

# Antibacterial Drugs Summary

Drug Class & Drugs	Mechanism of Action	Pharmacokinetics (PK) & Resistance	Clinical Uses	Adverse Effects (AEs) & Contraindications
<p><b>Folate Antagonists</b></p> <ul style="list-style-type: none"> <li>• Trimethoprim</li> <li>• Co-trimoxazole (Trimethoprim + Sulfamethoxazole)</li> </ul>	<p>-Inhibits bacterial <b>dihydrofolate reductase</b>, blocking synthesis of purines and DNA .</p> <p>-Co-trimoxazole blocks sequential steps in folate synthesis (Bactericidal synergy).</p>	<p><b>PK:</b> Absorbed orally, given IV in combo. Concentrates in acidic prostatic and vaginal fluids. Reduce dose in renal failure .</p> <p><b>Resistance:</b> Altered reductase with low binding (most important), reduced permeability, overproduction of reductase.</p>	<p>-Acute UTI, Prostatitis, Salmonellosis, Shigellosis</p> <p>-IV for <i>Pneumocystis jiroveci</i> infections.</p>	<p>-Megaloblastic anemia, leukopenia, granulocytopenia</p> <p>-Hyperkalemia and hyponatremia (blocks Na<sup>+</sup> channels)</p> <p><b>-Note:</b> AIDS patients have a high frequency of adverse reactions (fever, rash, etc.)</p>
<p><b>Fluoroquinolones (FQs)</b></p> <ul style="list-style-type: none"> <li>• Norfloxacin (least active)</li> <li>• Ciprofloxacin, Levofloxacin, Ofloxacin</li> <li>• Gemifloxacin, Moxifloxacin</li> </ul>	<p>-Block bacterial DNA synthesis by inhibiting <b>DNA gyrase</b> (topoisomerase II) and <b>topoisomerase IV</b></p> <p>-Gyrase block prevents DNA relaxation; Topo IV block prevents DNA separation during cell division</p>	<p><b>PK:</b> Well absorbed orally, but <b>impaired by divalent Cations</b> (antacids,dairy)Renal elimination (adjust dose in renal failure) EXCEPT Moxifloxacin (hepatic)</p> <p><b>Resistance:</b> Point mutations in binding region or changed permeability.</p>	<p><b>-Cipro:</b> Best for <i>Pseudomonas</i> &amp; Anthrax (drug of choice)</p> <p><b>-Levo:</b> Superior for <i>Strep pneumoniae</i></p> <p><b>-Moxi:</b> Good for anaerobes</p> <p>-UTIs (Except Moxi), bacterial diarrhea, gonococcal infections, tuberculosis (2nd line), respiratory tract infections</p>	<p>-Nausea, vomiting, diarrhea</p> <p><b>-Photosensitivity</b></p> <p><b>-QTc prolongation</b></p> <p>-Cartilage damage/Arthropathy (<b>Contraindicated &lt; 18 years</b>)</p> <p>-Tendonitis and tendon rupture</p> <p><b>-Contraindicated in pregnancy</b></p>

<b>Urinary Antiseptics</b> <ul style="list-style-type: none"> <li>Nitrofurantoin</li> </ul>	-Prodrug activated to metabolites that <b>damage bacterial DNA</b> -Bacteriostatic	-Active against <i>E. coli</i> and enterococci -Resistant: <i>Pseudomonas</i> , <i>Proteus</i> , <i>Enterobacter</i> , <i>Klebsiella</i>	-UTIs - <b>Avoid in Pyelonephritis</b> (does not achieve therapeutic levels outside urine)	-Nausea, vomiting, diarrhea (most common) - <b>Acute pneumonitis &amp; Interstitial pulmonary fibrosis</b> -Hemolysis in G6PD deficiency & megaloblastic anemia . -Polyneuropathies - <b>Colors urine brown</b> - <b>Contraindicated:</b> Impaired renal function & infants < 1 month