summary of antibacterials II

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Sulphamethoxazole + trimethoprim†	Sulphonamides and combination agents	Inhibition of bacterial synthesis of tetrahydrofolate Sulphonamides inhibit dihydrofolate synthetase Trimethoprim inhibits dihydrofolate reductase	Combination used for: *Pneumocystis jiroveci*, *Stenotrophomonas maltophila*, *Listeria monocytogenes*, *Nocardia* spp. Trimethoprim active against some Gram-negative bacilli	Sulphonamides cause: • multiple drug interactions—increase levels of warfarin, phenytoin, cyclosporin • nephritis • hypoglycaemia • Stevens-Johnson syndrome • haemolytic anaemia (especially in G-6-PD deficiency) • thrombocytopaenia • stomatitis • arthritis • conjunctivitis

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Tetracycline† Doxycycline Minocycline	Tetracycline	Bacterial protein synthesis inhibitor via 30S ribosome	Gram-positive and Gram-negative cover but problematic widespread resistance Good cover against *Chlamydophila*, *Mycoplasma*, Rickettseiae, Spirochaetes, *Brucella*, *Coxiella burnetii*	Oesophagitis (doxycycline), tooth discolouration in children, photosensitivity, vestibular reactions and benign intracranial hypertension (especially minocycline) Pancreatitis Hepatitis

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Rifampicin† Rifabutin†	Rifamycin	Inhibit bacterial RNA synthesis by binding to DNA-dependent RNA polymerase	Gram-positive (including staphylococci) and Gram-negative bacteria (including *Neisseria meningitidis* and *Haemophilus influenzae*) Mycobacteria tuberculosis and atypical mycobacteria	Rapid emergence of resistance Multiple drug interactions—reduce levels of warfarin, oral contraceptives, cyclosporin Orange discolouration of secretions Hepatitis Nephritis Thrombocytopaenia

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Linezolid	Oxazolidinone	Bacterial protein synthesis inhibitor via 50S ribosome	Gram-positive cover including MRSA, MRSE, VRE Intracellular organisms Poor anaerobic and Gram-negative cover	Bone marrow suppression MAOI activity with hypertensive crises with catecholamines, and serotonin syndrome with serotonergic agents

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Quinupristin Dalfopristin	Streptogrammin	Bacterial protein synthesis inhibitor—quinupristin inhibits 50S ribosome and dalfopristin interferes with peptidyl transferase	Gram-positive bacilli—*Enterococcus faecium* Gram-negative aerobes—limited to *Neisseria* and *Moraxella* spp. Intracellular organisms Poor CNS penetration	Phlebitis Myalgia Arthralgia

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Imipenem-cilastatin† Meropenem† Ertapenem†	Carbapenem	Bacterial cell wall inhibitor	Broad anaerobic, Gram-positive and Gram-negative cover, including *Pseudomonas* Ertapenem has poor *Pseudomonas* cover Inactive against *Enterococcus*	Hepatitis CNS stimulation

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Tigecycline	Glycylcycline	Bacterial protein synthesis inhibitor via 30S ribosome	Gram-positives, including VRE, MRSA, MRSE Gram-negatives, including ESBL Anaerobes	Gastrointestinal upset Prolonged APTT, PT Abnormal LFTs Rarely pancreatitis

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Gentamicin†‡ Tobramycin†‡ Amikacin†‡	Aminoglycoside	Bacterial protein synthesis inhibitor via binding to 30S ribosome	Aerobic Gram-negatives including *Pseudomonas* Synergistic with cell wall inhibitors	Nephrotoxic Ototoxic Peripheral neuritis Neuromuscular blockade

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Aztreonam†	Monobactam	Bacterial cell wall inhibitor	Aerobic Gram-negatives, including *Pseudomonas*	Phlebitis Hepatitis Thrombocytopaenia

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Ciprofloxacin† Norfloxacin† Moxifloxacin Gatifloxacin	Quinolone	Inhibits DNA gyrase needed for protein synthesis	Predominant Gram-negative cover Ciprofloxacin has reliable *Pseudomonas* cover but no anaerobic or reliable Gram-positive cover Moxifloxacin and gatifloxacin have good anaerobic cover, extended Gram-positive cover (including streptococci), intracellular organisms of atypical pneumonia cover but less reliable *Pseudomonas* cover	Growing cartilage damage Achilles tendinitis Nephritis CNS stimulation Hypoglycaemia with gatifloxacin QT prolongation

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Teicoplanin† Vancomycin†‡	Glycopeptide	Bacterial cell wall inhibitor and inhibition of bacterial protein synthesis	MRSA, MRSE Gram-positives but less effective than anti-staphylococcal penicillins Good cover against penicillin-resistant *Streptococcus pneumoniae* *Clostridium difficile* colitis	'Red man' syndrome from histamine release Nephrotoxic Ototoxic Neuromuscular blockade

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Clindamycin Lincomycin†	Lincosamide	Bacterial protein synthesis inhibitor via 50S ribosome	Gram-positive infections and anaerobes No reliable Gram-negative cover High bone, bile and urine concentrations	Classic cause of pseudomembranous colitis Leukopaenia Thrombocytopaenia Neuromuscular blockade

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Erythromycin† Azithromycin Clarithromycin† Roxithromycin	Macrolide	Bacterial protein synthesis inhibitor via 50S ribosome	Gram-positive, anaerobes and some non-enteric Gram-negative infections Intracellular organisms Azithromycin has reduced Gram-positive activity and cover against atypical mycobacteria and *Toxoplasma gondii* Clarithromycin active against *Helicobacter pylori* and *Mycobacterium avium* complex	Erythromycin has multiple drug interactions—long QT and monomorphic VT, increases levels of digoxin, warfarin, theophylline, cyclosporin Erythromycin causes pancreatitis and nephrotoxicity Azithromycin causes nephritis Thrombocytopaenia with clarithromycin Hepatitis with all

Drug(s)	Class	Mechanism	Spectrum	Specific side effects*
Metronidazole† Tinidazole	Nitroimidazole	Reduced intracellularly in anaerobes to a cytotoxic agent that interacts with DNA and inhibits bacterial protein synthesis	Anaerobes and protozoa, including *Trichomonas*, *Giardia* and *Entamoeba*	Leukopaenia Altered taste CNS stimulation Disulfiram-like reactions