Anaerobes Study Cheat Sheet

IDSTEWARDSHIP TRAINING

Anaerobic Bacteria: bacteria that do not live or grow when oxygen is present. Obligate anaerobes only grow in the absence of oxygen. Facultative anaerobes are able to grow with or without free oxygen.

Clinically Notable Anaerobic Bacteria			
Organism name	**Gram Stain**	**Go-To Drug(s)**	**Notes**
Clostridium perfringens	Gram + rod	Penicillin G	Known as "gas gangrene"; can cause a severe necrotizing infection called clostridial myonecrosis
Clostridium tetani	Gram + rod	See CDC guidance, more than antibiotics	Causes tetanus disease; has a vaccine; tetanus IG and supportive care important for treatment
Clostridium difficile	Gram + rod	Vancomycin PO	Spore forming organism not killed by hand sanitizer
Peptostreptococcus spp.	Gram + cocci	Clindamycin	Associated with mouth infections & skin infections
Cutibacterium acnes	Gram + rod	Penicillin G	Formerly known as *Propionobacterium acnes*; implicated for causing acne vulgaris
Prevotella spp. *Fusobacterium* spp.	Gram – rods	Metronidazole, clindamycin, amox/clav	Associated with bite wounds and oral infections
Eikenella corredens	Gram – rod	amox/clav	Associated with bite wounds; beware resistance to metronidazole and clindamycin
Bacteroides fragilis	Gram – rod	Metronidazole	Associated with intra-abdominal infections

Comparison of Select Anti-Anaerobic Drugs					
	Clindamycin	**Metronidazole**	**Amoxicillin/ clavulanic acid**	**Cefoxitin**	**Moxifloxacin**
Brand name:	Cleocin	Flagyl	Augmentin	Mefoxin	Avelox
Class:	Lincosamide	Nitroimidazole	β-lactam/ β-lactamase inhibitor	Cephalosporin (cephamycin)	Fluoroquinolone
Mechanism:	Binds to 50S ribosomal subunit, interfering with protein synthesis	Interrupts DNA helix, inhibits protein synthesis	Interferes with bacterial cell wall synthesis	Interferes with bacterial cell wall synthesis	Interferes with topoisomerase & DNA gyrase
Available IV + PO:	Yes	Yes	No*	No	Yes
Typical adult dose:	600-1,800 mg/day in 2-4 divided doses	500mg Q8H	500-875mg Q12H	1-2gm Q6-8H	400mg Q24H
Renal adjust:	No	No	CrCl < 30	CrCl < 50	No
B. frag. coverage:	Poor	Good	+/-	+/-	Poor
Side effects:	Diarrhea	Metallic taste, peripheral neuropathy (w/ frequent use)	Diarrhea, hypersensitivity	Diarrhea, hypersensitivity	Many, see fluoroquinolone cheat sheet
Notes:	Has MRSA activity, but beware clinda. resistance in MRSA	No longer first-line for *C. difficile* infxn	Pip/taz has better *B. frag.* coverage than amox/clav	Common intra-abdominal surg. prophylaxis drug	Not commonly a first-line agent

*Amoxicillin-clavulanic acid is available IV in some countries, but not in the United States. In the United States, ampicillin-sulbactam (Unasyn) serves as the IV counterpart to amox/clav.
-NOTE 1: Beyond the cephamycins (cefoxitin and cefotetan), anaerobic activity of cephalosporins is negligible
-NOTE 2: Penicillin, ampicillin, piperacillin-tazobactam, carbapenems, tigecycline, eravacycline, and omadacycline all also have considerable anti-anaerobic coverage. Fidaxomicin is only for *C. difficile* infection.

- Susceptibility testing not usually done for anaerobes due to inadequate lab techniques and poor quality controls
- For bite wounds, amoxicillin-clavulanic acid is a go-to, providing good oral aerobic + anaerobic coverage
- Some say 'clindamycin above the diaphragm, metronidazole below the diaphragm' – b/c if below the diaphragm *B. fragilis* coverage not likely needed and clindamycin covers most of the orodental flora
- Clinicians may suspect anaerobes in a wound if a bad smell is present (e.g., common in diabetic foot infxn)

***C. difficile* Key Points**
- Do not test formed stool for *C. difficile*
- Rule-out other causes of diarrhea to make dx
- Do not test for cure at EOT
- Bezlotoxumab only indicated for adjunctive therapy

Select Abbreviations: CrCl = creatinine clearance, dx = diagnosis, EOT = end of therapy, IG = immune globulin, infxn = infection