

# Penicillin

## Antibiotic Class:

Penicillin (natural penicillin)

## Antimicrobial Spectrum:

Gram-positive: non-beta-lactamase producing gram-positive cocci (including viridans streptococci, group A streptococci, *Streptococcus pneumoniae*, anaerobic Streptococcus), *Enterococcus spp.*, non-penicillinase producing strains of *Staphylococcus aureus*, coagulase negative *Staphylococcus aureus*, *Clostridium spp.* (excluding *C. difficile*), *Actinomyces spp.*

Gram negative: *Neisseria meningitidis*, non-penicillinase producing *Neisseria gonorrhoeae*, *Pasteurella multocida*

## Mechanism of Action:

Exerts bactericidal activity via inhibition of bacterial cell wall synthesis by binding one or more of the penicillin binding proteins (PBPs). Exerts bacterial autolytic effect by inhibition of certain PBPs related to the activation of a bacterial autolytic process.

## Pharmacodynamics:

Penicillins produce time-dependent killing

## Pharmacokinetics:

Table 6

## Adverse Effects:

Hematologic: anemia, thrombocytopenia, neutropenia, agranulocytosis

CNS: seizures

Renal: nephrotoxicity, interstitial nephritis

Hepatic: transient increases in transaminases

Other: Jarisch-Herxheimer Reaction (fever, chills, sweating, tachycardia, hyperventilation, flushing, and myalgia)

## Dosage:

Table 7

Disease state based dosing:

Renal failure: Table 7

## Contraindications/Warnings/Precautions:

Contraindications: hypersensitivity to ampicillin or other penicillins

Precautions:

- Cephalosporin hypersensitivity
- Patients with mononucleosis are more likely to develop a skin rash
- Atopic predisposition (e.g., asthma)

**Drug Interactions:**

Chloramphenicol - decreased antibacterial effectiveness

Cholestyramine - decreased penicillin absorption

Contraceptives - decreased contraceptive effectiveness

Live Typhoid Vaccine - decreased immunological response to the typhoid vaccine

Probenecid - increased penicillin levels

**Pregnancy:**

Category B: No evidence of risk in humans but studies inadequate.

**Monitoring Requirements:**

Therapeutic: Culture and sensitivities, signs and symptoms of infection

Toxic: Periodic CBC, urinalysis, BUN, SCr, AST and ALT, diarrhea, skin rash

**Brand names/Manufacturer:**

Available by many names and manufacturers