

Degradation Properties of Beta-Lactamases

*Grey portions are what they degrade (do not use), white are what they are sensitive too

Beta-Lactamase Type	Organisms Affected	Penicillin	1st gen Ceph	2nd Gen Ceph	cefoxitin	3rd gen Ceph	4th gen Ceph	Aztreonam	Carbapenems	Clavulanate Inhibits Class A	Sulbactam Inhibits Class A	Tazobactam Inhibits Class A	Avibactam Class Inhibits class A (most KPC), C, and Some D (OXA-48)	Vaborbactam Class Inhibits Class A, AmpC, D (KPC)	Relebactam Inhibits Class A, C	Durlobactam Inhibits Class A,C,D
Penicillinase	<i>E. coli</i> , <i>Klebsiella spp.</i> , <i>Enterobacter spp.</i>															
Ambler Class A (TEM, SHV) - Serine Active Site	<i>E. coli</i> , <i>Klebsiella spp.</i> , <i>Enterobacter spp.</i>															
Ambler Class D Oxacillinases (OXA) - Serine Active Site	<i>Acinetobacter</i> , <i>Pseudomonas</i>															
Ambler Class C Cephalosporinases (AmpC) - Serine Active Site	<i>Enterobacter spp.</i> , <i>Serratia spp.</i> , <i>Citrobacter spp.</i> , <i>Providencia spp.</i> , <i>Pseudomonas spp.</i> , <i>Acinetobacter spp.</i>					Avoid ceftriaxone and ceftazidime even if listed as susceptible	if cefepime mic>4, carbapenem preferred	Reduced sensitivity								
Ambler Class A ESBLs (CTX-M, TEM-Type, SHV-Type) - Serine Active Site	<i>E. coli</i> , <i>Klebsiella spp.</i> , <i>Enterobacter spp.</i>					Ceftazidime not always hydrolyzed	Cefepime not hydrolyzed									
Ambler Class D Carbapenemase (OXA-48, OXA-23) - Serine Active Site	<i>Acinetobacter</i> , <i>Pseudomonas</i>					Ceftazidime not always hydrolyzed	Cefepime not always hydrolyzed									
Ambler Class A Carbapenemases (KPC, GES, SME, IMI/NMC-A, SHV38, SFC-1) - Serine Active Site	<i>E. coli</i> , <i>Klebsiella spp.</i> , <i>Enterobacter spp.</i>										Some combos	ceftolozane-tazobactam is not effective			restores imipenem susceptibility to <i>P. aeruginosa</i>	
Ambler Class B metallo-β-lactamases (VIM, IMP, NDM) - Zinc Active Site	<i>E. coli</i> , <i>Klebsiella spp.</i> , <i>Enterobacter spp.</i>												Aztreonam + ceftazidime/avibactam has coverage			