

Macrolides + Clindamycin Study Cheat Sheet



Mechanisms of Action

Macrolides and clindamycin are not chemically related, but both bind to the 50S ribosomal subunit of susceptible bacteria, thus interfering with protein synthesis in susceptible bacteria
 → Clindamycin and macrolides can be bacteristatic or bactericidal depending on the bacteria and drug concentration at the site of infection
 → The *erm* genes have been associated with macrolide and clindamycin resistance

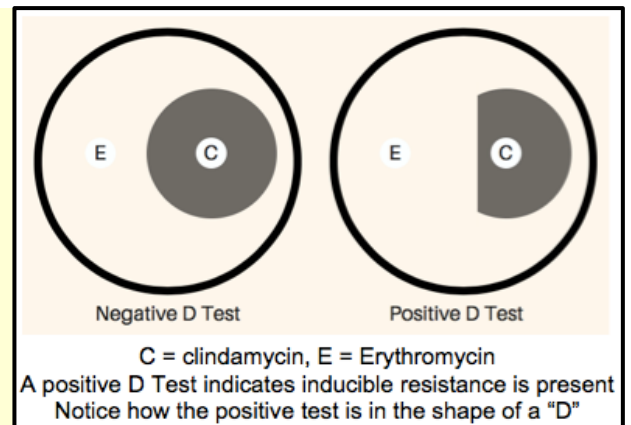
Comparison of Macrolides¹ and Clindamycin

	<u>Erythromycin</u>	<u>Clarithromycin</u>	<u>Azithromycin</u>	<u>Clindamycin</u>
Brand name	Ery-Tab	Biaxin, Biaxin XL	Zpak, Zithromax, Zmax	Cleocin
Class	Macrolide	Macrolide	Macrolide	Lincosamide
FDA-approval	1983	1991	1994	1970
Generic available	Yes	Yes	Yes	Yes
Systemic formulations	IV, PO	PO	IV, PO	IV, PO
Typical PO adult dose	Varies by formulation ²	250-500mg Q12H, XL is 1gm Q24h	250-500mg Q24H	150-900mg given Q6H, Q8H, or Q12H
Renal adjust	No	CrCl < 30	No	No
Hepatic adjust	No	No	No	No
Pregnancy category	B	C	B	B
Side effects	GI effects, QTc prolongation	GI effects, QTc prolongation	GI effects (less), QTc prolongation	Diarrhea, including <i>C. difficile</i> infection
Other	A motilin-agonist, used for GI motility	An important drug for NTM infections	NOT first-line for acute bronchitis, sinusitis, or pharyngitis	A common drug to use in penicillin-allergic patients

¹Fidaxomycin (Difcid) is a macrolide, but has been excluded since it is exclusively used for *Clostridium difficile* infection
²400mg erythromycin ethylsuccinate produces the same serum concentrations as 250mg erythromycin stearate or base

HIGHLIGHTS

- Clindamycin has anti-toxin effects, which can help treat necrotizing infections due to Streptococci or Staphylococci
- Clindamycin has good anaerobic activity, but is not good for *Bacteroides fragilis* and lacks *Clostridium difficile* activity
- Beware clindamycin resistance in MRSA, especially with hospital-acquired MRSA. A D-test is used to confirm susceptibility, which can detect the *erm* gene (an inducible type of resistance other tests may not identify) – see image → → → → → → → → → → → → → → → →
- Clindamycin can be combined with pyrimethamine to treat encephalitis or pneumonitis caused by *Toxoplasma gondii*
- Macrolides are commonly considered for infection due to atypical organisms (e.g., Chlamydia, Mycoplasma, Legionella)
- Azithromycin 1gm x1 is a go-to treatment for sexually-transmitted chlamydia in adults
- Azithromycin comes as a “Z-Pak” dosed 500mg x1 on day 1, then 250mg daily x4 days
- Beware that while a Z-Pak may be prescribed for CAP, *Streptococcus pneumoniae* resistance rates can be a problem
- For CD4 below 50, azithromycin 1200mg weekly is preferred for primary prophylaxis vs *Mycobacterium avium* Complex
- Azithromycin generally has less side effects and less drug-drug interactions than clarithromycin or erythromycin so in turn azithromycin is used more frequently in clinical practice
- Erythromycin topical is commonly used for prophylaxis in newborns to prevent gonococcal ophthalmia neonatorum
- Macrolides play an important role in the treatment of *H. pylori*, which requires combination therapy for treatment
- Macrolides are sometimes employed for their anti-inflammatory effects and to help prevent pulmonary exacerbations
- Some studies have found macrolides are associated with increases in cardiac events, however this is still debated



Abbreviations: CAP = community acquired pneumonia, CrCl = creatinine clearance, HIV = human immunodeficiency virus, IV = intravenous, MRSA = methicillin-resistant *Staphylococcus aureus*, NTM = non-Tuberculosis mycobacterium, PO = oral