

Learning unit: Antimicrobial drugs

Impact of the learning unit

This learning unit aims to teach students to characterize and distinguish the basic classes of antibacterial drugs and basic principles of antimicrobial chemotherapy. Knowledge of the mechanisms of action of individual representatives, their adverse effects, antimicrobial spectrum, and specifics of rational use of antimicrobial agents is within the competence of each practitioner. It is the basic knowledge of every student of medicine.

Important terms

effect of ATBs

- with respect to intensity
 - o bacteriostatic
 - o bactericidal
- with respect to parameter
 - o time dependent
 - o concentration dependant
 - o AUC dependant

minimum inhibitory concentration (MIC)

minimum bactericidal concentration (MBC)

minimum antibacterial concentration (MAC)

post-antibiotic effect

resistance to antibacterial drugs

- types
- mechanisms

beta-lactams

- penicillins
 - o benzylpenicillin
 - o phenoxymethylpenicillin
 - o oxacillin
 - o piperacillin/piperacillin-tazobactam
- aminopenicillins
 - o ampicillin/ampicillin-sulbactam (sultamicillin)
 - o amoxicillin/co-amoxicillin (co-amoxiclav)

cephalosporins

- first-generation cephalosporins
 - cefazolin
 - cefadroxil
- second-generation cephalosporins
 - cefuroxime
- third-generation cephalosporins
 - cefotaxime
 - ceftazidime
 - ceftriaxone
 - cefixime
 - cefoperazone/cefoperazone-sulbactam (sulperazone)
 - ceftazidime/ceftazidime-avibactam
- fourth-generation cephalosporins
 - cefepime
- fifth-generation cephalosporins
 - ceftaroline
 - ceftolozane-tazobactam

carbapenems

- meropenem
- imipenem-cilastatin
- ertapenem

monobactams

- aztreonam

glycopeptides

- vancomycin
- teicoplanin

lipoglycopeptides

- dalbavancin

polymyxins

- polymyxin B
- colistimethate

tetracyclines

- doxycycline
- tigecycline

aminoglycosides

- gentamicin
- amikacin
- kanamycin
- tobramycin
- neomycin

macrolides

- clarithromycin
- spiramycin
- azithromycin
- erythromycin

oxazolidinones

- linezolid

lincosamides

- clindamycin

amphenicols

- chloramphenicol

quinolones

- ciprofloxacin
- ofloxacin / levofloxacin
- norfloxacin
- prulifloxacin
- moxifloxacin

sulfonamides

- sulfadiazine
- sulfathiazole
- sulfamethoxazole/co-trimoxazole (trimethoprim)

nitroimidazoles

- metronidazole

nitrofurans

- nitrofurantoin
- nifuratel
- nifuroxazide

ansamycins

- rifampicin
- rifaximin
- fosfomicin

local antibiotics

- see outline Dermatologics

antituberculotics

- isoniazid
- rifampicin
- rifabutin
- ethambutol
- pyrazinamide
- capreomycin

- cycloserine

Learning outcomes

Student knows the basic pharmacological profile (mechanism of action, side effects, indications and contraindications) of individual classes of antibacterial drugs.

Student knows the basic pharmacological profile (mechanism of action, side effects, indications and contraindications) of antituberculotics.

Student knows the basic principles of rational antimicrobial therapy.

The student knows the important interactions of antibiotics with other drugs.

The student describes and explains the mechanisms of resistance of important microbial organisms to antibacterial drugs.

Study literature

Rang & Dale's Pharmacology 9th edition, 2020, chapters 51 and 52.
Study materials to subjects aVLFA0822c and aVLFA0822p.

Exam questions

Special pharmacology:

30. Principles of antibacterial therapy – overview (modes of action, resistance, MIC, MBC); 31., Penicillins, carbapenems; 32. Cephalosporines, monobactams; 33. Lincosamides, glycopeptides, polymyxins; 34. Tetracyclines + related ATBs, amphenicoles; 35. Macrolides and related ATBs; 36. Aminoglycosides; 37. Sulphonamides, nitrofurans and nitroimidazoles; 38. Quinolones, antituberculotics

“Essential” drugs:

76. phenoxymethylpenicilin, 77. co-amoxicilin, 78. piperacilin, 79. cefuroxim, 80. meropenem, 81. vancomycin, 82. doxycycline, 83. clarithromycin, 84. azithromycin, 85. gentamicin, 86. cotrimoxazol, 87. ciprofloxacin, 88. rifampicin