Operating instructions for the students of dental faculty to the lesson on the theme: **Antiseptics and disinfectants** (4 hrs)

**Actuality of the theme:** Disinfecting substances are basic remedies, which prevent the spread of infectious diseases. Antiseptics are used for the prevention and the treatment of the skin and the mucous membranes diseases. They are widely used in the surgery, gynecology, dermatology, otolaryngology and dentistry. The knowledge of the side effects of these drugs and rules of the use allows avoiding poisonings.

**The educational goals:**

a) to have an idea about pharmacology of the antiseptic and disinfecting drugs ($\alpha$-I);

b) to know the forms of the antimicrobial action; the mechanisms of the action, indications to the application of antiseptics and disinfectants, poisoning signs and safety procedures in the work with antiseptics and disinfecting substances ($\alpha$-II);

c) to be able to prescribe drugs; to carry out experiments and to explain the practical value of the obtained results ($\alpha$-III).

**Educational purposes:** to inoculate briefly the ethical standards to the future doctors. Significant attention should be given to the responsibility of the future specialists as to the guarantee of the conditions for the maximum effectiveness and safety of the application of antiseptics and disinfectants.

**Chapter 1. Materials for out-of-class independent work of students.**

**1.1. Interdisciplinary integration**

<table>
<thead>
<tr>
<th>Subjects</th>
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<th>To be able</th>
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</thead>
<tbody>
<tr>
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<td>Latin</td>
<td>Latin terminology</td>
<td>To prescribe drugs</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Chemical structures of substances, their chemical Properties</td>
<td>To give the chemical structures of non-organic and organic antiseptics, the chemical properties of acids, salts of metals, aldehydes, and phenols</td>
</tr>
<tr>
<td>Microbiology</td>
<td>Special features of the vital activity of the microorganisms</td>
<td>To explain the forms of the antimicrobial action</td>
</tr>
<tr>
<td>* The following clinical:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery, LOR- diseases, urology, obstetrics and gynecology</td>
<td>Pharmacological properties of antiseptics and disinfectants</td>
<td>To assign antiseptics with the treatment of surgical and LOR-diseases, the diseases of eyes, urological and gynecological diseases; to rationally use the disinfecting drugs</td>
</tr>
<tr>
<td>Dermatology</td>
<td>Pharmacological properties of antiseptics</td>
<td>To assign antiseptics with the treatment of the diseases of skin and mucous membranes</td>
</tr>
<tr>
<td>Dentistry</td>
<td>Pharmacological properties of antiseptics</td>
<td>To assign antiseptics with the treatment of the diseases of</td>
</tr>
</tbody>
</table>
1.2. The graph of the logical structure of the theme (is added).


1.4. Questions, which are subject to study (tentative card of the work of students):
1. Notion about the disinfecting, antiseptic and chemotherapeutic actions.
2. Forms of the antimicrobial action.
3. Classification of disinfecting and antiseptic drugs.
4. Pharmacology of antiseptics of aromatic group (phenol, thymol, resorcinol).
5. Pharmacology of antiseptics from the group of nitrofurans (nitrofurazone, furazolidone).
6. Pharmacology of antiseptics from the group of aldehydes (formaldehyde, ethyl alcohol, isopropyl alcohol).
7. Pharmacology of antiseptics from the group of dyes (brilliant green, etacridine lactate, methylene blue).
8. Pharmacology of antiseptics from the group of detergents (etonium, decametoxine, chlorhexidine bigluconate, miramistin).
11. Pharmacology of acids, alkalis (salicylic acid, boric acid, citric acid, ammonia solution, sodium bicarbonate, sodium tetraborate).
12. Pharmacology of salts of heavy metals (mercury dichloride, yellow mercury oxide, mat lead simple and complex, silver nitrate, bismuth sub-nitrate , copper sulfate, zinc oxide ).
13. Antiseptics from medicinal plants (chlorophyllipt, novoimanin, eucalimin, parodontocid).
14 Combined drugs (sterilium, cutasept)
15. Toxic effects of halogens, metallic salts, phenol. Emergence help in poisonings.
16. Preparations and doses

1.5. Preparations which are subject to study (task for prescription):
1. Hydrogenii peroxydi - 3% sol.
2. Kalii permanganas - 0,1%; 0,5%; 5% sol.
3. lodum - 5% alcohol sol.
4. loddicerinum- bottle on 25 ml
5. Furacilinum – 0,02% sol.; tab. 0,1 for external use (ad usum externum)
6. Viride nitens -1% alcohol sol.
7. Aethacridini lactas - 0,1 % sol.
8. Chlorhexidini bigluconas - bottle on 500 ml of 20% solution (to dissolve in ethyl alcohol in correlation 1:40).
9. Spiritus aethylicus - 40%, 70%, 90%
10. Aethonium - 0,5% sol.
11. Decametoxinum – tab. 0.1 for the preparation of solution, 0.02% sol.

1.6. Materials for self-control
A. Questions for self-control:
1. What drugs are used for the disinfection of surgical tools?
2. In what concentration is ethyl alcohol used for the disinfection of tools, for cleaning the hands of the surgeon, for compresses?
3. What antiseptics are used for the primary treatment of wounds?
4. What drug should be used for processing of burns?
5. What is the mechanism of the antiseptic action of hydrogen peroxide?
6. What drugs do not lose their antimicrobial activity at the contact with the organic substances?
7. Why is the solution of chloramine B not used for the disinfection of metallic tools?
8. What preparation is used for the washing of the stomach in morphine poisoning?
9. What aid is provided during the poisoning by salts of heavy metals?
10. What antiseptics belong to dyes?

B. Tests for self-control

The 1st level
1. To point the antiseptic from the group of the oxidizers:
2. For processing of surgeon’s hands all drugs are used except:
3. To determine the basic mechanism of the antiseptic action of salts of heavy metals:
   1. Oxidation of the organic components of the protoplasm of microorganisms.
   2. Blockade of the SH-groups enzyme systems of microorganisms.
   3. Dehydration of the proteins of the protoplasm of microorganisms.
   4. Formation of steady holes in the membrane of microorganisms.

The 2nd level
4. To select the effects (1,2,3...) for drugs (A, B, C...).
   Effects:                      Drugs:
   1. Foaming                A. Hydrogen peroxide
   2. Antiseptic              B. Phenol
   3. Disinfecting           C. Formaldehyde
   4. Mummifying             D. Silver nitrate
   5. Cauterizing
   6. Deodorizing

5. To compile a table, where to indicate group belonging (1,2,3) of drugs (a, b, c) and the means of aid during the poisoning by them (A, B, C)

<table>
<thead>
<tr>
<th>Drugs</th>
<th>The group of antiseptics</th>
<th>The means of emergence help</th>
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<tbody>
<tr>
<td>a.) silver nitrate</td>
<td>1) aromatic series</td>
<td>A) unithiol</td>
</tr>
<tr>
<td>b.) mercury dichloride</td>
<td>2) aliphatic series</td>
<td>B) alcohol, vaseline oil</td>
</tr>
<tr>
<td>c.) iodine alcohol solution</td>
<td>3) halogens</td>
<td>C) sodium chloride</td>
</tr>
<tr>
<td>d.) formaldehyde</td>
<td>4) heavy metals</td>
<td>D) starch</td>
</tr>
<tr>
<td>e.) phenol</td>
<td></td>
<td>E) solution of ammonia</td>
</tr>
</tbody>
</table>

6. To determine the indications for the usage (1, 2, 3) of drugs (A, B, C)

<table>
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<tbody>
<tr>
<td>1) conjunctivitis, blepharitis</td>
<td>A.) Silver nitrate</td>
</tr>
<tr>
<td>2) cleaning the hands of the surgeon</td>
<td>B.) Peroxide of hydrogen</td>
</tr>
<tr>
<td>3) cleaning the metallic tools</td>
<td>C.) nitrofurazone</td>
</tr>
<tr>
<td>4) Washing wounds</td>
<td>D.) alcohol solution of iodine</td>
</tr>
<tr>
<td>5) Inflammation of the external auditory pathway</td>
<td>E.) Potassium permanganate</td>
</tr>
<tr>
<td>6) Purulent wounds</td>
<td>F.) Chlorhexidine</td>
</tr>
<tr>
<td>7) Pharyngitis</td>
<td></td>
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</table>

The 3rd level
7. A patient is delivered to the clinic in grave condition: severe abdominal pain, forward of the gullet, vomiting, rare defecations with the admixtures of blood. The copper-colored shade of the mucous membrane of the mouth cavity and throat is observed. The lymph nodes are increased, there
is metallic aftertaste in the mouth, bleeding of the gums. On the 2nd–3rd days there appeared the symptoms of acute kidney deficiency and the defeat of the central nervous system. Hypochromic anemia is rapidly developing. What is the cause of the poisoning? What must be first aid?

8. After a random internal administration of the liquid the patient had pains in the epigastric area. The mucous membrane of the mouth is of white color. Vomiting is observed (emetic masses of white color, soon they grow dark), diarrhea, temporary faint, spasm, sharp strengthening of the secretion of bronchial glands, suffocation. Later, a shock state developed with a sharp decrease in the arterial pressure, disorders of respiration, anuria. What is the cause of the poisoning? First aid during this poisoning.

Answers
I. № 1.- 2; №2.-2; №3.-2. Ⅱ. №4.-A. 1,2,6; B.3; C.2,4; D.2,4,5. №5.-a-4 C; b-4 A; c-3 C; d-2C. №6.-A. 1, B. 4Д; C .4.5.7; EX2: F. 2,3,6; E. 4,6,7. III. №7. Poisoning by the compounds of mercury. Antidote - unithiol. №8. Poisoning by the compounds of silver. Aid – washing of the stomach with 2% solution of sodium chloride.

Chapter 2. Materials for independent class work of students

Materials and methodical maintenance of the theme: drugs, tables, tasks on pharmacotherapy, situation tasks, aqueous and oil solutions of phenol, the solution of protein, potassium of permanganate, water, 5% alcohol solution of iodine, 30% solution of sodium thiosulfate, 5% solution of unithiol, solutions of salts of heavy metals, test tubes.

Instruction to the experimental work:

Experiment 1. The action of phenol on the protein
Two test tubes are filled with solution of protein. Into the 1st tube 5 drops of the 2% aqueous solution of phenol is added, into the 2nd – 5 drops of the 2% oil solution of phenol. Conclusions are done.

Experiment 2. Demonstration of the solutions of potassium permanganate (5%, 1%, 0.01%).
The solutions of the corresponding concentration are prepared, their color is examined and the practical application of the medicines in different concentrations is explained.

Experiments 3. Inactivation of iodine by sodium thiosulfate.
The skin of a volunteering student is lubricated with the 5% alcohol iodine solution. The nature of painting and subjective sensations are noted. Then, the place of iodine application is processed with a solution of sodium thiosulfate. Conclusions are made.

Experiment 4. Interaction of salts of heavy metals with SH-groups of unithiol.
In test tubes, which contain 1 ml of the 5% solution of unithiol, 1 ml of the solutions of salts of heavy metals (cobalt, zinc, lead, mercury) is added. Changes in the color of solutions or appearance of sediment are controlled and the conclusions about the role of SH-groups in the mechanism of the action of salts of heavy metals are made

Practical skills on the theme:
1. To be able to prescribe for the drugs on the theme of the lesson.
2. To carry out experiments.

During the lesson the student must:
1. Give answers to questions according to the theme of the lesson.
2. Prescribe drugs on the theme of the lesson.
3. Carry out the experiments and analyze their results
5. Carry out in writing the intermediate control (pharmacotherapy, tests, cases).
OPERATING INSTRUCTIONS
for students of dental faculty to the lesson on the theme:
**Synthetic antimicrobial drugs with different chemical structure. Sulfonamides. Antifungal drugs**

**Actuality of the theme:** Sulfonamides and trimethoprim belong to folate antagonists. They are synthetic antimicrobial drugs of wide spectrum of action. Sulfonamides have many side-effects and now are used rarely except combined preparation “Co-trimoxazole”. Modern chemotherapeutical drugs from fluorquinolones series are more potent, have less side effects and replace sulfonamides in treatment of many infections. Clinical use of antibiotics and synthetic drugs with antifungal action have made it possible to treat successfully fungal infections of skin, oral mucosa as well as deep and systemic mycosis.

**The educational goals:**
a) to have an idea about structure and functions of microbial cell (α-1);
b) to know the mechanisms of the action, indications to the application and side-effects of sulfonamides, synthetic antimicrobial drugs with different chemical structure and antifungal drugs (α-II);
c) to be able to prescribe drugs (α-III).

**Educational purposes:** to inoculate ethics norms to the future specialists; to be instrumental in forming of responsible attitude toward conducting of therapy by chemotherapeutical drugs, underline their role in treatment

**Chapter 1. Materials for out-of-class independent work of students.**

*1.1. Interdisciplinary integration*

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<td>Structure and chemical properties of substances</td>
<td>To classify drugs on their chemical structure</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>Features of vital functions and structure of bacteria and pathogenic fungi, ways of spread of infections</td>
<td>To name the microbiological spectrum of action of drugs</td>
</tr>
<tr>
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<td>Development of infectious process</td>
<td>To name the terms of rational application of drugs</td>
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<tr>
<td><em>Following clinical:</em></td>
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</tr>
<tr>
<td>Dentistry, Surgery, gynecology</td>
<td>Pharmacology of sulfonamides and chemotherapeutical preparations with different chemical structure</td>
<td>To apply the drugs from listed groups for treatment of dental, surgical and gynecological diseases</td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>Pharmacokinetics, mechanism of action, spectrum, indications, side-effects and contraindications of sulfonamides, chemotherapeutical preparations with different chemical structure and antifungal drugs</td>
<td>To use the drugs from listed groups to treat infectious diseases, to use antifungal drugs to prevent fungal complications of the therapy by wide spectrum antibiotics.</td>
</tr>
<tr>
<td>Dermatology</td>
<td>Pharmacology of antifungal drugs</td>
<td>To use antifungal drugs to treat</td>
</tr>
</tbody>
</table>
1.2. The graph of the logical structure of the theme (is added).


1.4. Questions which are subject of study (tentative card of the work of students).
1. Principles of chemotherapy.
2. Sulfa drugs and their classification on pharmacokinetics and duration of action.
3. Pharmacology of sulfonamides, their pharmacokinetics, spectrum of action and indications.
   Schemes of treatment by sulfa drugs.
4. Side-effects of sulfa drugs and their prevention.
5. Comparative description of sulfonamides: Aethazolum, Sulfacylum- natrium, Sulfadimethoxine,
   Sulfamethoxyprydrizidine (Sulfapyridasiniun), Sulfamethoxypyrazine (Sulfalenum), Phthalyl
   sulfathiazole (Phthalazolum).
6. Pharmacology of Co-T trimoxazole (Bactrium). Combined sulfa drugs containing salicylic acid
   (Salazopiridazine). 
7. Classification of antimicrobial drugs with different chemical structure.
9. Pharmacology of quinolones (Nitroxoline (5-NOK), Nalidixic acid) and fluorquinolones
   (Ofloxacinc, Ciprofloxacin).
10. Classification of antifungal drugs.
11. Pharmacological characteristics of Nystatin, Amphotericin B, Grizeofulvin, Decaminum,
   Terbinafine, and imidazole derivatives (Clotrimazole, Ketoconazole, Itraconazole).
12. Usage of antifungal drugs for treatment and prophylaxis of fungal diseases.
13. Side-effects of antifungal drugs.
14. Preparations and doses.

1.5. Preparations which are subject of study (tasks on prescribing):
   1. Aethazolum – tab. 0,5
   2. Sulfacylum – natrium – 30% sol. (eye drops)
   3. Sulfadimethoximum – tab. 0,5
   4. Sulfalenum – tab. 0,2
   6. Furazolidone – tab. 0,05
   7. Nitrozinulum – tab. 0,05
   8. Ciprofloxacinum – tab. 0,5; amp. 10 ml of 1% sol.
   9. Amphotericinum B – flac. 50 000 IU
   10. Itraconazole – caps. 0,1.
   11. Nystatinum – tab.250000 IU; ointment 15,0 (1,0 – 100000 IU), supp.500000 IU

1.6. Materials for self-control

A. Questions for self-control:
1. What are the principles of the therapy by chemotherapeutical drugs?
2. What is the mechanism of action of sulfonamides?
3. What spectrum of action have sulfonamides?
4. How do they use sulfa drugs in a clinic?
5. Why do sulfonamides can cause crystalluria?
6. Why does Co-Ttrimoxazole has bactericidal action?
7. What preparations with different chemical structure are suitable in treatment of urinary pathways infections?
8. Which group of chemotherapeutical agents inhibits DNA gyrase?
9. What do you know about antifungal drugs from the group of imidazole derivatives?
10. Which antifungal drugs are used for prevention of fungal infections?

B. Tests for self-control

The 1st level

№ 1. The following are the bases for sulfamethoxazole and trimetoprim combination, except
A. Both produce a sequential block in tetrahydrofolate (THF) synthesis. B. Both are wide spectrum antibiotics. C. It widens antimicrobial spectrum.D. Combination is bactericidal.
E. Both drugs have nearly similar plasma t½.

№ 2. The drugs inhibiting DNA gyrase belong to group of

The 2nd level

№ 3. Put together the indexes of drugs (1, 2...) and their indications (A, B, C...):

№ 4. Put together the indexes of drugs (1, 2...) and their side-effects (A, B, C...):

The 3rd level

№ 5. A doctor prescribed a sulfonamide to a patient with pneumonia. What mechanism of sulfonamide action provides the therapeutic effect?
A. Competitive antagonism with para-amino-benzoic acid.
B. Inhibition of the synthesis of microorganisms membrane.
C. Increasing of the permeability of microorganisms membranes.
D. Inhibition of the synthesis of microorganisms proteins.
E. Blockade of the sulfhydric groups of enzymes

Answers: № 1 – B; № 2 – B; № 3 – 1 AH; 2 A, 3 AFH, 4 BCDE, 5 CD; № 4 – 1 BE, 2 A, 3 C, 4 F, 5 D; № 5 – A.

Chapter 2 Materials for independent class-work of students
Material and methodical maintenance of the theme:
Tables, tests and situation tasks, collection of preparations.

Practical skills on the theme:
1. To prescribe the preparations

During the lesson the student must:
1. Answer questions on the theme of the lesson
2. In writing execute control tasks
OPERATING INSTRUCTION
for students of stomatological faculty to laboratory lesson on the theme
“Antibiotics-inhibitors of cell wall synthesis” (2 hr)

Actuality of the theme: Penicillins was the first group of antibiotics made it possible to treat many infections, such as bacterial meningitis, pneumonia, gonorrhea, syphilis etc. But natural penicillins were destroyed by penicillinase and had narrow spectrum of action. Modern semi-synthetic penicillins and cephalosporins are wide spectrum antibiotics, resistant to beta-lactamases, so they may be used in sepsis, peritonitis and other severe infections.

The educational goals:

d) to have an idea about structure and functions of bacterial cell (α-1);
e) to know the mechanisms of the action, indications to the application and side-effects of antibiotics – inhibitors of cell wall synthesis (α-II);
f) to be able to prescribe drugs and to carry out experimental work (α-III).

Educational purposes: to inoculate ethics norms to the future specialists; to be instrumental in forming of responsible attitude toward conducting of therapy by antibiotics, underline the role of antibiotics in the fight against especially dangerous infections.

Chapter 1. Materials for out-of-class independent work of students.

1.1. Interdisciplinary integration

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<td><em>Following clinical:</em></td>
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</tr>
<tr>
<td>Surgery</td>
<td>Pharmacology of antibiotics – inhibitors of cell wall synthesis</td>
<td>To use antibiotics- cell wall synthesis inhibitors for treatment and prevention of purulent complications of surgical operations</td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>Pharmacokinetics, mechanism of action, spectrum, indications, side-effects and contraindications of penicillins, cephalosporins, carbapenems and monobactams</td>
<td>To use the antibiotics – inhibitors of cell wall synthesis to treat infectious diseases</td>
</tr>
<tr>
<td>Dentistry</td>
<td>Pharmacology of antibiotics – inhibitors of cell wall synthesis</td>
<td>To apply antibiotics – cell wall synthesis inhibitors for treatment of dental diseases</td>
</tr>
<tr>
<td><em>Intrasubject integration</em></td>
<td>Pharmacology of antibiotics — inhibitors of protein synthesis and antibiotics violating the structure of membranes</td>
<td>To conduct comparative description of preparations</td>
</tr>
</tbody>
</table>

1.2. The graph of the logical structure of the theme (is added).

1.3. The literature.

1.4. Questions which are subject of study (tentative card of the work of students).
1. Definition of antibiotics. History of antibiotics.
2. Principles of therapy by antibiotics.
4. Types of antibiotics’ side-effects.
5. Classification of antibiotics on their structure and mechanism of action.
6. Classification and pharmacology of penicillins: penicillin-sodium (Benzylpenicillinum-natrium), benzathine penicillin (bicillin-1), bicillin-3, bicillin-5, oxacillin, ampicillin, amoxicillin, phenoximethylpenicillin.
9. Pharmacological characteristics of carbapenems and monobactams (meropenem, astreonam)/Clinical use. side-effects.
11. Preparations and doses.

1.5. Preparations which are subject of study (tasks on prescribing):
12. Benzylpenicillinum-natrium – flac. 500 000 IU
13. Bicillinum-1 – flac. 600 000 IU
14. Bicillinum-5 – flac. 1500 000 IU
15. Ampicillini-trihydras – tab. 0.5
16. Oxacillini-natrium – tab. 0.5; flac. 0.5
17. Cephalexinum – caps. 0.25
18. Cefazolinum – flac. 1.0
19. Ceftriaxonum – flac. 1.0

1.6. Materials for self-control
A. Questions for self-control:
1. What antibiotics inhibit cell wall synthesis?
2. What antibiotics belong to natural penicillins?
3. How do they use long-acting natural penicillins?
4. What do you know about semi-synthetic penicillins?
5. What is the aim of combination of penicillins with beta-lactamase inhibitors?
6. What antibiotics are the derivatives of 7-aminocephalosporanic acid?
7. In what infections cephalosporins are the preparations of choice?
8. What side-effects have cephalosporins?
9. What do you know about clinical use of beta-lactam antibiotics in dentistry?
10. What are the principles of rational application of antibiotics?

B. Tests for self-control
The 1st level
1. To point the antibiotic from the group of semi-synthetic penicillins
2. For treatment of staphylococcus infections are used all preparations except:
The 2nd level
3. To select side-effects (1,2,3...) for drugs (A, B, C...).

5. Disturbances in hemopoiesis 6. Decrease in blood coagulation

Drugs: A. Penicillin sodium  B. Penicillin potassium  C. Cefazolin

4. To determine the indications for the usage (1, 2, 3) of drugs (A, B, C)

Indications

Drugs

1) season prophylaxis of rheumatism  
A) Ampicillin

2) pneumonia caused pneumococci  
B) Bicillin-5

3) pneumonia caused by staphylococci  
C) Cefotaxime

4) sepsis  
D) Cefazolin

5) prevention of invective complications of surgeries

The 3rd level

5. A 19-year-old patient has primary syphilis. He gets a complex therapy. Benzylpenicillin sodium is a part of this therapy. What is the mechanism of the action of this drug?

A. Blockade of RNA synthesis.
B. Blockade of cytoplasm proteins synthesis.
C. Blockade of thiol enzyme groups.
D. Blockade of microbe membrane peptidoglycane synthesis.
E. Blockade of DNA synthesis.

Answers: 1-1; 2- 4; 3 – A1,2; B1,2,3; C1,2,4,5,6; 4 – 1B,2A,3CD,4CD,5C; 5 – D.

Chapter 2 Materials for independent class-work of students

Material and methodical maintenance of the theme:

Tables, tests and situation tasks, collection of preparations.

Experimental work

Preparing of solution of Benzylpenicillin-sodium and determination of its volume for 1 administration according to activity.

Practical skills on the theme:

1. To prescribe the preparations

During the lesson the student must:

1. Answer questions on the theme of the lesson
2. In writing execute control tasks
3. Carry out experimental work.
OPERATING INSTRUCTIONS

for the students of dental faculty to the 1 lesson on the theme:

Antibiotics – inhibitors of protein synthesis.

Antibiotics influencing on structure of membranes

Actuality of the theme: The variety of infectious diseases, narrow spectrum of penicillin’s action, the appearance of resistant forms of microbes make necessity to create and to use new groups of antibiotics such as tetracyclines, chloramphenicols, amynoglycosides, etc.

Educational goals:

g) to have an idea about structure and functions of bacterial cell (α-1);
h) to know the mechanisms of the action, indications to the application and side-effects of antibiotics – inhibitors of protein synthesis as well as antibiotics influencing on membranes’ structure (α-II);
i) to be able to prescribe drugs (α-III).

Educational purposes: to inoculate ethics norms to the future specialists; to be instrumental in forming of responsible attitude toward conducting of therapy by antibiotics, underline the role of antibiotics in the fight against especially dangerous infections.

Chapter 1. Materials for out-of-class independent work of students.

1.2. Interdisciplinary integration

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<td>To classify antibiotics - inhibitors of protein synthesis and antibiotics which influence on the structure of membranes</td>
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<td>Features of vital functions and structure of bacteria and fungi, ways of distribution of infections</td>
<td>To name the microbiological spectrum of action of antibiotics</td>
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<td>Pathological to physiology</td>
<td>Development of infectious process</td>
<td>To name the terms of rational application of antibiotics</td>
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</table>

*Following clinical:

Surgery, gynecology, dentistry

Pharmacology of antibiotics – inhibitors of protein synthesis and antibiotics influencing on membranes’ structure

To apply the antibiotics of these groups at treatment of the diseases

Infectious diseases

Pharmacokinetics, mechanism of action, spectrum, indications, side-effects and contraindications of antibiotics affecting protein synthesis and cell membranes

To use the antibiotics – inhibitors of protein synthesis and antibiotics which influence on the structure of membranes at the infectious diseases

Dermatology

Pharmacological properties of antifungal antibiotics

To apply antifungal antibiotics at treatment of mycoses

*Intrasubject integration

Pharmacology of antibiotics — inhibitors of protein synthesis and antibiotics violating the structure of membranes

To conduct comparative description of preparations

1.2. The graph of the logical structure of the theme (is added).


1.4. Questions, which are subject to study (tentative card of the work of students):

1. Classification of antibiotics violating the synthesis of protein and structure of membranes on the spectrum of their antimicrobial action.

2. Classification of antibiotics violating the synthesis of protein and structure of membranes on chemical structure and mechanism of action.


4. Pharmacology of antibiotics – inhibitors of protein synthesis in 50S subunits of ribosomes: chloramphenicols - laevomycetin; macrolides and azalides - erythromycin, clarithromycin, azithromycin, spiramycin, roxithromycin; lincosamides – lincomycin hydrochloride, clindamycin; steroids – fusidin sodium

5. Pharmacology of antibiotics violating the structure and function of membranes: polyenes – nystatin, amphotericin B; cyclic dekapeptides - polymyxins M sulfate, colistemate sodium.

6. Pharmacology of antibiotics violating the function of nucleic acids (rifampicin).

7. Principles of antibiotics combination with antimicrobial preparations of other groups.


10. Preparations and doses.

1.5. Preparations, which are subject to study (task for prescription):

1. Neomycini sulfas – tab. 0,25; flac. 0,5
2. Gentamycini sulfas – amp. 2 ml of 4% sol.
3. Amikacini sulfas – flac. 0,25 or 0,5
4. Tetracyclinum – tab. 0,1; 10,0 of 3% ointment
5. Doxycyclini hydrochloridum – caps. 0,05 or 0,1
6. Laevomycetinum – tab., caps. 0,25
7. Erythromycinum – tab. 0,1; 5,0 of 1% ointment (1,0 - 10000 IU)
8. Azithromycinum – caps.0,125 or 0,25; tab. for 0,5
9. Nystatini – tab.250000 IU, 10,0 of ointment (1,0 - 100000 IU); vaginal supp. 250000 IU
11. Polymyxini B sulfas – flac. 250000 IU or 500000 IU

1.6. Materials for self-control

A. Questions for self-control:

1. What antibiotics inhibit 30S subunits of bacterial ribosomes?
2. What antibiotics are applied for “sterilization” of intestine before surgeries?
3. What antibiotics have osteotropic action?
4. What side-effects has tetracycline?
5. What antibiotics have macrocyclic lactone structure?
6. What antibiotics can influence on Pseudomonas aeruginosa?
7. In what infections Laevomycetinum is the preparation of choice?
8. What infections are treated by polymyxin B and polyene antibiotics?
9. How are antibiotics combined between itself and with other chemotherapeutic drugs?
10. What are terms of rational application of antibiotics?

B. Tests for self-control

The 1st level

1. To point the antibiotic from the group of macrolides:
2. For treatment of intestinal infections are used all preparations except:

The 2nd level

3. To select side-effects (1, 2, 3, ...) for drugs (A, B, C, ...).

10. Endotoxic reaction

Drugs: A. Streptomycin sulfate  B. Tetracycline  C. Laevomycetin

4. To determine the indications for the usage (1, 2, 3) of drugs (A, B, C)

Indications

1) conjunctivitis, blepharitis  A) Tetracycline (ointment)
2) salmonella infections  B) Streptomycin sulfate
3) tuberculosis  C) Erythromycin
4) infections caused by mycoplasma and chlamidia  D) Chloramphenicol
5) infection caused by Pseudomonas aeruginosa  E) Polymyxin M

The 3rd level

5. A 6-year boy was admitted to hospital with pneumonia. Treatment with amoxicillin was not effective. Bacterial analysis revealed Micoplasma pneumoniae. Choose the most suitable drug for treatment of this child.

A. Tetracycline  B. Azithromycin  C. Bicillin-5  D. Nystatin  E. Oxacillin

Answers: 1-4; 2-3; 3 – A1,3,4; B2,5,7,8; C6,9,10; 4 – 1A,2D,3B,4C,5E; 5 – B.

Chapter 2 Materials for independent class-work of students

Material and methodical maintenance of the theme:

Tables, tests and situation tasks, collection of preparations.

Practical skills on the theme:

1. To prescribe the preparations

During the lesson the student must:

1. Answer questions on the theme of the lesson
2. In writing execute control tasks
OPERATING INSTRUCTION
for students of dental faculty to the lesson on the theme
“Antimycobacterial drugs. Antispirochetal drugs. Antiviral drugs” (2 hr)

Actuality of the theme: Tuberculosis is chronic infection caused by Mycobacterium tuberculosis. The treatment of tuberculosis is a serious problem due to some peculiarities of mycobacteria, but antimycobacterial drugs make it possible to treat this infection successfully. Syphilis is one of the most widely spreading spirochetal infections, caused by Treponema pallidum. It is chronic infection developed in a few stages form the primary tissue affect to the systemic disorders in CNS and other organs. Antibiotics and bismuth preparations are effective instruments in treatment of patients suffering from syphilis. Viral infections including AIDS are among the most dangerous diseases. Antiviral drugs are drugs for treatment of herpes, influenza, HIV infection etc.

Educational goals:
a) to have an idea about structure and functions of mycobacteria, spirochetes and viruses (α-1);
b) to know the mechanisms of the action, indications to the application and side-effects of antimycobacterial drugs, antiviral and antispirochetal drugs (α-II);
c) to be able to prescribe drugs (α-III).

Educational purposes: to inoculate ethics norms to the future specialists; to underline the role of pharmacological therapy in the struggle against tuberculosis, syphilis and AIDS.

Chapter 1. Materials for out-of-class independent work of students.
1.1. Interdisciplinary integration

<table>
<thead>
<tr>
<th>Subjects</th>
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<tr>
<td>Phthisiatry</td>
<td>Pharmacology of antimycobacterial drugs</td>
<td>To use antimycobacterial antibiotics and synthetic preparations to treat tuberculosis</td>
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<tr>
<td>Infectious diseases</td>
<td>Pharmacokinetics, mechanism of action, spectrum, indications, side-effects and contraindications of antiviral preparations</td>
<td>To use the drugs from listed group to treat infectious diseases caused by viruses</td>
</tr>
<tr>
<td>Dermato</td>
<td>Pharmacology of</td>
<td>To use drugs to treat syphilis</td>
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</tbody>
</table>
venerology | antispirochetal drugs | To conduct comparative description of preparations
---|---|---
*Intrasubject integration | Pharmacology of antibiotics — inhibitors of protein synthesis and antibiotics violating the structure of membranes

1.2. The graph of the logical structure of the theme (is added).


1.4. Questions which are subject of study (tentative card of the work of students).
1. Classification of antimycobacterial drugs.
3. Antimycobacterial antibiotics (streptomycin sulfate, kanamycin sulfate, amikacin sulfate, rifampicin).
4. Synthetic antimycobacterial drugs (isoniazide, ethionamide, prothionamide, pirazinamide, sodium paraaminosalicylate) and their pharmacological characteristics.
5. Pharmacology of antispirochetal drugs (Benzylpenicillin-sodium, Bicillin (5), macrolides, cephalosporins, tetracyclines, Bismuth preparations).
6. Classification of antiviral drugs on structure and clinical usage.
7. Pharmacological characteristics and indications for interferones, remantadine, acyclovir, azidotimidin.
8. Clinical use of antimycobacterial, antiviral and antispirochetal drugs in dentistry.
9. Preparations and doses.

1.5. Preparations which are subject of study (tasks on prescribing):
20. Streptomycini sulfas – flac. 0.5 (or 1.0)
21. Rifampicinum – caps. 0.15
22. Isoniazidum – tabl. 0.1 (or 0.3)
23. Bijochinolum – flac. 100 ml
24. Remantadinum – tab. 0.05
25. Acyclovir – flac. 0.25; tab. 0.2; 3% ointment 5.0
26. Laferonum – amp. 1 000 000 IU

1.6. Materials for self-control
A. Questions for self-control:
1. What are the principles of anti-tubercular therapy?
2. What is the mechanism of action of isoniazide?
3. What spectrum of action has rifampin?
4. How do they use the 2nd line antimycobacterial preparations?
5. What antibiotics are the drugs of choice in treatment of syphilis?
6. Why Bijochinolum has bacteriostatic action?
7. What preparations are suitable in treatment of herpetic infection?
8. Which groups of antiviral agents inhibits development of HIV infection?
9. What do you know about antiviral activity of interferons?
10. Which antiviral drugs are used for prevention of influenza?
B. Tests for self-control
The 1st level
№1. All drugs are antiviral agents, except:
№2. Isoniazide is:

The 2nd level

№3. Put together indexes of drugs (A,B...) and their mechanisms of action (1,2,3..):
1. Blockage of reverse transcriptase. 2. Inhibition of protein synthesis. 3. Inhibition of DNA-dependent RNA polymerase. 4. Blockage of the synthesis of mycolic acids. 5. Blockage of SH-groups of enzymes.

№4. Select from the list drugs for treatment of syphilis (A), AIDS (B) and herpes (C):

The 3rd level

A neurologist diagnosed herpetic encephalytis. What is necessary to prescribe for treatment in this case?
A. Sulfacylum-natrium.
B. Tetracyclini hydrochloridum.
C. Clotrimazolum.
D. Interferonum.
E. Acyclovir.

Answers: №1 – C; №2 – B; №3 – A3; B2, C4, D5, E1; №4 – A2,5,6,7, B1,3, C1;3; №5 – E

Chapter 2 Materials for independent class-work of students
Material and methodical maintenance of the theme:
Tables, tests and situation tasks, collection of preparations.

Practical skills on the theme:
1. To prescribe the preparations

During the lesson the student must:
1. Answer questions on the theme of the lesson
2. In writing execute control tasks
OPERATING INSTRUCTION

for students of dentalal faculty to the lesson on the theme:

**Antiprotozoal drugs. Helminthicide drugs (Helminthics)** (2 hr)

**Actuality of the theme:** Protozoal infections are widely spread around the world, especially in the tropical countries. Antiprotozoal drugs are preparations for the treatment and prophylaxis of malaria, amebiasis and other protozoal diseases. Helminth infestation is caused by pathogenic worms and may be localized in alimentary tract or in other tissues. Helminth infestations are widely spreading in the world especially in countries with hot climate. Helminthics are drugs for treatment of helminthiasis. Some preparations (levamisole) have immune stimulating properties and are used to regulate immunity in patients with collagenoses, autoimmune diseases and chronic inflammations.

**Educational goals:**

a) to have an idea about life cycle of protoza and parasitic worms (α-1);
b) to know the mechanisms of the action, indications to the application and side-effects of antiprotozoal and helminthic drugs (α-II);
c) to be able to prescribe the drugs (α-III).

**Educational purposes:** to inoculate ethics norms to the future specialists; to be instrumental in forming of responsible attitude toward conducting of therapy by antiprotozoals and helminthics.

**Chapter 1. Materials for out-of-class independent work of students.**

**1.1. Interdisciplinary integration**

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*Following clinical:

| Internal diseases | Pharmacology of levamisole | To use levamisole for treatment of collagenoses, autoimmune diseases and chronic inflammations. |

| Infectious diseases | Pharmacokinetics, mechanism of action, spectrum, indications, side-effects and contraindications of antiprotozoals and helminthics | To use the drugs to treat infestations caused by cestodes, nematodes and trematodes. To use the drugs to treat malaria and other protozoal infections |

| *Intrasubject integration | Pharmacology of antiprotozoals and helminthics. | To conduct comparative description of preparations |

**1.2. The graph of the logical structure of the theme (is added).**

1.4. Questions which are subject of study (tentative card of the work of students).


3. Helminth infestations and species of pathogenic warms caused these infestations.


5. Preparations for treatment of infestations by nematodes (Piperasini adipinas, levamisole (decaris), mechanism of action, indications, side-effects

6. Drugs for treatment of infestations by cestodes (niclosamide (Phenasalum), Extr. Fillicis maris spissum), their mechanisms of action, indications, side-effects.

7. Drugs for treatment of infestations by trematodes (praziquantel, mechanisms of action, indications, side-effects.

8. Drugs with wide spectrum of action (mebendazole), mechanism of action, indications, side-effects.

9. Preparations and doses.

1.5. Preparations which are subject of study (tasks on prescribing):

1. Mebendazolum – tab.0,1
2. Levamisolum – tab.0,15
3. Phenasalum – pulv. (s.d. for adults is 2,0)
4. Chingaminum – tab.0,25; amp. cont. 5 ml of 5% sol.
5. Metronidazolum – tab.0,25 or 0,5; vaginal supp. 0,5

1.6. Materials for self-control

A. Questions for self-control:

1. What are the principles of the therapy by helminthicides?
2. What is the mechanism of action of levamisole?
3. What do you know about levamisole’s action on umminity?
4. How do they use levamisole in a clinic?
5. What drugs are for infestations caused by round worms?
6. What drugs are for infestations by tapeworms?
7. What preparations are used to treat infestations caused by trematodes?
8. Which drug may penetrate echinococcus cyst?
9. What do you know about extra-intestinal helminthiasises and their treatment?
10. Which drugs are used for prevention of helminth infestations?
11. What are the principles of the therapy by antimalarial drugs?
12. What is the mechanism of action of chloroquine?
13. What do you know about quinine?
14. How do they use tetracycline in the treatment of protozoal infections?
15. What drugs are for the prevention of malaria?
16. What drugs are for the treatment of amebiasis?

B. Tests for self-control

The 1st level

1. Only one helminthicide has wide spectrum of action:
2. All concerning Niclosamide is correct, except:
A. It is helminthic. B. It is effective against round worms. C. It is effective against tapeworms. D. It damage cuticulum of cestodes. E. It acts on parasitic worms in alimentary tract.

The 2nd level

3. Put together the indexes of drugs (1,2,...) and their indications (A,B,C...):

4. Select from the list drugs (1,2...) for treatment of nematodoses (A), cestodoses (B) and trematodoses (C):

The 3rd level

5. Mixed helminth infestation has been revealed (ascariasis and enterobiasis) in a patient. What antihelminthic drug with wide spectrum is expedient for use?
A. Levamisole B. Mebendazole C. Pyrantel D. Chloxylum. E. Piperazine

Answers: 1 – B; 2 – B: 3 – 1AB; 2ABCF, 3ABE, 4F, 5D; 4 – A1,2,4,5,6; B3,6; C7,8; 5 – B

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