

ANTIBIOTICS

		Class	Mechanism	Uses	Adverse/SE	Nursing Implications
INHIBITS CELL WALL SYNTHESIS	BETA	PENICILLINS -narrow spectrum -PCNase-resistance -aminopencillins -anti-pseudomonas	-Inhibits cell wall synthesis by inhibiting cross-linking of polymers required for bacterial cell wall	-infections: caused by aerobic, Gram + organisms	-allergic rx: anaphylaxis infrequent but can be fatal -pain at IM site -lg doses leads to CNS effects -rash -diarrhea (oral dose)	-assess for allergies Penicillinase Resistant PCN: hepatotoxic & blood dyscrasias Aminopenicillins=broad spectrum PCN -ampicillin + sulbactam (Unasyn): inhibit beta-lactamases -clavulanatic acid + amoxicillin=Augmentin - ampicillin is leading cause of pseudomembranous colitis-C. difficile -toxic rash: 8-10 days after therapy
	LACTAMS	CEPHALASPORINS	-inhibits bacterial cell wall synthesis, similar to PCN	Four generations: 1 st : Gram + organisms 2 nd : incr. activity against Gram - 3 rd :decr. Gram + activity; incr. Gram -; penetrates CNS 4 th : incr. beta-lactamase activity; incr. Gram + activity	-allergic rx-cross-allergy in some pts allergic to PCN -pain at IM injection site -rash; abdomen, scalp & arms -pseudomembranous colitis— <i>C. difficile</i> ; diarrhea -superinfections DDIs: alcohol, NSAIDs, anticoagulants, thrombolytics, Probenecid, bacteriostatic agents, aminoglycosides	- CSF penetration w/ 3rd generation -assess for previous allergies; fewer allergic Rx than PCN—DC if allergic -monitor for seizures w/ renal dx -may need to give w/ food -monitor IV infusion closely -monitor glucose levels in diabetic -monitor renal status: I&O, CrCl -assess for superinfections; suggest yogurt
		MONOBACTAMS aztreonam (AZACTAM)	-interference w/ cell wall synthesis	-Gram – aerobic bacteria -UTI, septicemia, lower resp. tract infections, soft tissue-- <i>Pseudomonas</i>	- pain or phlebitis @ admin site -GI symptoms: N/V, diarrhea -rash	-must be administered parenterally -can be used for pts allergic to PCNs or cephalosporins
		CARBAPENEMS imipenem,(PRIMAXIN) meropenem (MERREM)	-potent cell wall inhibitor -resistant to beta-lactamase	- very broad spectrum -MRSA, <i>P. aeruginosa</i> -MEROPENEM used for resistant nosocomial infections & meningitis, intra-abdominal infections	-GI: N/V, diarrhea -Hypersensitivity rx: rashes, pruritus - <i>P. colitis</i> , seizures (rarely)	-IM or IV only -penetrates meninges -renally eliminated
		VANCOMYCIN VANCONIN, LYPHOCIN	-inhibits bacterial cell wall synthesis (differs from PCN) -bactericidal	-narrow spectrum-primarily against Gram+ (resistant infections) - <i>Staph (MRSA)</i> ; <i>Strep</i> - Pseudomembranous colitis caused by <i>C. difficile</i>	- ototoxicity (high doses) - nephrotoxicity (high doses) -neutropenia -“Red man/neck” syndrome -drug allergy -give intermittent IV for best effect DDIs: ototoxic & nephrotoxic drugs—aminoglycosides, Amphotericin B, Lasix, aspirin	-caution w/ other ototoxic/nephrotoxic drugs

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INHIBIT	<p>TETRACYCLINES</p> <p>Short acting: Tetracycline, oxytetracycline</p> <p>Intermediate-acting: demeclocycline, methacycline</p> <p>Long-acting: dosycycline, minocycline</p>	<p>-binds to 30S ribosomal subunit, inhibiting binding of tRNA to mRNA-ribosome complex</p> <p>-inhibition of bacterial protein synthesis</p> <p>-bacteriostatic</p>	<p>-broad spectrum, but widespread resistance limits use</p> <p>-1st line for rickettsial infections (RMSF & typhus, Q fever)</p> <p>-Lyme dx; Chlamydial dx</p> <p>-Cholera, Mycoplasma pneumonia</p> <p>-gonorrhea, chlamydia, -acne; <i>Propionibacterium acnes</i></p> <p>-Peptic ulcer dx-<i>H. pylori</i></p>	<p>-gastrointestinal irritation</p> <p>-photosensitivity</p> <p>-CNS: dizziness or unsteadiness</p> <p>-discoloration of teeth</p> <p>-depression of bone growth in children < 8yrs or fetuses</p> <p>-superinfections common (<i>Staphylococcal enterocolitis</i>, <i>C. difficile</i>) or <i>Candida</i> (throat, vagina & bowel)</p> <p>-hepatic toxicity from large doses</p> <p>-nephrotoxicity</p> <p>-delayed blood coagulation</p>	<p>-food impairs absorption, avoid milk and antacids (best on empty stomach)</p> <p>-ZITHROMAX (azithromycin) on empty stomach for 5days</p> <p>-doxycycline can be taken w/ food</p> <p>-use protection from sunlight</p> <p>-assess for signs of superinfection</p> <p>-administer w/ full glass of water</p> <p>-stools may be yellow or green</p> <p>-tongue can discolor</p> <p>-avoid taking old drug (bad rx)</p> <p>-avoid taking iron or vit C within 2-3 hrs</p> <p>DDIs: Questran, iron, calcium binds & impair oral absorption; decr. effectiveness of estrogen contraceptives or PCN</p>
PROTEIN	<p>MACROLIDES</p> <p>erthromycin, clarithromycin (BIAXIN), azithromycin (ZITHROMAX)</p>	<p>-inhibition of bacterial protein synthesis</p> <p>-binds to 50s ribosome and blocks addition of new amino acids</p> <p>-bacteriostatic (low)</p> <p>-bactericidal(high)</p>	<p>-may be used as alternative to PCN G if allergic</p> <p>-PCN resistant <i>Streptococcal</i> & <i>Staphylococcal</i> infections</p> <p><i>-Mycoplasma pneumoniae</i> infections</p> <p><i>-Mycobacterium avium</i> (clarithromycin)</p>	<p>-GI irritation (oral erthromycin)</p> <p>-N/V, diarrhea, abdominal cramping</p> <p>-hepatotoxicity in pregnancy</p> <p>-cholestatic hepatitis</p> <p>-> than 4 Gm/d=hearing loss</p> <p>-thrombophlebitis when given IV</p>	<p>-assess for frequent diarrhea, monitor wt</p> <p>-monitor for hepatotoxicity</p> <p>-give w/ water or food; best on empty stomach</p> <p>-azithromycin should be given on empty stomach (5 days not 7-14)</p> <p>-instruct not to chew or break capsules</p> <p>DDIs: cytochrome P450 inhibitor-incr. levels of theophylline, carbamazepine, warfarin; prevents binding of chloramphenicol & clindamycin to ribosomes (antagonizes effects)</p>
SYNTHESIS	<p>AMINOGLYCOSIDES</p> <p>(gentamicin, tobramycin, amikacin)</p>	<p>-binds to 30S subunit and produces abnormal proteins</p> <p>-bacteriocidal (high)</p>	<p>-Gram – aerobic infections only; Enterobacter, Proteus, Pseudomonas, Klebsiella, Serratia</p> <p>-serious or life-threatening infections</p> <p>For some microorganisms, the combo of aminoglycoside & PCN/cephalosporin leads to incr. synergistic antibacterial activity</p> <p>-topical w/ gentamicin, tobramycin, neomycin</p>	<p>-Ototoxicity (dose-dependent & cumulative)</p> <p>-nephrotoxicity (dose-dependent & cumulative)</p> <p>-acute muscular paralysis (rare)</p> <p>-dizziness, vertigo, ataxia</p>	<p>-does not penetrate CNS</p> <p>-IM or IV only; not absorbed orally</p> <p>-short plasma t1/2; long inner ear & renal tubule t1/2</p> <p>-assess hearing & balance</p> <p>-monitor serum drug levels—peaks/troughs : ototoxicity when levels > 8-10 ug/ml</p> <p>-peak: 1hr after IM, 30 min after IV</p> <p>-trough: prior to next dose</p> <p>-caution w/ anesthetics & muscle relaxants</p> <p>-monitor renal function-CrCl, I & O</p> <p>-DO NOT administer or mix in syringe w/ other drugs</p> <p>DDIs: PCN & cephalosporin (synergy)</p> <p>ototoxic drugs: ethacrynic acid, Lasix</p> <p>nephrotoxic drugs: methoxyluaner, Amphotericin B, cephalosporins, polymixins, vancomycin, cisplatin</p>

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Inhibits folic acid synthesis	<p>SULFONAMIDES</p> <p>sulamethoxazole, sulfadiazine, sulfisoxazole</p>	-act as competitive inhibitor in synthesis of folic acid from precursors; inhibits enzyme (dihydropteroate synthetase)	-broad spectrum -Gram + coccus, Gram- bacilli - urinary tract infections , acute otitis media, ulcerative colitis - infections on burned skin; SILVADENE	-GI irritation: N/V, diarrhea, pancreatitis, hepatitis - hypersensitivity: skin rashes (Steven Johnson syndrome) -nephrotoxic (highly protein bound) -bone marrow toxicity- blood dyscrasia (w/ G-P-6D deficient-hemolytic anemia) -crystalline aggregates in urine	-assess for allergy to sulfa, thiazide diuretics, oral hypoglycemic agents -encourage fluids; 2000-3000 cc/day -monitor I & O -monitor CBS & WBC -take on empty stomach if possible -don't give sulfa to children <12 y/o - photosensitivity -protect against sunlight (clothing) -check other drugs) - sulfasalazine turn urine/skin yellow-orange (harmless) DDIs: hepatic metabolism inhibitor-leads to incr. levels of warfarin, hypoglycemic agents, phenytoin
	<p>TRIMETHOPRIM</p> <p>trimethoprim & sulfamethoxazole=BACTRIM or SEPTRA 1:5 ratio--synergistic</p>	-inhibits dihydrofolic acid reductase enzy -penetrates tissues & concentrates in: breast milk, bile, prostatic fluid, vaginal fluids, liver, spleen & kidney	-active against Gram (-) organisms; <i>Proteus</i> & <i>Klebsiella</i> -in combo w/ (Bactrim & Septra) used to treat P. carinii, UTI's, traveler's diarrhea	-rare w/ trimethoprim alone -blood dyscrasias	-if possible, should be avoided during pregnancy & lactation - DO NOT USE in folate deficient patients -inform patients about sx of blood disorders
	NITROFURANTOIN	-interferes w/ bacterial enzymes; damages DNA -2 nd choice urinary tract antiseptic -Gram + & - organisms	-bactericidal concentrations in urine (not in blood or tissues) -effective for UTIs ; <i>E. Coli</i> , <i>Enterobacter</i> , <i>Klebsiella</i> , <i>Proteus</i> , enterococci & staph	-GI-N/V, anorexia -pneumonitis or pulmonary fibrosis after long use -rashes, allergic rx - urine turns brown (harmless) - peripheral neuropathy	-instruct to monitor blood glucose -may cause false positives on urine tests -take w/ meals or snack -oral suspension may stain teeth -use straw & good oral hygiene
	METRONIDAZOLE (FLAGYL)	-interferes w/ bacterial DNA synthesis by causing strand breakage & loss of structure leads to inhibition of nucleic acid synthesis leads to cell death	- anaerobic infections: <i>Bacteroides</i> , <i>C. diff</i> , <i>H. pylori</i> , <i>Gardnerella</i> - protozoal infections: <i>Trichomoniasis</i> , <i>Amebiasis</i> , <i>Giardiasis</i>	-GI irritation -metallic taste -toxic (disulfiram-like effect) w/ alcohol	-may potentiate action of warfarin; observe for signs of bleeding -caution about disulfiram rx -avoid in pregnancy -avoid in pts w/ CNS disease or blood dyscrasias
	QUINOLONES Ciprofloxacin (CIPRO) Levofloxacin (LEVAQUIN) Ofloxacin (FLOXIN) Sparfloxacin (ZAGAM)	-inhibition of bacterial DNA synthesis by inhibiting enzyme (DNA gyrase); prevents supercoiling & DNA replication cannot take place -bactericidal	-broad spectrum - UTI's (Gram -) difficult to treat w/ other drugs -respiratory infections-pneumonia, bronchitis -bacterial diarrheas (<i>E.coli</i> , <i>Shigella</i> , <i>Salmonella</i>)	-GI irritation: N/V, diarrhea -CNS: dizziness, HA, tinnitus, seizures (rare), insomnia - photosensitivity -tendonitis - damage to growing cartilage -crystalluria w/ alkaline urine -skin rash, itching, SOB, serum sickness	-protect against sunlight - urine may be brown or bright orange -monitor renal status -may cause confusion in elderly - do not use w/ children -don't take AL or Mg antacids DDIs:CIPRO w/ theophylline & warfarin-lowers clearance; Al & Mg antacids, sucralfate, iron, milk-blocks absorption

