

Doxycycline

Antibiotic Class:

Tetracyclines

Antimicrobial Spectrum:

Staphylococcus aureus, *Streptococcus pneumoniae*, *Streptococcus pyogenes*, *Streptococcus agalacticae*, *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 200mg PO: Cmax: 1.5-3.6 mcg/mL; Tmax: 1.5-4 hours; Half-life: 14-24 hours; Volume of distribution: 50 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: 20mg, 50mg, 100mg capsules
25mg/5mL suspension
50mg, 75mg, 100mg tablets

IV: 100mg Solution for injection

Dosing in adults (common indications):

Lyme disease: 100-200 mg/day PO x 10-20 days

Periodontitis: 20mg 20 mg PO q12h for up to 9 months

Chlamydial infection: 100 mg PO q12h x 7 days
Bacterial infectious disease, Susceptible infections due to *Vibrio cholerae*, *Brucella species*,
Rickettsiae, *Yersinia pestis*, *Francisella tularensis*, *M. pneumoniae*: 100 mg PO q12h
Table 4, Table 7

Dosing in pediatrics:
2.2-4.4 mg/kg/day in 1-2 divided doses
Table 4, Table 7

Disease state based dosing:
Renal failure: None necessary
Hepatic failure: No dosing changes recommended at this time.

Contraindications/Warnings/Precautions:

Precautions: Usage in newborns, infants, and children less than 8 years of age – risk for tooth discoloration; Phototoxicity

Drug Interactions:

Warfarin: Increased anticoagulant effect
Barbiturates, phenytoin, carbamazepine: Decreased serum concentrations of doxycycline
Oral contraceptives: Decreased contraceptive effectiveness
Ethanol: Decreased doxycycline serum concentrations
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: