

ANTIVIRAL DRUGS

A. Actuality. Viruses have a very diverse class of pathogens with impressive capacity to transform and cause new infections until pandemics (HIV, atypical influenza, Ebola, covid coronavirus-19, etc.). The particularities of the viral infections determine difficulties in the elaboration of the antiviral preparations and respectively in the prophylaxis and the treatment of the viral diseases. Study of these medications is absolutely necessary because the number of people that suffer from viral infections is very high.

B. The purpose of the training is to study the pharmacology of anti-spirochete and antiviral drugs, necessary for prophylaxis and differential treatment of diseases caused by these specific pathogenic agents.

C. Learning objectives:

1) The student must **know:** classification, spectrum, and mechanism of action, indications, side effects and pharmacokinetic properties of anti-spirochete and antiviral drugs

2) The student must **be able to:** prescribe the compulsory anti-spirochete and antiviral drugs; administer the drugs depending on the pathogenic agents.

D. Initial level of knowledge required for interdisciplinary integration:

Microbiology. Treponema pallidum. Mechanisms of transmission and clinical manifestations. Classification of leptospire. Ways of leptospire transmission. Pathogenic agents of recurrent typhus. Viruses. Classification and general characteristics.

E. Self-training questions:

1. Classification of antiviral drug according to mechanism of action and virus type (clinical use) .
2. Influenza antiviral drugs: classification, spectrum and mechanisms of action, indications, side effects.
3. Anti-herpetic antiviral drugs: classification, spectrum and mechanisms of action, indications, side effects.
4. Antiretroviral antiviral drugs: classification, spectrum and mechanisms of action, indications, side effects.
5. Antiviral drugs used in cytomegalovirus infections: spectrum and mechanisms of action, indications, side effects.
6. Classification of drugs used in hepatitis.
7. Antiviral drugs active against hepatitis B: classification, mechanisms of action, indications, side effects.
8. Antiviral drugs active against hepatitis C: classification, spectrum and mechanisms of action, indications, side effects.

9. Interferons: types, mechanism of action, pharmacological properties, indication, side effects. Interferon inducers (interferonogens). Recombinant interferons.

10. Antiviral drugs used in infections with adenoviruses, papillomaviruses, coronarviruses: mechanisms of action, indications, side effect.

F. Independent work (is done in written form while preparing for the lesson)

1.) Brief characteristics of compulsory drugs:

Down: Drug name. 1. Rimantadine. 2. Oseltamivir. 3. Acyclovir. 4. Foscarnet. 5. Zidovudine. 6. Interferon-alpha. 7. Lopinavir. 8. Ritonavir. 9. Lamivudine. 10. Ribavirin. 11. Amantadine. 12. Vidarabine.

Across: 1. Medicinal form. 2. Way of administration. 3. Doses (therapeutic, maximal for one intake and for 24 hours). 4. Spectrum of action 5. Mechanism of action. 6. Indications and contraindications. 7. Side effects.

2.) Questions on medical prescriptions.

To prescribe the following drugs in all the possible medicinal forms: 1. Rimantadine. 2. Oseltamivir. 3. Acyclovir. 4. Foscarnet. 5. Zidovudine. 6. Interferon-alpha. 7. Lopinavir. 8. Ritonavir. 9. Lamivudine. 10. Ribavirin. 11. Amantadine. 12. Vidarabine.

Drugs used in (for): influenza prophylaxis, prophylaxis and treatment of influenza A and B (atypical), herpetic keratitis, skin and oro-facial herpes infections, systemic herpes infections, varicella-zoster infections, cytomegalovirus infections, viral hepatitis C, viral hepatitis C , infections with retroviruses.

3.) Tests (Guidelines for Laboratory Work in Pharmacology).

4.) Clinical case (Guidelines for Laboratory Work in Pharmacology).

5.) Virtual situations (Guidelines for Laboratory Work in Pharmacology).

6.) Virtual didactic movie (during the seminar: protocol, conclusions).

7.) Tables

Table N1

The spectrum of action of some antiviral drugs

Virus	Rimantadine	Ribavirin	Aciclovir	Ganciclovir	Zidovudine
Influenza type A2					
Influenza type B					
Measles					
Rubella					
Herpes					
Hepatitis B					

HIV AIDS					
Smallpox					

Tabelul N2

Mechanism of action of antiviral drugs

Mechanism	Rimantadine	Saquinavir	Gama-globulines
Inhibits viral proteases			
Inhibits the penetration of the virus into the cell			
Inhibits the release of the viral genome			

8.) Problem

On the third day of the disease, for influenza treatment, a child was given an antiviral drug. Way of administration: 3-5 drops in each nasal meatus with an interval of 2-3 hours, not less than 5 times per day. Within 3 days the child's condition slightly improved.

Which drug was indicated?

What is the cause of its non-essential efficacy?

ANTIMYCOTIC DRUGS

A. Actuality. Pathogenic fungi and conventional pathogenic fungi cause local and systemic mycosis, with difficult treatment. The efficacy of antimycotic drugs depends on their spectrum of action, mechanism of action, pharmacokinetic particularities, and location of fungi.

B. The purpose of the training is to study the pharmacological properties of antimycotic drugs, to acquire skills and to develop the perception of drug selection depending on fungi shape and location.

C. Learning objectives:

1) The student must **know:** Classification, spectrum, and mechanism of action, indications and side effects, pharmacological particularities of antimycotic drugs.

2) The student must **be able to:** prescribe the compulsory antimycotic drugs, administer these drugs in different mycotic diseases.

D. Initial level of knowledge required for interdisciplinary integration:

Microbiology. Pathogenic fungi – dermatomycosis, candidomycosis and systemic mycosis, morphological and functional particularities.

E. Self-training questions:

1. Classification of antifungal drugs. Mechanisms of action
2. Antimycotic antibiotics: spectrum and mechanism of action, indications, side effects, pharmacokinetics.
3. Imidazole derivatives: spectrum and mechanism of action, indications, side effects, pharmacokinetics.
4. Triazole derivatives: spectrum and mechanism of action, indications, side effects, pharmacokinetics.
5. Echinocandins as antifungal agents: spectrum and mechanism of action, indications, side effects, pharmacokinetics.
6. Antimycotic drugs used in dermatomycosis: spectrum and mechanism of action, indications, side effects, pharmacokinetics.

F. Independent work (is done in written form while preparing for the lesson)

1.) Brief characteristics of compulsory drugs:

Down: Drug name. 1. Amphotericin B. 2. Nystatin. 3. Clotrimazole.

4. Griseofulvin. 5. Capsosungin. 6. Terbinafine hydrochloride. 7. Dequalinium chloride. 8. Fluconazole.

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

2.) Questions on medical prescriptions.

To prescribe the following drugs in all the possible medicinal forms: 1. Amphotericin B. 2. Nystatin. 3. Clotrimazole. 4. Griseofulvin. 5. Capsosungin. 6. Terbinafine hydrochloride. 7. Dequalinium chloride. 8. Fluconazole.

Drugs used in (for): Systemic mycoses, dermatomycosis, mycotic meningitis, onychomycosis, digestive candidiasis, vaginal candidiasis, skin candidiasis.

3.) Tests (Guidelines for Laboratory Work in Pharmacology).

4.) Clinical case (Guidelines for Laboratory Work in Pharmacology).

5.) Virtual situations (Guidelines for Laboratory Work in Pharmacology).

6.) Virtual didactic movie (during the seminar: protocol, conclusions).

7.) Tables

Table N1

The spectrum of action of some antimycotic drugs

Preparations	Candidiasis	Dermatomycosis	Systemic mycosis
Amphotericin B			
Nystatin			

Griseofulvin			
Ketoconazole			
Clotrimazole			
Itraconazole			
Terbinafine			
Fluconazole			

Table N2

Identify drugs after the mechanism of action

Mechanism of action	Drug
Irreversible coupling with ergosterol and other specific sterols in the fungal cell membrane with membrane permeability disruption and ion loss, macromolecules with toxic consequences	a. b. c.
Prevention of the synthesis of ergosterol, an essential component of the fungal membrane, by inhibiting specific enzymes (14 alpha-sterol demethylase, squalene poxidase, etc.).	a. b. c.

8.) Problem

A patient with mycosis of pulmonary pathways was given inhalatory an antimycotic drug. After a short period of time, the patient had symptoms like irritation of the larynx, cough, rhinitis, and fever.

Which drug was given to the patient?

What measures have to be undertaken to prevent complications?