, neuroleptanalgesia, ataralgesia, neurovegetative imbalance, vomiting, anxiety, seizures, spastic conditions of striated muscles, insomnia, neurosis, gastrointestinal ulcer, feeling of fear, tension, anxiety before dental surgery.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

## **ANTIHYPERTENSIVES**

**A. Actuality:** According to World Health Organization hypertension has one of leading places among the diseases that lead to disability and death. The prophylaxis and treatment of this condition is possible only having a deep knowledge of antihypertensive drugs.

**B. Aim of the unit:** to familiarize students with major antihypertensive drugs and comprehend the principles of selection of the most effective antihypertensive drugs to treat various forms of hypertension.

**C. Educational purposes:**

a) the student should know: main antihypertensive drugs, their general characteristics, name, classification, mechanism of action, pharmaceutical forms and routes of administration, dosages, indications and contraindications, side effects, medical assistance in case of hypertensive crisis.

b) students should be able to: prescribe the necessary drug and to replace with other medicines if necessary, indicate antihypertensive drugs in different forms of hypertension.

**D. Initial level of knowledge required for interdisciplinary integration.**

**Human anatomy.** Cardiovascular system (heart, arteries, veins and capillaries). Structural peculiarities. Arteries and veins of large and small circuit. Main blood vessel defects.

**Histology.** Arteries. Classification. Structure of muscular, elastic and elasticomuscular arteries. Functional importance of muscular and non-muscular types of veins.

**Human physiology:** Blood pressure as a physiological constant of the body.

Blood pressure autoregulation. Tonic excitation of vasomotor center (C. Bernard). Characteristics and peculiarities of the vascular system receptors. Functional system of blood pressure self control (central and peripheral components' analysis). Afferent and efferent influence of vasomotor centers. Vasomotor nerves (blood vessel dilators and constrictors). Humoral influence on vascular tone (adrenaline, vasopressin, renin, angiotensin, histamine and kinins). Physiological bases of hypertension pathogenesis. Importance of capillary perfusion. Concept of cardiac output, microcirculation, peripheral vascular resistance, circulating blood volume.

**Biochemistry.** Peculiarities of smooth muscle metabolism.

**Pathophysiology.** Disturbance of blood pressure in receptor, central and vascular wall damage. Pathogenesis of essential and symptomatic hypertension. Disruption of local blood circulation.

### **E. Control questions.**

1. Antihypertensives. Classification (drugs decreasing the sympathetic tone at different levels, muscletropic substances, drugs regulating the norepinephrine metabolism, inhibitors of the renin-angiotensin-aldosterone system).

2. Drugs decreasing sympathetic tone at different levels. Classification.

a) Centrally acting substances (clonidine, moxonidine, methyldopa). Particularities of their hypotensive action. Indications. Adverse reactions and their prevention.

b) Ganglioplegics (hexamethonium, trimetofan, pentamethonium). Classification. Particularities of their antihypertensive action. Influence on systemic blood pressure. Indications. Complications and their prevention. Side effects.

c) Sympatholytics (reserpine, guanethidine). Particularities of antihypertensive action. Action on systemic blood pressure. Indications. Contraindications and their prevention.

d)  $\alpha$ -adrenergic blockers (phentolamine, prazosin, doxazosin). Classification. Mechanism of action. Neuroleptics with  $\alpha$ -antiadrenergic action (droperidol, chlorpromazine, levopromazine). Indications. Side effects.

e)  $\beta$ -antiadrenergics (propranolol, metoprolol, atenolol). Classification. Mechanism of action. Indications. Complications and their prevention.

f)  $\alpha$ - $\beta$ -antiadrenergics (labetalol). Pharmacologic effects. Indications.

3. Medicinal substances acting on the smooth muscles of vessels (hydralazine, bendasole, sodium nitroprusside). Classification. Particularities of the mechanism of action. Indications. Complications.

4. Calcium channel blockers (verapamil, nifedipine). Mechanism of action. Indications. Side effects.

5. Stimulants of potassium channels (diazoxide, minoxidil). Mechanism of action. Indications. Side effects.

6. Diuretics used as antihypertensive drugs (hydrochlorothiazide, spironolactone, furosemide). Mechanism of action. Indications. Complications.

7. Inhibitors of the renin-angiotensin-aldosterone system (captopril, enalapril, lisinopril). Mechanism of action. Indications. Side effects.

8. Comparative characterization of antihypertensive action on arterial and venous tone, resistance, cardiac output, heart contractions frequency, circulating blood volume, activity of the renin-angiotensin-aldosterone system and glomerular filtration.

9. Drugs used in the abolition of hypertensive crisis. Characterization.

10. General principles of hypertension treatment.

#### **F. Brief characterization of the main drugs.**

**Vertical:** International drug name. **1. Clonidine.** 2. Methyldopa. 3. Guanethidine. 4. Reserpine. 5. Hexamethonium. 6. Propranolol. **7. Atenolol.** **8. Magnesium sulphate.** **9. Furosemide.** 10. Bendazol. 11. Captopril. **12. Enalapril.** **13. Nifedipine.** **14. Prazosin.** **15. Hydrochlorothiazide.** 16. Hidralazina. 17. Diazoxide. 18. Sodium Nitroprusiat. **19. Lisinopril.** **20. Indapamid.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

#### **G. Exercises of prescription.**

**Prescribe** the following pharmaceutical drugs in all possible forms. 1. Clonidine. 2. Methyldopa. 3. Hexamethonium. 4. Reserpine. 5. Guanethidine. 6. Nifedipine. 7. Propranolol. 8. Captopril. 9. Enalapril. 10. Atenolol. 11. Diazoxide. 12. Hydralazine. 13. Prazosin. 14. Hydrochlorothiazide.

**Indicate** drugs used in: hypertensive crisis, pheochromocytoma diagnosis, mild hypertension, severe hypertension, hypertensive crisis.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

### **ANTIHIPOTENSIVES**

**A. Actuality.** Acute and chronic hypotension are frequent pathological conditions in therapeutic practice, surgery etc. Requiring a complex and appropriate treatment and often presents serious difficulties. In this aspect, world medical science is primarily concerned with the study of the existing drugs and developing of an effective and acceptable hypotensive medication.

**B. Aim of the unit:** to know the pharmacology of antihypotensive vasoconstrictive drugs, their principles of selection according to indications, possible side effects and their prevention.

**C. Educational purposes:**

a) the student should know: general characterization of vasoconstrictive and antihypotensive drugs, origin, chemical structure and principles of classification, name, form of delivery and routes of administration of the main drugs of the group, mechanism of action, basic effects, main indications and contraindications, adverse reactions.

b) Students should be able to prescribe antihypotensive drugs, indicate such drugs in different hypotensive states.

**D. Initial level of knowledge required for interdisciplinary integration.**

**Human physiology.** Hemodynamics. Circulation speed of the blood. Laminar and turbulent circulation. Nervous regulation of terminal circulation. Vasomotor centers. Humoral adjustment of terminal circulation (adrenaline, vasopressin, renin, histamine, prostaglandins, kinins). Renin-angiotensin-aldosterone system.

**Pathophysiology.** Acute and chronic circulatory insufficiency. Disorders of the mechanical properties of blood vessels. Vascular disorders, nervous and humoral mechanisms of regulation of the vascular tone disorders. Hypotension.

**E. Control questions.**

1. Definition and classification principles of vasoconstrictive and antihypotensive drugs.

2. Vasoconstrictors. Classification.

a) Sympathomimetics (norepinephrine, epinephrine, phenylephrine, dopamine, ephedrine). Mechanism of action. Indications, contraindications. Side effects. Comparative characterization.

b) ergot alkaloids and their derivatives (ergotamine). Mechanism of action. Indications, contraindications. Side effects.

c) izothiourea compounds (izoturon, difetur). Peculiarities pharmacodynamics. Indications, contraindications. Side effects.

d) musculotropic vasoconstrictors (vasopressin, angiotensinamide). Mechanism of action. Indications, contraindications. Side effects.

e) psychoanaleptics used as antihypotensives (caffeine sodium benzoate, niketamide). Mechanism of action. Indications, contraindications. Side effects.

f) general tonics (Ginseng, Echinopanax, Aralia tinctures, Leuzea, Rodiola extracts, pantocrine). Mechanism of action. Indications, contraindications. Side effects.

3. Local vasoconstrictors (naphazoline, xylometazoline, phenylephrine, epinephrine, ethylephrine, ephedrine). Indications. Use in dentistry.

4. Vasoconstrictors with complex mechanism (DOXA, fludrocortisone). Pharmacodynamics.
5. Vasoconstrictors with permissive action (corticosteroids). Peculiarities of action.
6. Antihypotensives that increase cardiac output (isoprenaline, dopamine, dobutamine, glucagon). Mechanism of action. Indications, contraindications. Side effects.
7. Plasma volume substitutes (dextran-40, dextran-70). Pharmacodynamics. Indications.

#### **F. Brief characterization of the main drugs.**

**Vertical:** International drug name. **1. Epinephrine. 2. Norepinefrin. 3. Phenylephrine. 4. Ergotamine. 5. Caffeine sodium benzoate. 6. Dopamine. 7. Pantocrin. 8. Dextran-70. 9. Dezoxicorticosteron acetate. 10. Izoturon. 11. Angiotensinamide.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

#### **G. Exercises of prescription.**

**Prescribe** the following recipes in all possible pharmaceutical drugs. 1. Epinephrine. 2. Norepinephrine. 3. Phenylephrine. 4. Ergotamine. 5. Caffeine sodium benzoate. 6. Dopamine. 7. Pantocrin. 8. Dextran-70. 9. Dezoxicorticosteron acetate. 10. Izoturon. 11. Angiotensinamide.

**Indicate** drugs used: posthaemorrhagic hypotension, hypotension caused by CNS depressants overdose, cardiogenic shock with hypotension, migraine, neurovegetative dystonia, hypotension resistant to sympathomimetic drugs, orthostatic hypotension, acute rhinitis, hypovolemic shock, chronic hypotension.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

## **ANTIANGINALS**

**A. Actuality.** Angina pectoris and especially the myocardial infarction are some of the most common causes of fatal end invalidisation of the patients. This situation needs continuous research, implementation of more efficient and accessible drugs, and a deeper study of drugs which improve blood circulation and myocardial metabolism (antianginal drugs).

**B. Aim of the unit:** Students must have basic knowledge about antianginal medication, urgent medical problems (control of angina accesses, medical treatment principles of acute myocardial infarction).

#### **C. Educational purposes.**

a) the student must know the definition, classification, mechanism of action of antianginal drugs, their action on the heart and hemodynamics, indications and



contraindications, side effects, principles of treatment of the anginal accesses and myocardial infarction, optimal routes of administration and principle of dosage.

b) the student should be able to prescribe drugs most widely used therapy in various forms of angina pectoris, to apply the knowledge in solving different medical situations.

#### **D. Initial level of knowledge required for interdisciplinary integration.**

**Human Anatomy.** Arteries, veins, capillaries, cardiac vascular anastomoses. Large and small circuit. Age peculiarities of the heart and coronary circulation.

**Histology.** Cytochemical and functional specificities of myocardium.

**Human physiology.** Circulating blood volume, systolic volume and minute-volume, venous uptake to the heart, diastolic pressure of the left ventricle, peripheral resistance.

**Pathophysiology.** Parameters of heart failure: systolic volume changes, heart rate and cardiac contractions, cardiac work.

**Internal Diseases:** Definition of coronary heart disease. The main clinical forms (stable and unstable angina). Actuality of the issue. Risk factors for coronary heart disease.

#### **E. Control questions.**

1. Definition and classification of antianginal drugs.
2. Organic nitrates (nitroglycerin, nitrong, trinitrolong, sustac, izosorbide dinitrate, nitroderm). Classification. Pharmacokinetics. Mechanism of action. Influence on the heart and hemodynamics. Indications and contraindications. Side effects.
3. Peculiarities of the pharmacological action of molsidomine. Indications.
4. Beta-blockers as antianginals (propranolol, oxprenolol, metoprolol, pindolol). Classification. Mechanism of antianginal action. Indications. Side effects. Contraindications.
5. Calcium channel blockers (verapamil, nifedipine, dilthyazem). Pharmacokinetics. Mechanism of antianginal action. Influence on the heart and hemodynamics. Indications. Side effects. Contraindications.
6. Musculotropic coronaric dilators (dipyridamole, carbocromen, nonahlazine, lidoflazine, aminophylline). Classification and mechanism of action. Indications. Adverse reactions.
7. Coronaric dilators with reflex action (validol).
8. Principles of medication of the myocardial infarction and angina pectoris.

#### **F. Brief characterization of the main drugs.**

**Vertical.** International drug name.

1. Propranolol. 2. Verapamil. 3. Nifedipine. **4. Nitroglycerine.** 5. Dipyridamol. 6. Nitrong. **7. Izosorbit dinitrate. 8. Izosorbit mononitrate. 9. Molsidomine.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage

(maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

#### **G. Exercises of prescription.**

**Prescribe** the following pharmaceutical drugs in all existing forms: 1. Propranolol. 2. Verapamil. 3. Nifedipină. 4. Nitroglicerină. 5. Dipyridamol. 6. Nitrong. 7. Izosorbit dinitrat. 8. Validol.

**Indicate** drugs used in (for): acute myocardial infarction with hypotension, pain control in acute myocardial infarction; control of angina pectoris accesses, prophylaxis of angina accesses.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

### **THROMBOLYTICS. HAEMOSTATICS**

**A. Actuality.** The disorders of clotting, fibrinolysis and hematopoiesis are very frequent, often severe (acute bleeding, surgery) or deadly (thrombosis of pulmonary arteries, cerebral vessels, intravascular coagulation). Moreover, the dentist can meet different pathologies of the mouth that accompanies anemia, leukopenia.

**B. Aim of the unit.** To know the basic medication principles of hyper- and hypocoagulating states, fibrinolysis disorders and hematopoiesis.

#### **C. Educational purposes:**

a) the student should know: definition, classification, mechanism of action, indications, contraindications and side effects of antithrombotic drugs, haemostatics and substances used in hematopoiesis disorders.

b) Students should be able to: prescribe in different pharmaceutical forms the drugs that influence the blood system; indicate the drugs of this group in different pathologies of the blood system.

#### **D. Initial level of knowledge required for interdisciplinary integration.**

**Human Physiology.** Blood coagulation. Contemporary scheme of blood coagulation. Anticoagulation system of blood. Physiological role of heparin.

**Biochemistry.** Cascade mechanisms of the enzymes' action that contribute to blood coagulation. Metabolic functions of cyanocobalamin and folic acid.

**Pathophysiology.** Pathology of blood coagulation and fibrinolysis. Anemia, leukopenia, thrombocytopenia. Forms, causes and mechanisms of their development. Leukemia. Causes and mechanisms of development.

### **E. Control questions.**

1. Classification of drugs that affect the blood clotting and fibrinolysis (antithrombotics and haemostatics). Classification of antithrombotics.
2. Direct-acting anticoagulants (heparin, enoxoparin, nadroparin). Pharmacodynamics. Mechanism of action. Indications. Contraindications. Complications. Use in dentistry. Antagonists of direct anticoagulants.
3. Anticoagulants with indirect action (ethyl biscumacetat, acenocoumarol, phenindione). Mechanism of action. Indications. Side effects. Contraindications. Comparative characterization with heparin. Antagonists of indirect anticoagulants.
4. Antiplatelet (acetylsalicylic acid, dipyridamole, ticlopidine). Definition. Mechanism of action. Indications. Side effects.
5. Fibrinolytics (fibrinolysine, streptokinase, streptodekaze, urokinaze, alteplase). Classification. Peculiarities and mechanism of action of streptokinase and fibrinolysine. Immobilized bioproducts (streptodekaze). Indications. Side effects. Contraindications.
6. Definition and classification of haemostatics.
7. Direct coagulants (thrombin, fibrinogen) and indirect coagulants (menadione). Mechanism of action. Indications. Side effects.
8. Antifibrinolytics of synthetic (aminocaproic acid, aminomethylbenzoic acid) and animal origin (aprotinin). Mechanism of action. Indications.
9. Agregants (calcium chloride and gluconate, serotonin adipinate, adroxone). Mechanism of action. Indications.
10. Haemostatics of vegetal origin. Substances that reduce the permeability of the vascular wall (ascorbic acid, vitamin P, ascorutine). Indications.
11. Haemostatics with topical use (sympathomimetics, astringents, local coagulating matrix, thrombin).

### **F. Brief characterization of the main drugs.**

**Vertical.** International drug name. 1. **Heparin.** 2. **Nadroparin.** 3. **Ethylis biscoumacetas.** 4. **Menadione.** 5. Streptokinaze. 6. **Acetylsalicylic acid.** 7. Fibrinogen. 8. Aminocaproic acid. 9. **Protamini sulfas.** 10. **Aprotinin.** 11. Acenocoumarol. 12. Ticlopidine. 13. Alteplaze.

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

### **G. Exercises of prescription.**

**Prescribe** the following pharmaceutical drugs in all existing forms:

1. Heparin. 2. Nadroparin. 3. Etilbiscumacetat. 4. Menadione (Vikasol). 5. Aminocaproic acid. 6. Streptokinaze. 7. Protamini sulphas. 10. Calcium gluconate. 11. Acetylsalicylic acid.

**Indicate** drugs used in/for: overdose of anticoagulants with indirect action, stopping parenchymatic and capillary bleeding, treating deep vein thrombosis, postoperative thromboembolism prophylaxis, prophylaxis of arterial thrombosis, pulmonary artery embolism, bleeding caused by hyperfibrinolysis, iron deficiency anemia, leukopenia, overdose with direct anticoagulants, aplastic anemia, hemolytic anemia, B<sub>12</sub> – deficitary anemia, bleeding after tooth extraction.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

## ENZYMES AND ANTENZYMES USED AS MEDICINES

**A. Actuality.** Recently antienzymes and enzymes are largely used as drugs. These drugs show different actions depending on the nature of enzyme or antienzyme. They can be used in different conditions for both preventive and curative aim. They have acquired a special significance in dentistry. So, antiseptics with irritant and cauterizing action are used less, being replaced by enzymes that dissolve the pus and necrotic masses.

**B. The aim of the unit** is to familiarize students with the opportunities of the therapeutic use of enzymes and antienzymes in general medicine and dentistry.

### **C. Educational purposes:**

a) the student should know: overall characterization of enzymes and antienzymes, origin and chemical structure, classification principles, international names of drugs, pharmaceutical forms and routes of administration, mechanisms of action, main indications and contraindications for administration, adverse reactions.

b) Students should be able to: prescribe antienzymes and enzymes and indicate them according to pathology.

### **D. Initial level of knowledge required for interdisciplinary integration.**

**Biochemistry.** History of the discovery and study of enzymes. Classification of enzymes. Isoenzymes. Dependence of enzyme reaction upon temperature, pH, enzyme concentration and substrate. Measure units for enzyme activity and quantity. Enzyme cofactors: metal ions and coenzymes. Vitamins with coenzyme function. Enzyme inhibitors: reversible, irreversible. Medicinal properties of antienzymes. Regulation of the action of enzymes.

### **E. Control questions.**

1. Notion of enzymes and antienzymes. Biological importance.

2. Enzymes used as medicine. Classification by their use.

a) Enzymes used in suppurative-necrotic processes (trypsin, trypsin, ribonuclease,

deoxiribonuclease, collagenase). Pharmacodynamics. Pharmacotherapy. Use in dentistry.

b) fibrinolytic enzymes (fibrinolizin, streptolizae). Pharmacodynamics. Notion of immobilized enzymes (streptodekaze). Indications. Side effects.

c) digestive enzymes (pepsin, natural gastric juice, pancreatin, oraz, festal). Pharmacodynamics. Indications. Side effects.

3. Different enzyme drugs (cytochrome C, hyaluronidase, lecozim, asparaginase, penicillinase). Pharmacodynamics. Indications. Side effects.

4. Notion of enzyme drugs prepared from microbial source (bactisubtil, subtil). Therapeutic use.

5. Antienzymes. Definition. Classification by mechanism of action.

6. Antiprotease enzymes (aprotinin). Pharmacodynamics. Indications.

7. Antifibrinolytics. Pharmacodynamics. Indications.

8. Drugs from different groups used as antienzymes. Characterization.

a) Anticholinesterase agents (neostigmine, physostigmine).

b) Inhibitors of monoamine oxidase (nialamide).

c) Inhibitors of carboanhydrase (acetazolamide).

d) Inhibitors of xantinoxidase (allopurinol).

#### **F. Brief characterization of the main drugs.**

**Vertical.** International drug name.

Enzymes used as medicine: 1. Terilitin. 2. Streptokinase 3. Pepsin. 4. Festal. **5. Hyaluronidase. 6. Trypsin.** 7. Ribonuclease. Antienzymes: **1. Aprotinin.** 2. Aminocaproic acid. 3. Neostigmine. 4. Nialamide. **5. Acetazolamide. 6. Allopurinol.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

#### **G. Exercises of prescription.**

**Prescribe** the following pharmaceutical drugs in all existing forms:

1. Streptokinase. 2. Festal. 3. Aminocaproic acid. 4. Allopurinol. 5. Aprotinin. 6. Hyaluronidase. 7. Pepsin. 8. Neostigmine. 9. Acetazolamide.

**Indicate drugs used in (for):** acute pancreatitis, pulmonary embolism, hemorrhage, bleeding through increased fibrinolysis, gastric hyposecretion, poisoning with organophosphorus compounds, suppurative-inflammatory processes in the oral tissues, dystrophic and inflammatory paradontitis, ulcerative and necrotic processes of oral cavity, stomatitis, ulcerative stomatitis, gingivitis with purulent exudate and necrotic destruction, exudative multiforme erythema, odontogenic sinusitis, maxillary bone osteomyelitis, removal of temporo-mandibular joint contractures, scars after combustion and surgeries in the maxillo-facial region, hypertrophic

gingivitis, improvement of local anesthetics absorption.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

## **PHARMACOLOGY OF VITAMINS**

**A. Actuality.** Vitamins are specific biologically active substances involved in processes of the vital activity of the body. Most of them are coenzymes of different enzymes are involved in the regulation of the metabolism (carbohydrate, protein, lipid and mineral) and support cell structure. Most of them are substances of exogenous origin. Together with enzymes and hormones they act as biocatalysts.

Vitamin deficiency causes pathological features that can be prevented by the administration of the respective vitamin. Vitamins are most commonly used to treat hypo- and avitaminosis (substitution vitamin therapy). Moreover, the vitamins have antitoxic action, help increasing the body resistance against the influence of environmental pathogens, accelerate tissue regeneration, support normal cell metabolism and stimulate the body ages (adaptation vitamin therapy). In some cases, pharmacodynamic vitamin therapy is used (in these cases, vitamins are indicated in increased doses).

Vitamins are one of the groups of drugs most commonly used by dentists. Vitamin deficiency often manifests itself in the mouth - trophic mucosal disorders, paradental tissue damage etc. Often the initial symptoms of hypovitaminosis are stomatitis, gingivitis, glossitis that demand the dentist to know the physiological and therapeutic action of vitamins and vitamin drugs, clinical manifestations of vitamin deficiencies, indications and contraindications for their use. Vitamin drugs in dentistry are widely used to treat mouth diseases (gingivitis, stomatitis, hyperkeratosis, lichen Rüber plan, exudative erythema multiforme), lips (keilitis), dental hard tissue (hyperesthesia, multiple dental caries), paradental tissue (paradontitis) and others.

**B. The aim of the unit** is to familiarize students with the opportunities of prophylactic and curative use of vitamins in diseases with and without vitamin deficiency.

### **C. Educational purposes:**

a) The student should know: overall characterization of vitamin drugs, provenance, classification principles, international names, pharmaceutical forms and routes of administration of the drug required, the mechanisms of action of vitamins, especially in dentistry, major indications and contraindications, side effects.

b) Students should be able to: prescribe vitamin drugs in different formulations and indicate them depending on the pathology and patient age.

### **D. Initial level of knowledge required for interdisciplinary integration.**

**Biochemistry.** Vitamins A, D, E, K, B<sub>1</sub>, B<sub>6</sub>, B<sub>2</sub>, B<sub>12</sub>, C, PP, biotin, pantothenic acid, folic acid: structure, food sources, daily requirements, symptoms of avitaminosis, biological properties.

**Pathophysiology.** Hyper-, hypo- and avitaminosis. Exogenous (primary) hypovitaminosis. Endogenous (secondary) hypovitaminosis caused by insufficient intake, disorders of the absorption, storage, use and metabolism of vitamin drugs. Symptoms of hypo- and hypervitaminosis.

#### **E. Control questions.**

1. Biological importance of vitamins. Notion of hypo- and hypervitaminosis. Foods containing various vitamins. Principles of classification of vitamin drugs.

2. Pharmacodynamics, indications, contraindications, side effects of the drugs of hydrosoluble vitamins (thiamin, fosfothiamin, riboflavin, riboflavin mononucleotid, pyridoxine, pyridoxal phosphate, cyanocobalamin, folic acid, ascorbic acid, nicotinic acid, nicotinamide, routine, calcium pantothenate). Use in dentistry.

3. Mechanism of action, indications, contraindications, side effects of the drugs of liposoluble vitamins (retinol, fish oil, carotene, caratolen, tocopherol acetate, menadion, ergocalciferol, videcol). Use in dentistry. 4. Polyvitamin drugs (panhexavit, decamevit, kvadevit).

5. Notion of vitaminoids (choline chloride, calcium pangamat, lipoic acid, methylmetioninsulfonium chloride, biotin). Use in dentistry.

6. Vegetal vitamin drugs (hip oil, seabuckthorn oil, grape oil, vitamin species).

7. Clinical and physiological classification, indications, side effects of:

a) vitamin drugs that influence the overall reactivity of the organism (thiamine hydrochloride, riboflavin, niacin, pyridoxine hydrochloride, cyanocobalamin, calcium pangamat, retinol acetate, ascorbic acid, folic acid).

b) vitamin drugs, which protect the mucous membranes and skin (retinol acetate, riboflavin, calcium pantothenate, nicotinic acid, pyridoxine hydrochloride, cyanocobalamin, biotin, tocopherol acetate),

c) antitoxin drugs and anti-infective vitamins (ascorbic acid, retinol acetate, thiamine hydrochloride, riboflavin, calcium pantothenate, nicotinic acid, pyridoxine hydrochloride, cyanocobalamin, folic acid),

d) vitamin drugs that influence hematopoiesis and blood clotting (cyanocobalamin, folic acid, ascorbic acid, pyridoxine hydrochloride, routine, menadion)

e) vitamin drugs that influence the bone and dental tissue metabolism (ascorbic acid, ergocalciferol, thiamine hydrochloride),

f) vitamin drugs that regulate sight (retinol acetate, ascorbic acid, tocopherol

acetate, riboflavin).

#### **F. Brief characterization of the main drugs.**

**Vertical.** International drug name.

Hydrosoluble vitamin drugs: **1. Thiamine hydrochloride.** 2. Riboflavin. **3. Nicotinic acid.** 4. Nicotinamide. 5. Calcium pantothenate. **6. Pyridoxine hydrochloride.** 7. Folic Acid. **8. Cyanocobalamin.** 9. Calcium pangamat. **10. Ascorbic acid.** 11. Routine.

Liposoluble vitamin drugs: 1. Retinol acetate. 2. Ergocalciferol. 3. Tocopherol acetate. 4. Menadionă.

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

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

#### **G. Exercises of prescription.**

**Prescribe** the following pharmaceutical drugs in all existing forms:

1. Pyridoxine hydrochloride. 2. Cyanocobalamin. 3. Menadion. 4. Riboflavin. 5. Folic acid. 6. Ascorbic acid. 7. Retinol acetate. 8. Ergocalciferol. 9. Nicotinic acid. 10. Kvadevit. 11. Thiamine hydrochloride. 12. Nicotinamide. 13. Calcium pantothenate. 14. Routine. 15. Panhexavit. 16. Decamevit.

Indicate drugs used: alcoholism, neuritis, keratitis, pellagra, anemia, skin and mucous membranes disorders, bleeding diathesis, infectious and inflammatory diseases of upper respiratory tract, deficient rickets, sterility, stomatitis, allergic stomatitis, paradontitis, glossitis, trigeminal neuralgia, multiple cavities, paradontosis, gingivitis, glossitis, vericolor lichen, haemorrhagic gingivitis, gingival bleeding, haemorrhagic stomatitis, prevention of mouth and caries affection after radiotherapy, hyperkeratosis, mouth ulcers, bleeding after tooth extraction and surgery.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

### **HORMONES AND HORMONAL DRUGS**

**A. Actuality.** In the clinical practice there are encountered diseases caused by the failure of the endocrine organs (like diabetes, Addison's disease) or their hyperfunction. It is obvious that in the first case the hormones will be introduced from outside (replacement therapy) and in the second case – anti-hormonal drugs are given. Finally, there are cases when the endocrine gland functions normally, but its hormone is introduced for the pathogenetic therapy of other diseases. In dentistry the most frequently used drugs are glucocorticoids (in shock urgent assistance, for the treatment of pulpitis and periodontitis, inflammatory and allergic diseases of the oral mucosa,



arthritis and arthrosis of the temporo-mandibular joint, osteomyelitis, periostitis, pemphigus, Ruber lichen plan.

**B. The aim of the unit** is to study the pharmacology of hormones and hormonal drugs, principles of drug selection depending on the pathology and to prescribe properly the recipes.

**C. Educational purposes:**

a) The student should know: the definition and classification of hormonal drugs, their pharmacodynamics, name, form of delivery and main routes of administration for drugs, indications and contraindications, side effects.

b) Students should be able to: prescribe the hormonal drugs in different formulations and indicate them in dependence of the pathology and patient age.

**D. Initial level of knowledge required for interdisciplinary integration.**

**Human Anatomy.** Endocrine glands. Human physiology. General characterization of endocrine glands. Hormones. Participation of hormones in the integrative reactions of the body. Pituitary gland. The relationship between the pituitary gland and hypothalamus. Neurosecretion. Pancreas. Cortical layer of the adrenal gland. Importance of steroids in the body. Parotid gland.

**Histology.** Endocrine system. Structure of the endocrine glands. Formations of the central regulation of the endocrine system. Hypothalamus. Pituitary gland. Epiphysis. Peripheral endocrine glands. Thyroid and parathyroid glands. Adrenal gland. Isolated hormone-producing cells. Male genitalia. Female genitalia.

**Biochemistry.** Hormonal regulation of the metabolism. 3', 5'-cyclic AMP as a secondary mediator. Structure, influence on the metabolism and mechanism of action of the leading hormones. Liberines, statins and pituitary hormones. Somatotropin, vasopressin, thyroxine, parathyroid hormone, calcitonin, insulin, glucagon, glucocorticoids, mineral corticoids, regulation of their biosynthesis and secretion. Influence on the carbohydrate, protein, lipid and hydrosalin metabolism.

**Pathophysiology.** Pituitary pathology. Thyroid pathology. Hyperfunction and hypofunction. Pancretic pathology. Adrenal pathology. Acute and chronic pathologies of the cortical layer of the adrenal glands. Overproduction of aldosterone, glucocorticoids.

**Pathology.** Morphological changes in endocrine pathology.

**E. Control questions.**

1. Concept of hormone, hormonal and anti-hormonal drug.
2. Classification, sources for obtaining hormonal drug.
3. The mechanism of action of polypeptide and steroid hormones on cellular level.
4. Pancreatic hormone drugs. Classification of insulin drugs. Influence of insulin on the carbohydrate, lipid and protein metabolism. Comparative characterization of insulin drugs. Indications

for administration. Use in dentistry. Side effects. Emergency drug assistance in the hyperglycaemic and hypoglycemic coma.

5. Classification of oral antidiabetics. Mechanism of action. Comparative characterization of sulfonylurea derivatives and biguanidelor. Peculiarities of sulfonylurea derivatives of second and third generation. Indications, contraindications. Side effects.

6. Steroid anabolic drugs. Classification. Anabolic steroids (nandrolone phenylpropionate and decanoate, metandienon). Influence on the protein metabolism. Indications and contraindications. Side effects. Steroid anabolic drugs used in dentistry.

7. Non-steroid anabolic drugs (kalii orotas, inosine). Classification, mechanism of action. Effects. Indications for administration.

8. Drugs of glucocorticoids (hydrocortisone, prednisolone, dexamethasone, triamcinolone, flumethasone pivalate). Classification. Influence on the carbohydrate, protein, lipid and hydrosalin metabolism, mesenchymal tissues, cardiovascular system, CNS, muscles and blood. Mechanism of action. Anti-inflammatory, anti-allergic, immunosuppressive and anti-shock actions of glucocorticoids.

9. Therapeutic use of glucocorticoids. Principles of administration. Synthetic glucocorticoids for external use. Side effects. Use in dentistry. Hormonal drugs of glucocorticoids for topical use and their association with other drugs.

10. Parotid gland hormone (parotine) and its role in the growth and development of teeth and skeletal.

#### **F. Brief characterization of the main drugs.**

**Vertical.** International drug name.

1. Corticotropine. **2. Insulin.** 3. Glibenclamide. 4. Metformine. **5. Nandrolone.** **6. Hydrocortisone.** **7. Prednisolone.** 8. Dexamethasone.

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms. 3. Administration. 4. Dosage (maximum single dose and clinical dose (for 24 hours)). 5. Mechanism of action. 6. Indications and contraindications, including dental. 7. Adverse reactions.

#### **G. Exercises of prescription.**

**Prescribe** the following pharmaceutical drugs in all existing forms:

1. Corticotropine. 2. Insulin. 3. Prednisolone 4. Hydrocortizone. 5. Dexamethasone. 6. Glibenclamide. 7. Nandrolone. 8. Metformine.

**Indicate drugs used in (for):** diabetes, diabetic coma, coma, hypoglycemia, myocardial infarction, Addison's disease, rheumatism, eczema, pulpitis, periodontitis, paradontitis, allergic and inflammatory diseases of the mouth, arthritis and arthrosis of the temporo-mandibular joint, fractures of the jaws, dystrophical-inflammatory paradontitis.

**H. Exercises for self-control of the level of understanding of the material** must be

accomplished in written form.

## **NON-STEROIDAL ANTI-INFLAMMATORY DRUGS**

**A. Actuality.** Inflammation is a universal, complex reaction of the organism (neurotropic, vascular and metabolic) as a response to the action of various exo- and endogenous noxious factors (microorganisms, viruses). In biological sense, it is a reaction of defense at radiation, low or high temperatures, chemicals, etc. But inflammatory reactions, usually accompanying an infectious and noninfectious pathology can have an excessive character, leading to morphological and functional deep disorders of the organs and tissues. In this case, a special importance is given to anti-inflammatory drugs action, used frequently in therapeutics.

Today, anti-inflammatory drugs are an obligatory component in pharmacotherapy of many diseases in stomatological practice. In dental medicine anti-inflammatory drugs are used with general and local actions from different groups: non-steroidal anti-inflammatory and steroids drugs, enzymatic, astrigents, irritants, vitamins (especially C, P and E) drugs, calcium salts, dimexid, heparin ointment and others. In a complex therapy, sometimes, we need to include drugs that have an influence on immune processes or regeneration stimulators. In the ethiotrop treatment of inflammatory processes maxillo-facial region, frequently are used antibacterial drugs (antibiotics, chemotherapy synthetic substances). But they should be given only in infectious inflammation, because in case of catarrhal and allergic inflammation, on the contrary, may worsen the patient's condition, causing disbacteriosis, hypovitaminosis, superinfection, reducing the body's immunobiological reactivity.

**B. The aim of the unit** is to initiate students with potential anti-inflammatory medication.

### **C. Educational purposes:**

a) The student should know: general characterization of anti-inflammatory drugs, origin and chemical structure of them, the principles of classification, pharmaceutical forms and administration ways of the main drugs, the mechanisms of anti-inflammatory, antipyretic and analgesic action, indications and contraindications for administration, adverse effects, symptoms of acute and chronic intoxications with some anti-inflammatory drugs and their assistance.

b) Students must be able to: prescribe anti-inflammatory drugs in different pharmaceutical forms, to indicate in dependence on pathology and patient age.

### **D. Initial level of knowledge required for interdisciplinary integration.**

**Pathophysiology.** Inflammation. Definition. Etiology. Alteration. Metabolic disorders, pathochemical and physicochemical in the inflammation focus. The inflammation mediators . The peculiarities of microcirculation in the inflammation focus. Capillary permeability disorders.

Exudative, its mechanism. Phagocytosis in the inflammatory focus. Proliferative. Consequences of the inflammation.

### **E. Control questions.**

1. Anti-inflammatory drugs. Classification. Characterization of groups.
2. Anti-inflammatory drugs with immediately effect. Classification.
3. Steroids anti-inflammatory drugs. Classification (hydrocortisone, prednisolone, prednisone, dexametason, flucinolone acetonide, flumetason pivalat). The mechanism of antiinflammatory action. Indications and contraindications. Adverse effects.

#### **4. Non-steroidal anti-inflammatory drugs. Classification.**

##### **A. Non-selective cyclooxygenase inhibitors - 1 and 2 (COX-1 + COX-2)**

- a) Salicylic acid derivatives (aspirin, etc.);
- b) Antranilic acid derivatives (mefenamic acid, flufenamic acid etc.);
- c) Indolacetic acid derivatives (indomethacin etc.);
- d) Phenylacetic acid derivatives (diclofenac etc.);
- e) Phenylpropionic acid derivatives (ibuprofen, ketoprofen etc.);
- f) Naphtylpropionic acid derivatives (naproxen etc.);
- g) Pyrazolone derivatives (metamizole, phenylbutazone etc.);
- h) Enolic acids (oxicam) derivatives (piroxicam, lornoxicam etc.);

**B. Selective cyclooxygenase - 2 inhibitors (COX-2):** celecoxib, rofecoxib, nimesulide, meloxicam, etc. The mechanisms of anti-inflammatory, analgesic and antipyretic actions. Indications used in dentistry. Contraindications. Adverse effects.

5. The concept of basic antirheumatoid drugs. Classification (antimalarials chloroquine, hydroxychloroquine, gold salts-crizonal, thiol-penicillamine derivatives). The mechanism of action. Indications. Contraindications. Adverse effects.

### **F. Brief characterization of the main drugs.**

**Vertical:** International name of the drug.

1. **Hydrocortisone**. 2. **Prednisolone**. 3. **Diclofenac**. 4. Indomethacin. 5. **Ibuprofen**. 6. Naproxen. 7. Phenylbutazone. 8. **Acetaminophen**. 9. Fluocinalon. 10. Piroxicam. 11. Nimesulide. 12. **Metamizole**. 13. **Ketorolac**.

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms 3. The way of administration. 4. Dosage (maximum once and for 24 hours, therapeutic). 5. The mechanism of action. 6. Indications and contraindications, inclusive in dentistry. 7. Adverse effects.

### **G. Exercises of prescription.**

**To prescribe** the following drugs in all possible pharmaceutical forms.

1. Hydrocortisone. 2. Prednisolone. 3. Dexametason. 4. Aspirin. 5. Metamizole. 6. Indomethacin. 7. Ibuprofen. 8. Fluocinalon. 9. Diclofenac. 10. Phenylbutazone. 11. Naproxen. 12. Acetaminophen.

**Indicate drugs used in (for):** rheumatoid arthritis, spondylitis, acute gout, degenerative joint diseases, rheumatoid arthritis, myositis, arthritis and arthrosis of the temporo-mandibular joint, osteomyelitis, lichen Rüber plan, exudative erythema multiforme, neuralgia, headache, acute dental pain, pulpitis, periodontite, paradontites, gingivitis, stomatitis.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

## ANTIALLERGIC DRUGS

**A. Actuality.** Allergic manifestations are diverse, frequent and often very serious. Allergic diseases are widespread and according to OMS data, include about 40% of the population of the globe. Rational treatment of allergic diseases is often complex, pharmacotherapy recovered a special place. One of the common symptoms of allergy is affecting the mouth (stomatitis, gingivitis, glossitis, etc.). Patient with these symptoms is addressed first of all dentist that much depends the opportunity of drug assistance in this pathology.

**B. The aim of the unit** is to study the pharmacology of antiallergic drugs, to select the drugs depending on the pathology and the correct prescription of recipes according to the indication.

### **C. Educational purposes:**

a) The student should know: the definition and classification of this groups of drugs, their pharmacokinetic and pharmacodynamic properties, international name of the drug, pharmaceutical forms and way of administration of the main drugs, indications and contraindications for administration, side effects.

b) Students should be able to: prescribe antiallergic drugs in different pharmaceutical forms depending on the pathology and patient age.

### **D. Initial level of knowledge required for interdisciplinary integration.**

**Histology.** The organs with immunological protection. Immune system and cellular interactions in immune responses.

**Physiology.** Immunity. Allergy. The role of lymphocytes, immunoglobulin.

**Biochemistry.** Biochemical peculiarities of blood cells. Structure and function of immunoglobulin.

**Pathphysiology.** Notions about the allergy. Exoallergy. Sensitivity, hyposensitivity. Immediate type allergic reactions. Mechanisms of their development. Immunological phase.

Mediators of allergic reactions. Anaphylaxis. Serum sickness. Delayed type allergic reactions. Bacterial allergy. Autoallergy. Pathophysiology of immunopathological reactions. Immunodeficiency. Types of hyperallergical reactions.

**Microbiology.** Virology and immunology. Immune reactions. Concept of allergen and antibody. Body awareness. Basic symptoms of anaphylactic shock. Mechanisms of anaphylaxis. Local manifestations of anaphylaxis. Notions about transplantological immunity. Allergic diseases. Features and mechanisms of delayed hypersensitivity reactions.

#### **E. Control questions.**

1. Types of allergic reactions and drugs that can trigger such reactions. Immunopharmacology.

2. Medication of allergic immediately type reactions. Classification of the drugs used for this purpose.

3. Antihistamines. Classification. The mechanism of action. Comparative characterization and advantages of first generation H1-antihistamines (diphenhydramine, clemastine, chlorpiramina, promethazine etc.) and the second generation (astemizole, terfenadine, cetirizine, loratadine). Indications. Application in dentistry. Contraindications. Side effects.

4. H1- antihistamine intoxication. Signs and symptoms. Treatment.

5. Inhibitors of degranulation of mast cell (ketotifen, disodium cromoglicate). Classification. The mechanism of action. Indications. Contraindications. Side effects.

6. Pharmacodynamic peculiarities of glucocorticoids,  $\beta$ - adrenomimetics, xanthine, disodium cromoglicate, Ketotifen, M-colinoblocators. Indications, contraindications, side effects.

7. Drugs affecting the general manifestations of allergic reactions such as anaphylactic shock, asthma etc.. Characterization of sympathomimetic bronchodilators, musculotrope and parasympatholytics.

8. Drugs that attenuate cytotoxic reactions and formation of circulating immune complexes. Characterization of glucocorticoids and complement inhibitors (gold salts, aminocaproic acid, heparin, indomethacin, mefenamic acid). Indications. Side effects.

9. Medication in late-phase allergic reactions. Classification of drugs. General characterization.

#### **F. Brief characterization of the main antiallergic drugs.**

**Vertical:** International name of the drug.

**1. Diphenhydramine 2. Chloropyramine.** 3. Quifenadine. 4. Phencarole. 5. Disodium cromoglicate. 6. Ketotifen. **7. Clemastine.** 8. Terfenadine. 9. Cetirizine. **10. Loratadine. 11. Mebhydrolin. 12. Prometazine.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms 3. The way of administration. 4. Dosage (maximum once and for 24 hours, therapeutic). 5. The mechanism of action. 6. Indications and contraindications, inclusive in dentistry. 7. Adverse effects.

**G. Exercises of prescription.**

**To prescribe** the following drugs in all possible pharmaceutical forms:

1. Diphenhydramine. 2. Chloropyramine. 3. Mebhydroline. 4. Quifenadine. 5. Disodium cromoglicate 6. Ketotifen. 7. Clemastine. 8. Terfenadine. 9. Loratadine. 10. Prometazine.

**Indicate drugs used in (for):** polinozis, urticaria, postoperative vomiting, motion sickness, preanesthesia, Parkinson's syndrome, rheumatoid arthritis, bronchial asthma, anaphylactic shock, hemolytic anemia, contact dermatitis, bronchitis asthmiform.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

## **DISINFECTANTS AND ANTISEPTICS**

**A. Actuality.** About 50% of human diseases are caused by different pathogen agents. To combat pathogen agents, that are on a living tissue (skin, mucous membranes, natural cavities, wounds) or in the environment (disinfection of instruments, furniture, operating rooms, etc.) are used medicinal substances, which may hinder their multiplication or cause them perished. Disinfectants and antiseptics are antibacterial chemotherapy the are used widely in medical practice. Some substances are known ever since the ancient Egyptians, who used for embalming and preserving mummies. There can't be an absolute separation between antiseptics and disinfectants. Depending on the concentration of the substance and the time of contact with microorganisms, the same substance may exert antiseptics or disinfectants effects. Antiseptic substances widely used in dentistry for: the treatment of dental caries, root canal therapy after removal of necrotic pulp and removal dentin affected the treatment paradontitis, to inhibit or reduce plaque accumulation, also, for disinfecting mouth before local anesthesia. Applied on the oral mucosa can prevent infections at immunocompromised individuals that will support dental manoeuvre. Topically applied as complementary treatment to antibiotics, can prevent bacterial endocarditis. The drinkable water used daily, helps maintaining dental implants etc.

**B. The aim of the unit** is to know pharmacology of antiseptics and disinfectants, forming their skills on the selection depending on the pathology and location of pathogens, proper prescribing of recipes according to the indication.

**C. Educational purposes:**

a) The student should know: the definition and the classification of antiseptics, name, pharmaceutical forms and ways of administration of the main drugs, mechanism of action, main indications and contraindications, side effects.

b) Students should be able to: prescribe the main antiseptic drugs used in dentistry.

#### **D. Initial level of knowledge required for interdisciplinary integration.**

**Microbiology.** Taxonomy and the classification of microorganisms. Spread of microorganisms in nature. The influence of environmental factors on pathogens agents. Notion about infections. Bacteria, viruses, pathogenic fungi, protozoans and human diseases, caused by them.

#### **E. Control questions.**

1. Antiseptics and disinfectants. Definition. Classification according to the chemical structure. The main mechanisms of action on microorganisms. Factors determining the activity of the drug, the susceptibility of microbial species, concentration of the substance, the organic substrate at the place of action, microbial population size, pharmaceutical form, environmental factors, concomitant action of other antimicrobial agents.

2. Oxidants (hydrogen peroxide ( $H_2O_2$ ), urea peroxide, sodium and calcium perborates, potassium permanganate ( $KMnO_4$ )). The principle of action. Indications. Use in dentistry.

3. Halogenated compounds (chloramine B, sodium hypochlorite, iodine alcoholic solution of 5% and 10%, Lugol's solution, iodoform, iodinol, iodofors). Peculiarities of the action. Indications. Use in dentistry.

4. Alcohols (ethyl alcohol 70%, 90%, 95%, izoprpanol, benzilalcohol, fenilethanol, phenoxyethanol, glycerine, chloroform). Peculiarities of the action and use in dentistry.

5. Aldehydes (formaldehyde, paraformaldehyde and glutaraldehyde, methenamine). Peculiarities of the action and use in dentistry.

6. Acids (boric acid, benzoic, trichloroacetic, lactic acid, salicylic acid, salicylate, fennel, hydrochloric, sulfuric, nitric). The mechanism of action and purpose. Use in dentistry.

7. Alkaline agents (sodium hydroxides, potassium, magnesium, calcium and ammonia solution). Use in dentistry.

8. Phenols (phenol, parachlorphenol, cresol, hexylrezorcinol, thymol, chloroxyletol, vagotil, birch tar, eugenol, hexochlorophenol - hexetidine). Peculiarities of the action and the use in dentistry.

9. Detergents (dodicine, cerigelum etc.). Detergents anionic, cationic and amphoteric. Antimicrobial properties of detergents. Use. Use in dentistry (ricinoleatum sodium, benzalkonium, chlorhexidine, etc.).

10. Biguanide (chlorhexidine, chlorhexidine gluconate - betasept). The mechanism of



action and purpose. Use in dentistry.

11. Heavy metal compounds (compounds with silver, aluminum compounds, zinc compounds, bismuth compounds, mercury compounds). Local action (astringent, irritating and cauterized). Peculiarities action of the substances (silver nitrate, argyrol, protargol, chloride, aluminum acetate, zinc sulphate, zinc chloride, mercuric chloride, borate phenylmercury - phenosept sodium dibromohydroxymercurifluorescein - mercurochrome, cyanide mercury, mercuric oxide yellow) and the use. Use in dentistry.

12. Dyes (acridine, Gentian violet, brilliant green, methylene blue, azoic dyes - hexetidine, azulenes and ambazona (faringosept)). Peculiarities of the action. Use in dentistry.

13 Agents from plant source and animal origin (usninat sodium, novoimanine, tincture of *Calendula*, Japanese acacia, lysozyme, chlorophilipt). Peculiarities of the action. Use in dentistry.

#### **F. Brief characterization of the main drugs.**

**Vertical:** International name of the drug.

1. **Nitrofurantoin** 2. Phenol 3. Methenamine 4. Silver nitrate 5. Zinc sulphate 6. **Chloramine B** 7. **Iodum (*iodine*) spirit solution 5%** 8. **Hydrogen peroxide** 9. **Potassium permanganate** 10. **Ethyl alcohol** 11. Ammonia solution 12. **Brilliant green** 13. **Chlorhexidine** 14. Cerigelum 15. Aethacridine lactate 16. Formaldehyde 17. Chlorophilipt 18. **Hexetidine**.

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms 3. The way of administration. 4. Dosage (maximum once and for 24 hours, therapeutic). 5. The mechanism of action. 6. Indications and contraindications, inclusive in dentistry. 7. Adverse effects.

#### **G. Exercises of prescription.**

**To prescribe** the following drugs in all possible pharmaceutical forms:

1. Nitrofurantoin 2. Potassium permanganate 3. Phenol 4. Silver nitrate 5. Zinc sulphate 6. Chloramine B 7. Hydrogen peroxide 8. Ethyl alcohol 9. Brilliant green 10. Chlorhexidine 11. Aethacridine lactate 12. Iodum (*iodine*) spirit solution 5% 13. Cerigelum

**Indicate the drugs used in (for):** sputum disinfection, disinfection of instruments, disinfection of the water, hand processing, washing wounds, processing operating field, treatment of conjunctivitis, hyperhidrosis, primary processing of the wound, disinfecting the dentogingivale pathological bags, root canals, decayed cavities, fungal stomatitis, chronic periodontitis, stomatitis, gingivitis, xerostomia, stopping the bleeding pulp, also, after granulations curettage, the effect of the erosive-ulcerative oral mucosa and lips, impaired suppurative-inflammatory mouth.

**H. Exercises for self-control of the level of understanding of the material** must be

accomplished in written form.

## **ANTIMICROBIAL CHEMOTHERAPEUTIC AGENTS**

**A. Actuality.** A valuable realization of the twentieth century is to develop antibiotics that are most effective in combating infectious diseases. Worldwide more than 3,500 known antibiotics, but in medical practice is used much less. The most convenient are widely used in infectious disease clinics, therapy, surgery, etc.

Mouth, as a habitat for microorganisms, has four characteristics that distinguish it from other organs such as: teeth, specialized mucosal surfaces, saliva and crevicular fluid. In dentistry antibiotics are used to treat:

1. Acute infections (acute apical paradontitis, acute apical abscess, acute pericoronitis, ulcerative acute gingivitis, lateral periodontal abscess, acute fascial infections) associated with mechanical and surgical treatment;

2. Chronic infections (chronic periodontal disease, periodontal resistant, rapidly progressive parodontitis, oral lues, buccal TB)

3. Prophylactic (to prevent bacterial endocarditis to patients at risk, undergoing dental maneuvers, patients with crania-facial trauma, in major surgery, any dental intervention in immunosuppressed patients or after mandible radiotherapy).

**B. The aim of the unit.** To help the students know the principles of classification of antibiotics, their combined administration, the mechanism and spectrum of action, indications and side effects.

### **C. Educational purposes:**

- a) The student should know: classification, based representatives of different groups of antibiotics, spectrum and mechanism of action, chemical structure, principles of dosage, ways of administration, indications, contraindications, side effects.

- b) Students should be able to: prescribe correct antibiotics in all available pharmaceutical form, substitute with another preparation for its inefficiency or adverse reactions.

### **D. Initial level of knowledge required for interdisciplinary integration.**

**Microbiology.** Notions about chemotherapy. Chemotherapeutic index. Contemporary conceptions about the mechanism of action of chemotherapeutic drugs. Bactericide and bacteriostatic effects. Microorganism's resistance at drugs and appearance mechanism. Overcome the problem of pathogens resistance at antibiotic. Antibiotics as chemotherapeutic preparations. Unit of measurement of activity of the main antibiotics. Basic methods for determining antibiotic sensitivity of pathogens.

### **E. Control questions.**

1. Chemotherapy. Basic principles. Merits of L. Pasteur, I. Mечников, P. Ehrlich in this area. Requirements for antibiotics.
2. History of obtaining and use of antibiotics (research of A. Fleming, A. Chain, Waxman). Principles of classification. Concept on the main and reserve antibiotics.
3. Classification of antibiotics by chemical structure. Brief characterization of each group.
4. Classification of antibiotics by mechanism of action. Brief characterization. Antibiotics with bacteriostatic and bactericidal action.
5. Beta-lactam antibiotics. Classification.
  - a) Penicillins (benzylpenicillin, Phenoxymethylpenicillin, ampicillin, benzathine benzylpenicillin). Classification, the spectrum and mechanism of action. Indications. Side effects.
  - b) Cephalosporins (cefazolin, cefatoxim, cefuroxime, cefepime). Classification. Spectrum and mechanism of action. Indications. Side effects.
  - c) Monobactams (aztreonam), carbapenams and carbapenams (imipenem, meropenem). Spectrum and mechanism of action. Indications. Side effects.
  - d) Penicillins combined with beta-lactamase inhibitors (amoxiclav, Timentin, sulbactam). Spectrum and mechanism of action. Indications. Side effects.
6. Macrolides and azalides (erythromycin, azithromycin). Spectrum and mechanism of action. Indications. Side effects.
7. Lincosamides (lincomycin, clindamycin). Spectrum and mechanism of action. Indications. Side effects.
8. Aminoglycosides (streptomycin, gentamicin, amikacin). Classification. Spectrum and mechanism of action. Indications. Side effects.
9. Tetracyclines (tetracycline, doxycycline). Classification. Spectrum and mechanism of action. Indications. Side effects.
10. Chloramphenicol. Spectrum and mechanism of action. Indications and contraindications. Side effects.
11. Glycopeptides (vancomycin, teicoplanin). Spectrum and mechanism of action. Indications. Side effects.
12. Polypeptides (polymyxin M). Spectrum and mechanism of action. Indications. Side effects.
13. Rifamycins (rifampicin, rifabutin). Spectrum and mechanism of action. Indications. Side effects.

14. Various antibiotics (sodium fusidum, fusafungine, bacitracin, mupirocin, cicloserin, gramicidin).

15. Bacterial resistance to antibiotics and forms. Causes and mechanism of occurrence. Ways to combat.

16. Principles combination antibiotics. Antagonism and synergism. Basic indications for their association.

17. Factors influencing antibiotic activity, interaction with other drugs.

#### **F. Brief characterization of the main antibiotics.**

**Vertical:** International name of the drug.

**1. Benzylpenicillin sodium.** 2. Benzatin benzylpenicillin. **3. Ampicillin.** 4. Carbenicillin. **5. Phenoxymethylpenicillin.** **6. Cephalexin.** **7. Erythromycin.** 8. Lincomycin. 9. Clindamycin. **10. Gentamycin.** 11. Sisomycin. 12. Metacycline. 13. Tetracycline. **14. Cefuroxime.** 15. Cefotaxime. 16. Cefpirome. 17. Aztreonam. 18. Clarithromycin. **19. Doxycycline.** 20. Amikacin. 21. Imipinem. 22. Chloramphenicol. 23. Ristomycin. 24. Polymixin M 25. Rifampicin. 26. Fusidin. 27. Gramicidin S. 28. Vancomycin. **29. Ampiox.** **30. Amoxicillin.**

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms 3. The way of administration. 4. Dosage (maximum once and for 24 hours, therapeutic). 5. The mechanism of action. 6. Indications and contraindications, inclusive in dentistry. 7. Adverse effects.

#### **G. Exercises of general and medical prescription.**

**To prescribe** the following drugs in all possible pharmaceutical forms:

1. Benzylpenicillin sodium. 2. Benzatin benzylpenicillin. 3. Sisomycin. 4. Ampicillin. 5. Cephalexin. 6. Erythromycin. 7. Lincomycin. 8. Gentamycin. 9. Cefotaxime. 10. Tetracycline. 11. Clindamycin. 12. Carbenicillin. 13. Aztreonam. 14. Clarithromycin. 15. Doxycycline. 16. Amikacin. 17. Cefuroxime. 18. Cefpirome. 19. Chloramphenicol. 20. Ristomycin. 21. Rifampicin. 22. Polymixin M. 23. Fusidin. 24. Gramicidin S. 25. Vancomycin.

**Indicate antibiotics used in (for):** prevention of rheumatism, pneumonia, typhus, gas gangrene, anthrax, tetanus, syphilis, meningitis caused by H. influenzae, Pseudomonas infection caused by bacillus, infection caused by B. fragilis, osteomyelitis, staphylococcal infections resistant to benzylpenicillin, the prosthesis infections, dysentery, acute ulceronecrosant gingivitis (Vincent), abscess peridontal, peridontitis, soft tissue infections (abscesses, cellulitis, Pericoronitis postsurgery), polymicrobial infections with penicillin-resistant germs, prophylaxis of endocarditis infectious, staphylococcal infections penicillin-resistant, infections caused by Bacteroides fragilis, salmonellosis, pseudomembranous colitis, abdominal typhus, bacterial meningitis, urinary tract infections.

**H. Exercises for self-control of the level of understanding of the material** must be

accomplished in written form.

## **ANTIFUNGAL DRUGS**

**A. Actuality.** Antifungal drugs that are fungicidal or fungistatic action, allowing their use for prevention and treatment of mycoses. Conventional pathogenic and pathogens fungi cause local and systemic mycosis, which is difficult to treat. Election of antifungal substances depends on the spectrum of action, the localization of process - superficial and systemic mycoses and type of fungus - levurs, molds, dermatomycetes, actinomycetes, etc. Antifungals can be used in systemic administration, systemic mycoses or in the local application, in localized mycoses, including the mouth. May enter into the composition of drinkable water used in dentistry to prevent oral candidosis or as an alternative to conventional antifungal therapy. In dentistry are important drugs that inhibit growth and multiplication of Candida fungus which often leads to candidosis in the weak body or disbacteriosis caused by inhibitory gut bacterial drugs. Candidomycosis most commonly affects mucous membranes (mouth, gastrointestinal tract, vagina) and skin, rarely affect the viscera.

**B. The aim of the unit** is to study the pharmacological properties of antifungal, forming their skills on the selection depending on the form and location of fungi.

### **C. Educational purposes:**

a) The student should know: classification, spectrum and mechanism of action, indications and side effects of antifungal drugs.

b) Students should be able to: prescribe the main antifungal preparations, indicate these drugs in different mycoses.

### **D. Initial level of knowledge required for interdisciplinary integration.**

**Microbiology.** Pathogenic fungi - dermatomycosis agents, systemic mycoses, candidomycosis.

### **E. Control questions.**

1. Antifungals. Principles of classification.
2. Antifungal antibiotics (nystatin, amphotericin). Spectrum and mechanism of action. Indications. Side effects. Pharmacokinetics.
3. Imidazoles derivatives (ketokonazole, clotrimazole). Spectrum and mechanism of action. Indications. Side effects.
4. Triazoles derivative (fluconazole, itraconazole). Spectrum and mechanism of action. Indications. Side effects.
5. Undecylenic acid derivatives (undecyn, zincudan). Spectrum and mechanism of action. Indications. Side effects.

6. N-methylnaphthalene derivatives (terbinafine). Indications. Side effects.
7. Bisquaternare ammonium salts (decvalinil). Indications. Side effects.
8. Antifungal various groups (salts of iodine, fungifen etc.). Characterization of drugs.
9. Antifungal use in dentistry.

#### **F. Brief characterization of the main antibiotics.**

**Vertical:** International name of the drug.

1. Amphotericin B. 2. Nystatin. 3. Clotrimazole. 4. Mycoheptinum. 5. Nitrofunginum.
6. Miconazole 7. Terbinafine hydrochloride. 8. Decvalin chloridum. 9. Fluconazole. 10. Ketoconazole.

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms 3. The way of administration. 4. Dosage (maximum once and for 24 hours, therapeutic). 5. The mechanism of action. 6. Indications and contraindications, inclusive in dentistry. 7. Adverse effects.

#### **G. Exercises of prescription.**

**To prescribe** the following drugs in all possible pharmaceutical forms:

1. **Amphotericin B.** 2. **Nystatin.** 3. Clotrimazole. 4. Mycoheptinum. 5. Nitrofunginum. 6. Miconazole. 7. Terbinafine hydrochloride. 8. **Decvalin.** 9. **Fluconazole.** 10. **Ketoconazole.**

**Indicate antibiotics used in (for):** systemic mycosis, candidosis, dermatomycosis, orofaryngeal candidosis, angular cheilitis and chronic candidosis cutaneous-mucous to immunocompromised persons.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

### **ANTIVIRAL DRUGS**

**A. Actuality.** Viral infections represent a significant section of general pathology: respiratory infections, genital, gastrointestinal, acquired immunodeficiency syndrome (AIDS). The dental field is frequently report the following types of viral infections: gingivostomatitis with herpes simplex, recurrent herpes infections with herpes labialis, oral mucosal lesions caused by virus varicellzoster, warts caused by human papilloma virus (HPV), hairy leucoplakia and oral lymphoma, induced Epstein-Barr virus in immunocompromised patients, oral ulcers caused by cytomegalovirus or atypical lesions induced by molluscum contagiosum infection.

**B. The aim of the unit** is to study the pharmacology of antiviral drugs, required for prophylaxis and treatment of diseases caused by different pathogens.

**C. Educational purposes:**

a) The student should know: classification, spectrum and mechanism of action, indications and side effects.

b) Students should be able to: prescribe antiviral drugs required, indicate the drugs depending on the pathogens.

**D. Initial level of knowledge required for interdisciplinary integration.**

**Microbiology.** Viruses. Classification and general characterization.

**E. Control questions.**

1. Antivirals. Principles of classification.
2. Spectrum and mechanism of action of antiviral drugs.
3. Pharmacological specificities of synthetic antivirals.
4. Active antivirals against influenza (amantadine, remantadine etc.).
5. Active antivirals against herpes (acyclovir, vidarabine, idoxuridine etc.).
6. Active antivirals against human immunodeficiency virus (zidovudine, dideozoxycytidine, dideoxiinosine etc.).
7. Interferons. Pharmacological properties and therapeutic use. Interferon indicators (interferonogens).
8. The use of antivirals in dentistry.

**F. Brief characterization of the main antibiotics.**

**Vertical:** International name of the drug.

1. Remantadine.
2. Oxoline.
3. Acyclovir.
4. Vidarabine.
5. Zidovudine.
6. Amantadine.
7. Interferon.
8. Tebrofen.
9. Bonafton.

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms 3. The way of administration. 4. Dosage (maximum once and for 24 hours, therapeutic). 5. The mechanism of action. 6. Indications and contraindications, inclusive in dentistry. 7. Adverse effects.

**G. Exercises of prescription.**

**To prescribe** the following drugs in all possible pharmaceutical forms:

1. **Remantadine.**
2. **Oxoline.**
3. **Acyclovir.**
4. Vidarabine.
5. Zidovudine.
6. Amantadine.
7. **Interferon.**
8. Tebrofen.
9. Bonafton.

**Indicate antibiotics used in (for):** prophylaxis of influenza, keratitis, variola, viral skin disease, herpes encephalitis, viral stomatitis, cheilitis herpes, herpetic stomatitis, necrotizing ulcerative gingivitis.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

**SUMMARIZING THE THEME: „CHEMOTERAPEUTIC AGENTS”**

1. Disinfectants and antiseptics. Definition. Classification by chemical structure.
2. Oxidants, urea peroxide, sodium perborates calcium, potassium permanganate. Principles of action. Indications. Use in dentistry.
3. Halogenated compounds. Peculiarities of the action. Indications. Use in dentistry.
4. Alcohols.
5. Aldehydes. Peculiarities of the action and use in dentistry.
6. Acids. The mechanism of action and the use. Use in dentistry.
7. Alkaline agents. Use in dentistry.
8. Phenols. Peculiarities of action and the use. Use in dentistry.
9. Detergents. Detergents anionic, cationic, amphoteric. Antimicrobial properties of detergents. Use. Use in dentistry.
10. Biguanide. The mechanism of action and purpose. Use in dentistry.
11. Heavy metal compounds. Local Action (astringent, irritating, cauterized). Peculiarities of preparation and use of action. Use in dentistry.
12. Colors. Peculiarities of the action. Use in dentistry.
13. Preparations of plant and animal origin. Peculiarities of the action. Use in dentistry.
14. Chemotherapy. Basic principles. Requirements for antibiotics.
15. Principles of classification of antibiotics. Concept on the main and reserve antibiotics.
16. Classification of antibiotics by chemical structure. Short feature of each group.
17. Classification by mechanism of action of antibiotics. Short feature. Antibiotics with bacteriostatic and bactericidal action.
18. Beta-lactam antibiotics. Classification. Penicillin group. Classification, spectrum and mechanism of action. Semisynthetic penicillins (methicillin, oxacillin, ampicillin, carbenicilline, ampiclox, azlocilline, mezlocilline). Basic principle. Indications. Complications. Use in dentistry.
19. Macrolides. Spectrum and mechanism of action. Indications. Side effects. Use in dentistry.
20. Lincosamides. Spectrum and mechanism of action. Indications. Side effects. Use in dentistry.
21. Cephalosporines. Spectrum and mechanism of action. Indications. Side effects. Use in dentistry.
22. Aminoglycosides. Classification. Spectrum and mechanism of action. Indications. Complications.
23. Tetracyclines. Classification. Spectrum and mechanism of action. Indications. Complications. Use in dentistry.
24. Fluoroquinolones. Spectrum and mechanism of action. Indications.



25. Antifungal. Classification. Antifungal use in dentistry.

26. Antivirals. Classification. Use in dentistry.

### **G. Exercises of prescription.**

**To prescribe** the following drugs in all possible pharmaceutical forms:

Benzylpenicillin sodium, benzatinbenzylpenicillin, ampicillin, Phenoxymethylpenicillin, carbenicillieă, cephalixin, cefazolin, cefotaxime, erythromycin, lincomycin, gentamycin, tetracycline, doxycycline, clindamycin, sulfacetamide, sulfalene, cloxacilline, dicloxacilline, amoxicillin, co-trimoxazole, nitrofuraz, metronidazole, sulfamonometoxine, sulfadimethoxine, sulfaetidol, nystatin, vancomycin, chlorhexidine, chloramine B, ethacridine lactate, potassium permanganate, iodine alcoholic solution of 5%, formaldehyde solution, alcohol, hydrogen peroxide, clotrimazole, ketoconazole, terbinafine, flucytosine, acyclovir, vidarabine, amantadine, zidovudine, interferon.

**Indicate antibiotics used in (for):** gas gangrene, staphylococcal infections, prevention of rheumatism, diseases caused by Pseudomonas, Proteus caused diseases, diseases caused by E. Coli urinary tract infections, conjunctivitis, syphilis, trichomoniasis, candidomycosis, dermatomycosis, systemic mycosis, viral infection, disinfection of instruments, disinfection bags dental gum, root canals, carious cavities, fungal stomatitis, periodontal chronic stomatitis, gingivitis, dry mouth, stopping bleeding of pulp, the effect of the erosive ulcerative oral mucosa and lips, impaired purulento-inflammatory mouth, necrotizing ulcerative gingivitis acute (Vincent), abscess parodontal, parodontitis, soft tissue infections (abscesses, cellulitis, pericoronarite possurgery), polymicrobial infections with penicillin-resistant germs, infectious endocarditis prophylaxis, staphylococcal infections penicillino-resistant oro-faringean candidosis, chronic candidosis and angular cheilitis mucocutaneous in immunocompromised individuals, prophylaxis of influenza, viral stomatitis, cheilitis herpes, herpetic stomatitis.

## **MEDICINAL THERAPY COMPLICATIONS**

**A. Actuality.** Widespread use of drugs in recent decades has led to "drug illness", which is based on side effects of pharmacotherapy. Complications arising from the treatment requires an appropriate attitude in taking drugs. Using acute especially chronic of the drugs of different chemical and pharmacological classes is often favorable or unfavorable consequences on the mouth and therefore the dental practice.

**B. The purpose of study** is to familiarize students with basic complications, arising from drug treatment and prophylaxis.

**C. Educational purposes:**

- a) Students should be aware of classification and general characteristics of complications.

Pharmacotherapy.

- b) Students should be able to: outline and group the drugs according to the possible complications.

### **E. Control questions.**

1. Classification of the complications of pharmacotherapy.
2. Complications of drug therapy, caused by absolute and relative drug overdose. Interaction effects observed following the absorption, distribution, metabolism and elimination. Principles of prophylaxis and therapy of these complications.
3. Complications of drug therapy related of toxicity and side effects of drugs. Neurotoxic, hepatotoxic, haematotoxic, ulcerative, teratogenic action etc.. Drug psychosis. Prophylaxis.
4. Immediate type allergic reactions (anaphylaxis, urticaria, angioedema, asthma, rhinitis, allergic conjunctivitis, etc.).
5. Cytotoxic allergic reactions (granulocytopenia, hemolytic anemia).
6. Allergic reactions involving immune complexes (serum sickness, nodular periarteritis etc.).
7. Delayed-type allergic reactions.
8. Complications drug therapy subject to genetic factors.
9. Pharmacotherapy complications arising as a consequence of the suspension of treatment "Rebound-syndrome" (after cure with beta-adrenoblocantors, clonidine, cimetidine, indirect anticoagulants, tranquilizers), the phenomenon of glucocorticoid missing after cure. Prophylaxis and treatment.
11. Psychological and physical drug dependence as a result of prolonged use of opioid analgesics, tranquilizers, excitants CNS alcohol.
12. Idiosyncrasy. Tolerance.
13. The main types of side effects in the mouth.

## **FIRST AID MEASURES IN CASE OF ACUTE INTOXICATION WITH DRUGS**

**A. Actuality.** Correct dosage of drugs has a particularly important, because mistakes prescribed dose may lead to intoxications with drugs. Their control requires knowledge of first aid measures for all medical specialties.

**B. The purpose of study** is to familiarize the student with first aid measures in acute intoxications with drugs and other xenobiotics.

### **C. Educational purposes:**

a) Students should be aware of the spread of acute intoxications with drugs, their causes, sequence of first aid measures depending on the dominant symptoms.

b) Students should be able to: prescribe medicinal substances required in intoxications with drugs and to indicate treatment in dependence of intoxication symptoms.

#### **D. Control questions.**

1. Dialectical notion about medicine and toxic. Dependence of biological action, dose, chemical structure, physico-chemical features of the product and body reactivity.

2. Spread of acute intoxications with medicines, their causes, structure and consequences.

3. The main measures in drug and toxic poisoning. Methods to stop the penetration of toxic in the body (the digestive tract, skin and mucosal surface, the lungs). Mechanical removal methods, chemical inactivation, physical and chemical neutralization of toxic from the digestive tract. Gastric lavage. Use emetics for removing toxic from stomach.

4. Methods of neutralizing the toxic absorbed in the body and correcting ridden functions (antidote therapy, functional antagonism), stimulation of physiological functions (blood transfusion and its substitutes). Thiols antidotes, indications, mechanism of action.

5. Methemoglobines (sodium nitrite, nitrates, cyanides, etc.). Demethemoglobinese (methylene blue). Principles used.

6. Complexones. Using metal intoxications, cardiac glycosides, etc.

7. The importance of functional antagonists in the treatment of intoxications by inhibiting and stimulating CNS seizure cholinomimetic substances.

8. Recovery (resuscitation) and maintenance (intensive care) physiological functions of body in intoxications. Remedies normalized acid-base balance and their importance.

9. Methods of enhancing elimination of toxins in the body (haemodilution, forced diuresis, urine alkalinization and acidification, hemotransfusion, hemodialysis, peritoneal dialysis, hemosorbition).

10. Measures used in anaphylactic shock, coma, hypo-and hyperglycemia, pulmonary and cerebral edema, bronchospasm.

11. Preparations used in psychomotor agitation and convulsions.

#### **E. Brief characterization of the main antibiotics.**

**Vertical:** International name of the drug.

1. Dimercaptol. 2. Furosemide. 3. Epinephrine hydrochloride 4. Prednisolone. 5. Strophantines. 6. Clonidine. 7. Insulin. 8. Glucose. 9. Trimipridine. 10. Diazepam. 11. Magnesium sulfate. 12. Sulfat sodium. 13. Norepinephrine. 14. Naloxone. 15. Flumazenil.

**Horizontal.** 1. Synonyms. 2. Pharmaceutical forms 3. The way of administration. 4. Dosage (maximum once and for 24 hours, therapeutic). 5. The mechanism of action. 6. Indications and contraindications, inclusive in dentistry. 7. Adverse effects.

**F. Exercises of general and medical prescription.**

**To prescribe** the following drugs in all possible pharmaceutical forms:

1. Dimercaptol. 2. Furosemide. 3. Epinephrine hydrochloride 4. Prednisolone. 5. Strophantines. 6. Clonidine. 7. Insulin. 8. Glucose. 9. Trimipridine. 10. Diazepam. 11. Magnesium sulfate. 12. Sulfat sodium. 13. Norepinephrine. 14. Naloxone. 15. Flumazenil.

**Indicate antibiotics used in (for):** acid poisoning, abolition of bronchospasm caused by inhibiting substances, abolition of seizures, intoxication with opioid analgesics, stimulation the work of the heart, lung and brain edema, rapid removal of toxins from the body through the kidneys, psychomotor excitation, acute hypotension, hypertensive crisis, hypoglycemic coma, hyperglycemic coma, intoxication with cardiac glycosides.

**H. Exercises for self-control of the level of understanding of the material** must be accomplished in written form.

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