

	Co-trimoxazole (Bactrim, Septra)	Nitrofurantoin	Tetracyclines Doxycyclines:E.g	Aminoglycosides (Gentamicin)
MOA	<p>Sulfonamides: inhibit the enzyme Dihydropteroate synthase, thus inhibiting the synthesis of bacterial dihydrofolic acid</p> <p>Trimethoprim: Inhibits the enzyme Dihydrofolate reductase which lead to form tetrahydrofolate</p> <ul style="list-style-type: none"> -Alone, each agent is bacteriostatic (Inhibits the growth of bacteria) -Together they are bactericidal (sequential Synergism) -The optimal ratio of TMP to SMX in vivo is 1:20 	<p>Sensitive bacteria reduce the drug to an active agent that inhibits various enzymes and damages bacterial DNA</p> <p>Effective against E. coli, but other common UT gm- bacteria (<i>P. aeruginosa</i>) may be resistant.</p> <p>Gm+ cocci are susceptible</p>	<ul style="list-style-type: none"> • Broad spectrum antibiotic • Bacteriostatic <p>-Inhibit protein synthesis by binding <u>reversibly</u> to 30 s subunit</p>	<ul style="list-style-type: none"> • Bactericidal antibiotics • Active against gram negative aerobic organisms. • Inhibits protein synthesis by binding to 30S ribosomal subunits.
PK	<p>Sulfonamides :</p> <ul style="list-style-type: none"> -Mainly given orally -Rapidly absorbed from stomach and small intestine. -Widely distributed to tissues and body fluids (including CNS, CSF), placenta and fetus. -Absorbed sulfonamides bind to serum protein (approx. 70%) -Metabolized in the liver by the process of acetylation. -Eliminated in the urine, partly as such and partly as acetylated derivative. <p>Trimetoprim:</p> <ul style="list-style-type: none"> -Usually given orally, alone or in combination with SMX -Well absorbed from the gut. -Widely distributed in body fluids & tissues -More lipid soluble than SMX -Protein bound (approx.40 %) -60% of TMP or its metabolite is excreted in the urine -TMP concentrates in the prostatic fluid 	<ul style="list-style-type: none"> -Absorption is complete after oral use -The drug is well concentrated in the urine -75%of the dose is rapidly metabolised by the liver, 25% is excreted in the urine unchanged , achieving levels of 200ug/ml. -At this concentration , nitrofurantoin is bacteriocidal . - Drug & its metabolites are excreted in the urine by the kidneys. - It turns urine to a dark orange- brown. -Given with food -Keep urinary pH below 5.5 (acidic) to enhance drug activity 	<ul style="list-style-type: none"> -Long acting tetracycline -Usually given orally - Absorption is 90-100 % -Absorption in the upper s. intestine -Protein binding 40-80 % -Distributed well, including prostatic tissues -Cross placenta and excreted in milk -Metabolized in liver - Excreted through non renal route <p>-Absorption is impaired by:</p> <ol style="list-style-type: none"> 1- divalent cations (Ca, Mg, Fe) 2- milk and its products 3- antacids (aluminium hydroxide gel, sodium bicarbonate) 	<ul style="list-style-type: none"> • Poorly absorbed orally • Given I.M,I.V., • cross placenta • Excreted unchanged in urine • More active in alkaline medium

Indications	<ul style="list-style-type: none"> Acute UTIs Complicated UTIs Recurrent UTIs esp. in females Prostatitis (acute or chronic) 	<ul style="list-style-type: none"> -It is used as urinary antiseptics but has little or no systemic antibacterial effect. -Its usefulness is limited to lower UTI's. <p>Dose: 50-100 mg (orally four times daily) for 7 days</p>	<ul style="list-style-type: none"> -Treatment of UTI's due to Mycoplasma & Chlamydia. -Prostatitis 	Severe UTIs caused by gram negative aerobic organisms (pseudomonas) .
ADRs	<ul style="list-style-type: none"> Gastrointestinal: Nausea, vomiting Hypersensitivity due to sulpha Hematologic : Acute hemolytic anemia with patients suffering from 1- Hypersensitivity due to sulpha 2-G6PD deficiency Megaloblastic anemia due to Trimethoprim Kernicterus (displace bilirubin) Crystaluria 	<ul style="list-style-type: none"> -GIT disturbances: nausea, vomiting, diarrhea & gastric bleeding (must be taken with food). -Headache and nystagmus. -Hemolytic anemia -Pulmonary fibrosis 	<ul style="list-style-type: none"> -Nausea, vomiting, epigastric pain and diarrhea (given with food) -Thrombophlebitis (i.v route) -Hepatic toxicity (prolonged therapy with high dose) -Brown discoloration & deformity of teeth (children) -Deformity or growth inhibition of bones(children) -Vertigo -Superinfections 	<ul style="list-style-type: none"> Ototoxicity Nephrotoxicity Neuromuscular blocking effect
#	<ul style="list-style-type: none"> Pregnancy Nursing mother Infants under 6 weeks Renal or hepatic failure Blood disorders 	<ul style="list-style-type: none"> Patients with G 6PD deficiency (hemolytic anemia) Neonates (babies up to the age of one month) Pregnant women (after 38 weeks of pregnancy) 	<ul style="list-style-type: none"> Pregnancy Breast feeding Children (below 10 years) 	<ul style="list-style-type: none"> Renal dysfunction Pregnancy Patients with hearing problem (Diminished hearing) Myasthenia gravis

β -Lactam antibiotics

Fluroquinolones (Ciprofloxacin)

1-Extended- spectrum penicillins (piperacillin)

2-Cephalosporins

-Inhibit bacterial cell wall synthesis

-Bactericidal

Piperacillin

- Effective against *pseudomonas aeruginosa* & *Enterobacter*.
- Penicillinase sensitive
- Can be given in combination with β -lactamase inhibitors as clavulanate, sulbactam, tazobactam.

3rd generation cephalosporins (Ceftriaxone & Ceftazidime)

- Mainly effective against gm- bacteria.
- They are given parenterally

-Given in severe / complicated UTIs & acute prostatitis

Inhibits DNA gyrase enzyme

Used In :

- UTIs caused by multidrug resistance organisms as *pseudomonas*.
- Prostatitis

Antibiotics used for treatment of prostatitis

- TMP/SMX
- 3rd Generation cephalosporins (ceftriaxone)
- Quinolones (ciprofloxacin , levofloxacin)
- Tetracyclines (Doxycycline)

Acute prostatitis:

1. Non- catheter- gm- (*E.coli* or *Klebsiella*), Antibiotics used: TMP/SMX, IV (160/800mg bid), cephalosporin or ciprofloxacin.
2. Catheter associated due to gm- or enterococci.
Antibiotics used: ciprofloxacin or ceftriaxone.

Chronic prostatitis:

E.coli, *Klebsiella* & *Proteus*. Antibiotics used: ciprofloxacin, 500mg bid for at least 12 wks