

# Lecture 13



## Antibiotics

- Additional Notes
- Important
- Explanation
- Examples

# OBJECTIVES:

- Define antibiotic ,chemotherapy and selective toxicity
- Describe the difference between bactericidal and bacteriostatic antibiotics
- Recognize the narrow and broad spectrum antibiotics
- Define the therapeutic index
- Know the mechanism of action of antimicrobial agents.
- Recognize the various classes of antimicrobial agents(action, spectrum and side effects)
- Explain the criteria for an ideal antimicrobial

Antibiotics class	Examples	Mechanisms	Spectrum of Activity	S/E
( $\beta$ -Lactam)  Penicillins	<u>Natural:</u> penicillin G <u>Semi-synthetic:</u> oxacillin, ampicillin- clavulanic acid, ampicillin- sulbactam	Inhibit <b>CELL WALL</b> synthesis	Bactericidal; mostly active against gram +ve, little gram-ve	Hypersensitive, anaphylaxis GIT
( $\beta$ -Lactam)  CEPHALOSPHORINS	<u>1ST generation:</u> cephalothin, cephalexin, <u>2nd generation:</u> Cefuroxime. <u>3rd generation:</u> ceftriaxone, ceftazidime <u>4th generation:</u> Cefepime		Bactericidal <u>1<sup>st</sup> gen:</u> Gram +ve, limited Gram -ve <u>2<sup>nd</sup> gen:</u> Gram+ve, improved Gram -ve and some anaerobes. <u>3<sup>rd</sup> gen:</u> limited Gram +ve, excellent Gram- ve and anaerobes	
Glycopeptides "only for gram+"	Vancomycin		Bacteriocidal; Gram +ve bacteria only <u>"NARROW SPECTRUM"</u>	

Antibiotics class	Examples	Mechanisms	Spectrum of Activity	S/E
Aminoglycosi-des "Cannot be used for anaerobes"	Gentamicin, amikacin, tobramycin, neomycin	Inhibit protein synthesis <b>"RIBOSOMES"</b>	Bactericidal; Gram-ve <u>"Narrow spectrum"</u>	Ototoxicity, NEPHROTOXI-CITY
Tetracyclines "Cannot be used for pregnant and children under 8 year"	Tetracyclines, doxycycline		Bacteriostatic; Gram+ve and Gram -ve <u>"Broad"</u>	Teeth discoloration GIT photosensitivity
Chloramphenicol	Chlorampheni-col		Bacteriostatic; broad Gram+ and Gram-spectrum " used for meningitis "	BM a plastic anemia
Macrolides And Lincosamides	Erythromycin, Azithromycin, Clarithromycin, Clindamycin		Bacteriostatic; Gram+ve, good anaerobic spectrum	
Polymyxin "Cannot be used for pregnant"	Colistin		Alternate <b>CELL MEMBRANE</b>	Bacteriocidal; Gram- ve <u>"Narrow Spectrum"</u>

Antibiotics class	Examples	Mechanisms	Spectrum of Activity	S/E
Flouroquinolones "Cannot be used for pregnant and under 18 year"	Nalidixic acid, <b>Ciprofloxacin</b> , Gatifloxacin, Moxifloxacin	Inhibit nucleic acid synthesis " <b>DNA</b> "	Bactericidal; Gram +ve and gram -ve, "Broad"	Cartilage damage
Nitroimidazoles	Metronidazole "they only can cover Bactria and parasite."		<b>Bactericidal; anaerobes</b> (Also <u>antiprotozoal</u> )	
Rifampicin "used for TB"	Rifampicin		Bactericidal; Gram +ve and gram -ve "Broad"	Discoloration of body fluid, <b>hepatotoxicity</b>

Antibiotics class	Examples	Mechanisms	Spectrum of Activity	S/E
Sulfonamides	Trimethoprim-sulfadiazine, ormethoprim sulfa	<u>Competitive antagonism</u>	Bacteriostatic → bactericidal when combined. Gram -ve "Narrow"	Discoloration of body fluid hepatotoxicity

# REMEMBER !

- Antibiotics that CANNOT be used for pregnant: “CANTS”
  - ✓ Ciprofloxacin
  - ✓ Aminoglycosides
  - ✓ Nitrofurantoin
  - ✓ Tetracyclines
  - ✓ Sulfonamides
- Antibiotics that CANNOT be used for children:
  - ✓ Ciprofloxacin “under 18”
  - ✓ Tetracyclines “under 8”
- Antibiotics for Gram- only:
  - ✓ Aminoglycosides
  - ✓ Polymyxin “Colistin “
- Antibiotics for Gram+ only:
  - ✓ Vancomycin
- Antibiotics for anaerobes only:
  - ✓ Metronidazole
- All Antibiotics that inhibit cell wall synthesis is **BACTERICIDAL** others are mostly **BACTERIOSTATIC**

# Quiz

1. Aminoglycosides is used for ?

- a) Gram -    b) Gram +    c) Both A & B

2. Which one of these cannot be used for pregnant & children under "18" ?

- a) Sulfonamides    b) Ciprofloxacin    c) Tetracyclines

3. Vancomycin can cause .....

- a) Red man syndrome    b) Cartilage damage    c) Hepatotoxicity

4. Which one of these is used for anaerobes only?

- a) Vancomycin    b) Ciprofloxacin    c) Metronidazole

5. Bactericidal can only prevent multiplication

- a) T    b) F