**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**

spectrum of antibacterial activity (bacterial susceptibility)

resistance to antibacterial drugs

post-antibiotic effect

minimum inhibitory concentration (MIC)

minimum bactericidal concentration (MBC)

minimum antibacterial concentration (MAC)

time-dependent antimicrobial effect

concentration dependent antimicrobial effect

beta-lactams

peni**cillin**s

benzylpeni**cillin**

phenoxymethylpeni**cillin**

oxa**cillin**

aminopenicillins

ampi**cillin**/ampicillin-sulbactam (sultamicillin)

amoxi**cillin**/co-amoxicillin (co-amoxiclav)

pipera**cillin**/piperacillin-ticarcillin

cephalosporins

first-generation cephalosporins

**cefa**zolin

**cefa**droxil

second-generation cephalosporins

**cefu**roxime

third-generation cephalosporins

**cef**otaxime

**cef**tazidime

**cef**triaxone

**cef**ixime

**cef**operazone/cefoperazone-sulbactam (sulperazone)

**cef**tazidime/ceftazidime-avibactam

fourth-generation cephalosporins

**cefe**pime

fifth-generation cephalosporins

**ceft**aroline

**ceft**olozane-tazobactam

carba**penem**s

mero**penem**

imi**penem**-cilastatin

erta**penem**

monobactams

aztreonam

glycopeptides

vancomycin

teicoplanin

lipoglycopeptides

dalbavancin

polymyxins

polymyxin B

colistimethate

tetra**cycline**s

doxy**cycline**

tige**cycline**

aminoglycosides

gentamicin

amikacin

kanamycin

tobramycin

neomycin

macrolides

clarithromycin

spiramycin

azithromycin

erythromycin

oxazolidinones

linezolid

lincosamides

clindamycin

amphenicols

chloramphenicol

quinolones

cipro**floxacin**

o**floxacin** / levofloxacin

nor**floxacin**

prulifloxacin

moxi**floxacin**

sulfonamides

**sulfa**diazine

**sulfa**thiazole

**sulfa**methoxazole / co-trimoxazole

trimethoprim

nitroimidazoles

metronidazole

nitrofurans

nitrofurantoin

nifuratel

nifuroxazide

ansamycins

**rifa**mpicin

**rifa**ximin

fosfomycin

local antibiotics

neomycin + bacitracin

fusidic acid

mupirocin

systemic antibiotics used topically (clindamycin, tetracycline, erythromycin, azithromycin, chloramphenicol, kanamycin, tobramycin, ofloxacin, sulfacetamide, metronidazole)

antituberculotics

isoniazid

rifampicin

rifabutin

ethambutol

pyrazinamide

capreomycin

cycloserine

(streptomycin)

**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 basic principles of rational antimicrobial therapy.

The student knows 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 E - Book, Humphrey Rang 8th edition, 2016, chapter 50 and 51 (pages 615 – 641).

Study materials to subjects aVLFA0822c and aVLFA0822p.

**Exam questions**

*Special pharmacology:* 42. Aminoglycosides; 43. Principles of antibacterial therapy – overview, modes of action, resistance, MIC, MBC; 44. Lincosamides, glycopeptides, polymyxins; 45. Tetracyclines + related ATBs, amphenicoles; 46. Cephalosporines, monobactams; 47. Penicillins, carbapenems; 48. Sulphonamides, nitrofurans and nitroimidazoles; 49. Macrolides and related ATBs; 50. Quinolones, antituberculotics

*“Essential” drugs:* 94. doxycycline, 95. co-amoxicilin, 96. phenoxymethylpenicilin, 97. piperacilin, 98. meropenem, 99. cefuroxim, 100. cotrimoxazol, 101. clarithromycin, 102. azithromycin, 103. gentamicin, 104. ciprofloxacin, 105. vankomycin, 106. rifampicin