

# Tetracycline

## Antibiotic Class:

Tetracyclines

## Antimicrobial Spectrum:

*Staphylococcus aureus*, *Streptococcus pneumoniae*, *Streptococcus pyogenes*, *Streptococcus agalactiae*, *Campylobacter jejuni*, *Haemophilus influenzae*, *Neisseria gonorrhoeae*, *Neisseria meningitidis*, *Clostridium spp.*, *Peptostreptococcus spp.*, *Peptococcus spp.*, *Bacteroides melaninogenicus*, *Bacteroides fragilis*

## Mechanism of Action:

Inhibits bacterial protein synthesis by binding with the 30S ribosomal subunit.

## Pharmacodynamics:

Tetracyclines produce a combination of concentration and time-dependent killing (AUC:MIC ratio).

## Pharmacokinetics:

Dose of 500mg PO: Cmax: 1.5-5 mcg/mL; Tmax: 2-4 hours; Half-life: 6-12 hours; Volume of distribution: 108 L/kg; Table 3

## Adverse Effects:

GI: epigastric burning, abdominal discomfort, nausea, vomiting, anorexia, diarrhea, esophagitis, esophageal ulcers, dysphagia, candidal superinfections

Teeth and bone: (dose/duration related) yellow discoloration of teeth, which turns into a gray-brown permanent discoloration, hypoplasia of enamel, teeth demineralization, skeletal growth retardation

Hepatotoxicity: rare, but fatal; intrahepatic cholestasis, jaundice, azotemia, acidosis, irreversible shock

Renal Toxicity: hyperphosphatemia, acidosis, polyuria, polydipsia

Photosensitivity and hyperpigmentation: red rash to blistering on sun-exposed areas; photoallergic reactions manifested by paresthesias of hands, feet, nose, photo-onycholysis

Auditory: tinnitus, hearing loss

Vision: visual disturbances

CNS: lightheadedness, dizziness, ataxia, drowsiness, headache

## Dosage:

Oral: 250mg, 500mg capsules

Adult dosing (common indications):

Acne vulgaris: 250 mg PO q other day to 500 mg PO q24h

Bartonellosis: 1-2 g/day divided PO in 2-4 doses

Brucellosis: 500 mg PO q6h 4 x 3 plus streptomycin

Chlamydia psittaci infection: 1-2 g/day divided PO in 2-4 doses

Rickettsial disease: 1-2 g/day divided PO in 2-4 doses

Nongonococcal urethritis: 500 mg PO q6h x 7 days

Pediatric dosing:

25-50mg/kg/day in 2 to 4 divided doses OR 0.6-1.2g/m<sup>2</sup> in 2 – 4divided doses

Table 4

Disease state based dosing:

Renal failure: CrCl > 50mL/min: 250mg to 500mg q6h

CrCl 10-50 mL/min: 250mg to 500mg q12h to q24h

CrCl < 10 mL/min: Not recommended

Hepatic failure: No dosing changes recommended at this time.

**Contraindications/Warnings/Precautions:**

Contraindications: Hypersensitivity to tetracycline antibiotics.

Precautions: Usage in newborns, infants, and children less than 8 years of age; risk for tooth discoloration; Renal or liver impairment; Phototoxicity; Veneral disease with suspected coexistent syphilis

**Drug Interactions:**

Oral contraceptives: Decreased contraceptive effectiveness

Warfarin: Increased warfarin effect

Barbiturates, phenytoin, carbamazepine: Decreased serum concentrations of doxycycline

Ethanol: Decreased doxycycline serum concentrations

Antacids, didanosine, sucralfate, multivitamins: decreased tetracycline absorption

Kaolin, bismuth subsalicylate: decreased absorption of tetracycline

Food: Decreased absorption of tetracycline

Milk: Decreased absorption of tetracycline

Table 6

**Pregnancy:**

Category D: Risk established, but benefits may outweigh risk.

**Monitoring Requirements:**

Therapeutic: Culture and sensitivities, serum levels, signs and symptoms of infection, white blood cell count

Toxic: Hypersensitivity syndrome reaction, serum sickness like reaction or single organ dysfunction – Monitor: CBC, LFTs, urinalysis, urea, creatinine, chest radiograph; Drug-induced lupus: monitor antinuclear antibody and hepatic transaminases; General long-term therapy:

Liver and renal function tests, Hematopoietic studies

**Brand names/Manufacturer:**

Available by many names and manufacturers