

## 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,  
Proteus, Pasteurella, Bordetella

#### Anaerobic Gram Negative

**Bacteroides** (many resistant)

Pseudomonas-extended spectrum  
e.g. ticarcillin

## ANTIMICROBIALS

### Penicillins & Cephalosporins

#### CELL WALL SYNTHESIS

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

## ANTIMICROBIALS

### Penicillins & Cephalosporins

#### 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

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## ANTIMICROBIALS

### Penicillin Pharmacokinetics

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

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## ANTIMICROBIALS

### Penicillin Pharmacokinetics

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

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## 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!



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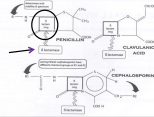
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## ANTIMICROBIALS

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



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## ANTIMICROBIALS

### Penicillins-extended spectrum

Gram + and gram - aerobes

Gram + anaerobes;

**Pseudomonas**

- Carbenicillin
- Ticarcillin



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## ANTIMICROBIALS

### Cephalosporins-Pharmacology

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

### Cephalosporins-Pharmacokinetics

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

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## ANTIMICROBIALS

### Cephalosporins

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



## ANTIMICROBIALS

### Penicillins and Cephalosporins



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

Adverse reactions

Uses and routes of administration

## Strangles

- **Streptococcus infection**
- **Penicillin ?**
  - pros and cons
  - route and choice?
- **Supportive therapy**
  - Drain and flush abscess



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