

# ANTIMICROBIALS

## Penicillins & Cephalosporins



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## 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

Pseudomonas-extended  
spectrum e.g. ticarcillin



# ANTIMICROBIALS

## Penicillins & Cephalosporins

### CELL WALL SYNTHESIS

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



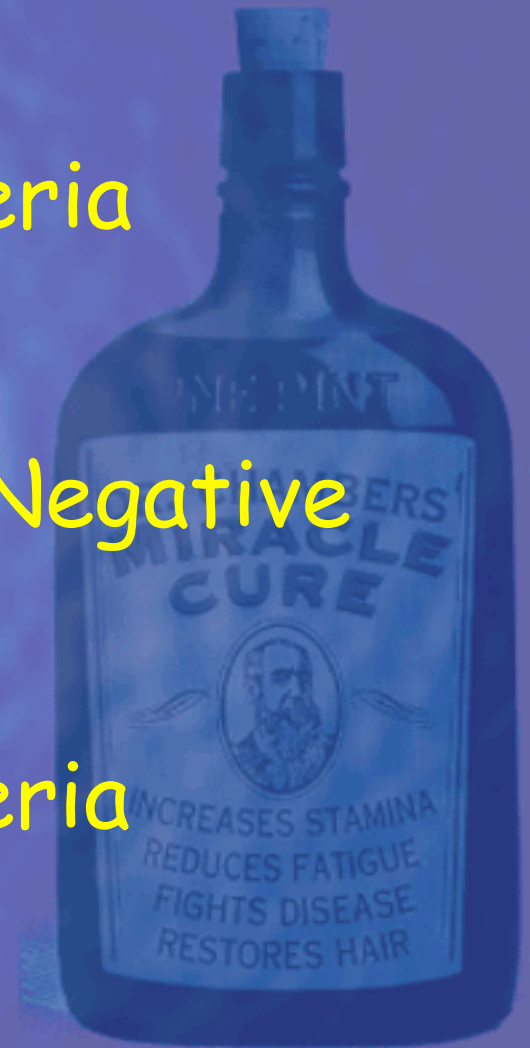


# ANTIMICROBIALS

## 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



# 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

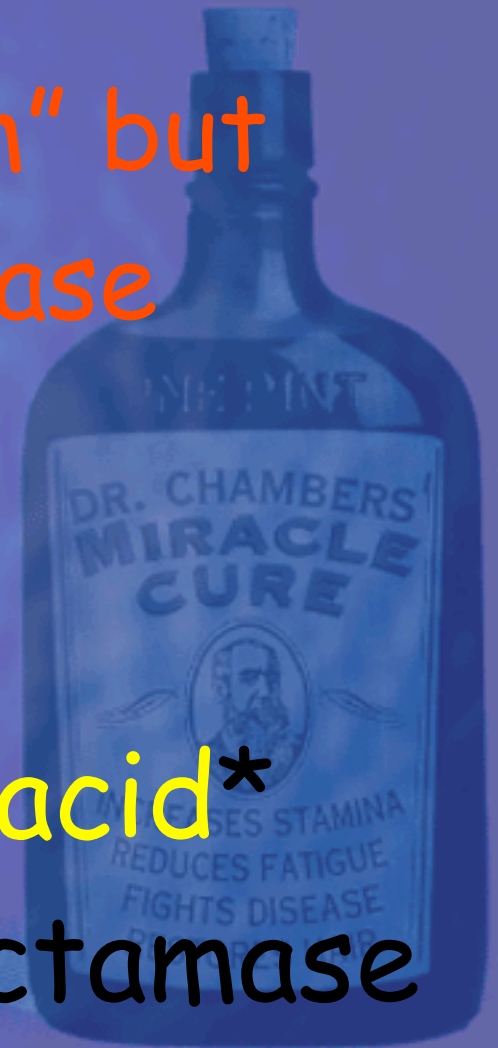
• Penicillins—"broad spectrum" but susceptible to beta lactamase

- Amoxicillin q 8-12 h

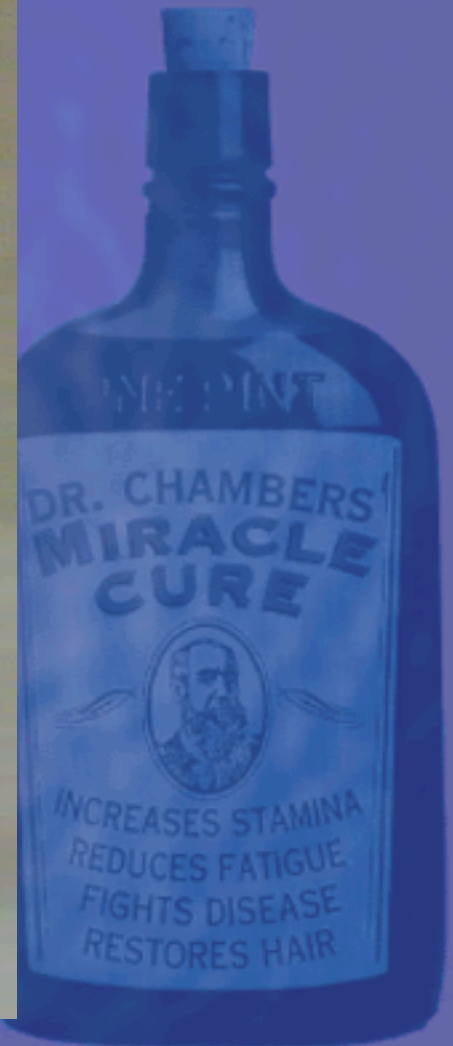
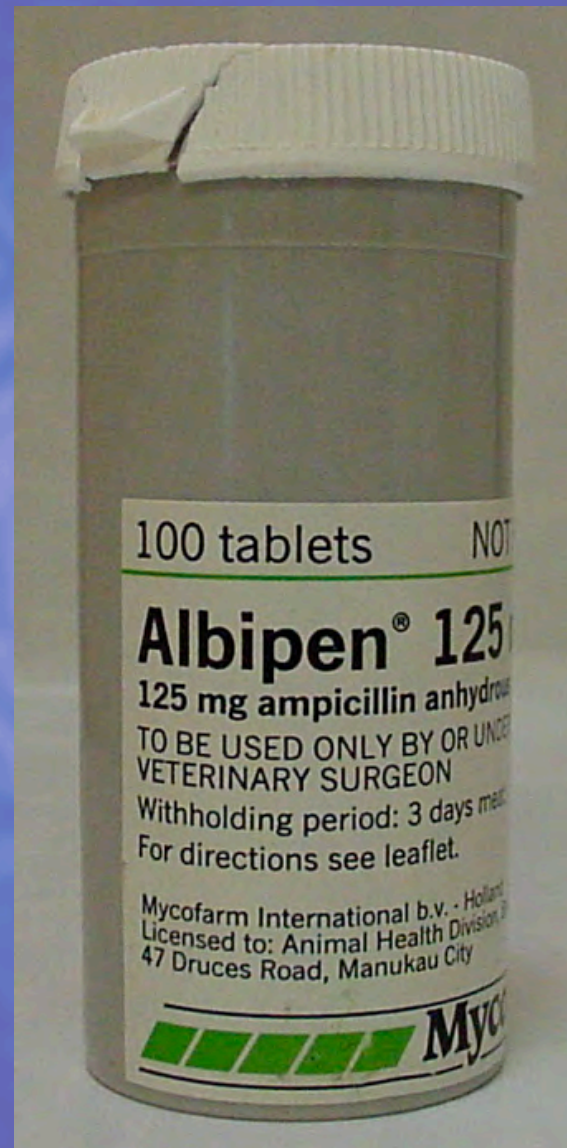
- Ampicillin

- Amoxicillin + clavulanic acid\*

\*resistant to beta lactamase







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Penicillins-beta lactamase resistant

Narrow gram + spectrum

- Cloxacillin q8h
- Flucloxacillin q8h





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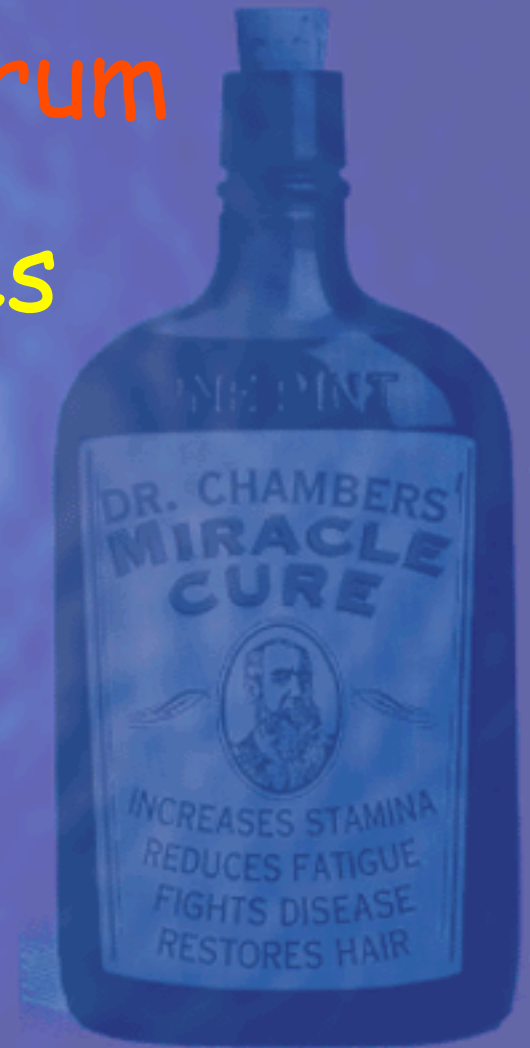
Penicillins-extended spectrum

Gram + and gram - aerobes

Gram + anaerobes;

Pseudomonas

- Carbenicillin
- Ticarcillin

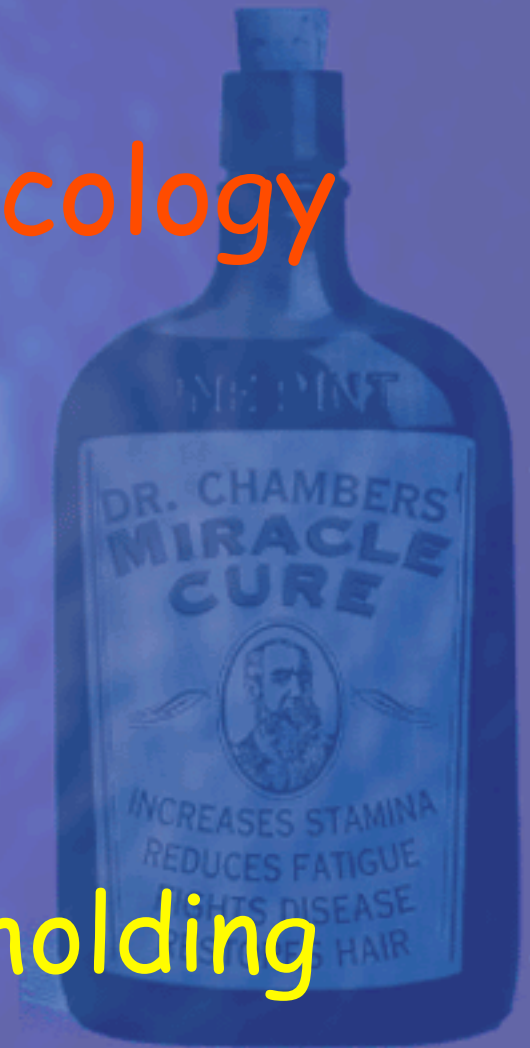




# ANTIMICROBIALS

## 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



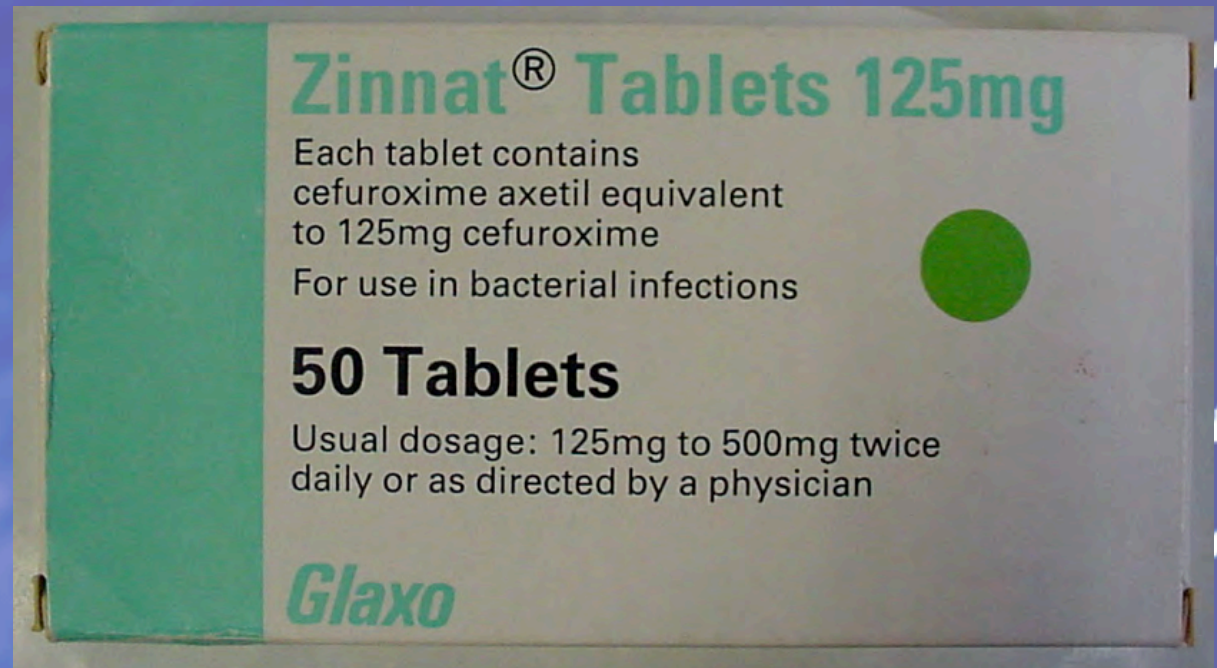
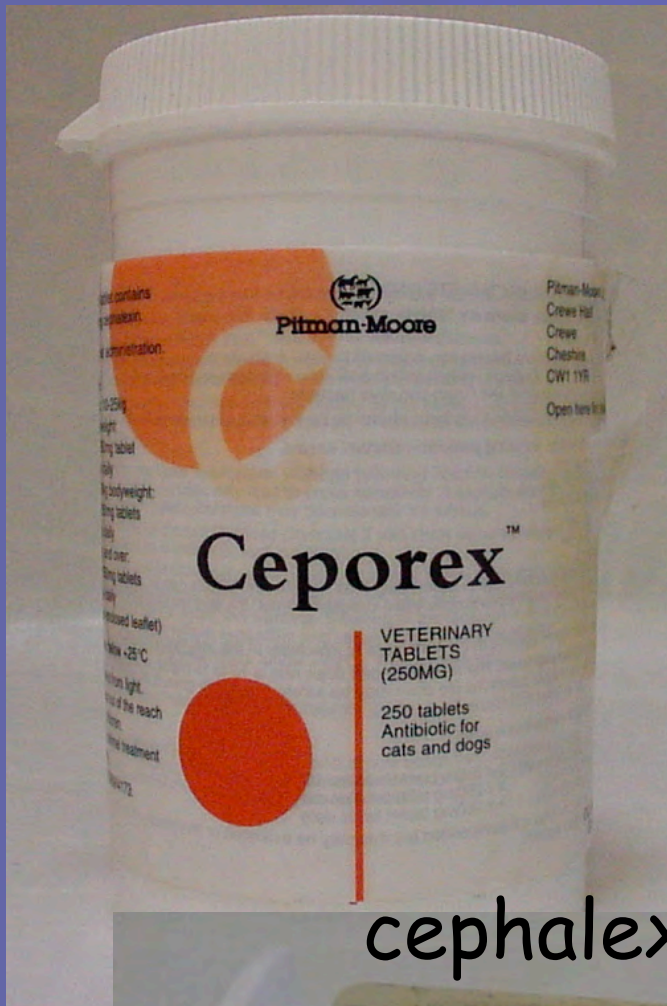
# ANTIMICROBIALS

## Cephalosporins

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







cephalexin







**PRESCRIPTION ANIMAL REMEDY  
KEEP OUT OF REACH OF CHILDREN  
FOR ANIMAL TREATMENT ONLY**

**EXCENEL™**

**Sterile Suspension**

**ceftiofur hydrochloride  
sterile suspension**

Equivalent to:

**50 mg/mL**  
ceftiofur

For the treatment of respiratory  
infections in cattle and pigs and  
bovine foot rot.

100 mL

**Pharmacia & Upjohn**



# ANTIMICROBIALS

## Penicillins and Cephalosporins

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

Adverse reactions

Uses and routes of administration

