

## ANTIMICROBIALS

### Penicillins & Cephalosporins



### Penicillins & Cephalosporins

#### Gram Positive Bacteria

**Cocci:** Staphylococcus, Strep,

**Rods:** Bacillus anthracis,  
Actinomyces, Erysipelas

#### Anaerobic Gram Positive

Rods: Clostridium (tetanus,  
black leg etc.)

#### Gram Negative Bacteria

**Rods:** Escherichia coli, Klebsiella, Bacteroides  
Proteus, Pasteurella, Bordetella

#### Anaerobic Gram Negative

Pseudomonas-extended  
spectrum e.g. ticarcillin

## ANTIMICROBIALS

### Penicillins & Cephalosporins

#### CELL WALL SYNTHESIS

- Penicillin binding proteins
- beta lactamases
- clavulanic acid (+sublactam)

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#### ACTIVITY AGAINST:

- Primarily Gram Positive Bacteria  
Penicillin (G & V)
- Broad spectrum - Positive & Negative  
Amoxicillin and ampicillin
- Primarily Gram Negative Bacteria  
Ceftiofur

## ANTIMICROBIALS

### Penicillins and Cephalosporins

#### Adverse reactions:

Allergic/anaphylactic reactions  
Suprainfections (guinea pigs!)  
Electrolyte disturbances (Na,K salts)  
Ticarcillin-avoid heparin, anticoagulants  
Procaine reactions in horses

## ANTIMICROBIALS

### Penicillin Pharmacokinetics

- Penicillin G (Na, K) inactivated in acid
- Lipid insoluble - extracellular
- Poorly distributed across lipid barriers  
(CNS, eye, prostate)

## ANTIMICROBIALS

### Penicillin Pharmacokinetics

- Semi-synthetic penicillins PO use
- Excreted unchanged in the urine (except ampicillin)
- Slow excretion with aspirin or probenecid

## ANTIMICROBIALS

### Penicillin Pharmacokinetics

- Duration of Action:
  - Salts (Na, K) 4-6 hours
  - Procaine salt aqueous 24 hours
  - Procaine salt in oil 48 hours
  - Benzathine salt 48+ hours
    - procaine in race horses!



## ANTIMICROBIALS

Penicillins - Gram positive,  
inactivated by beta lactamase

- Procaine Penicillin G
- Benzathine Penicillin
- Penicillin V



## ANTIMICROBIALS

Penicillins-"broad spectrum" but susceptible to beta lactamase

- Amoxicillin q 8-12 h
- Ampicillin
- Amoxicillin + clavulanic acid\*  
\*resistant to beta lactamase



## ANTIMICROBIALS

Penicillins-beta lactamase resistant

Narrow gram + spectrum

- Cloxacillin q8h
- Flucloxacillin q8h

## ANTIMICROBIALS

Penicillins-extended spectrum

Gram + and gram - aerobes

Gram + anaerobes;

**Pseudomonas**

- Carbenicillin
- Ticarcillin

## ANTIMICROBIALS

Cephalosporins-Pharmacology

- Similar to penicillins
- Doses q8-12h
- ceftiofur q24h, nil withholding

## ANTIMICROBIALS

### Cephalosporins-Pharmacokinetics

- Similar to penicillins:  
e.g excreted in urine, inhibition  
by aspirin and probenecid

## ANTIMICROBIALS

### Cephalosporins

- Cephalexin- Gram +, (-)
- Cephalothin- Gram +, (-) I
- ceftiofur-Gram -, (+) II
- ceftazidime-Gram +, - III





## ANTIMICROBIALS

Penicillins and  
Cephalosporins



Uses: skin, urinary tract,  
respiratory tract infections,  
footrot, foot abscess

Adverse reactions

Uses and routes of administration