

Acinetobacter. Varying frequencies of these carbapenemase genes in *A. baumannii* have been reported globally, with class D carbapenemase genes most often detected (Sabour et al., 2024). It has been reported to show the presence of type AmpC chromosomal cephalosporinases, extended-spectrum B β -lactamases, type D chromosomal (OXA-51), and plasmid (OXA-23, OXA-24, OXA-58, OXA143, and OXA 134) Carbapenemases, type A Carbapenemases (KPC and GES), and type B Carbapenemases (metallo- β -lactamases), with the alteration of porins and efflux pumps (Requena-Cabello et al 2023).

Acinetobacter baumannii Resistance to carbapenems is mainly mediated through acquired OXA-type carbapenem-hydrolyzing class D B β -lactamases [oxacillinases (OXAs)], encoded by bla_{OXA-23}-like, bla_{OXA-40}-like, bla_{OXA-58}-like, bla_{OXA143}-like, and bla_{OXA-235}-like. Some variants of the intrinsic OXA-51-like carbapenemase confer carbapenem resistance when overexpressed via ISAbal.Freund, the presence of β -lactam antibiotic increased the cytoplasmic anhydromuropeptides which bind to AmpR and activated AmpC while the absence of activating ligand-like peptidoglycan recycled product repressed AmpC expression. Previously, Ryuichi and coworkers determined the AmpC SS-lactamase expression level with or without AmpR and their results suggested that the resistance of CFE-1 (plasmid-encoded AmpC SS-lactamase) to cephalosporins is due to the substitution of Asp135Ala in AmpR of *C. freundii* (Tariq et al 2023). However, regional differences in the distribution of CREC CH β Ls have been observed, with KPC being predominant in North America, OXA-48 and VIM being predominant in Europe, and NDM being the most prevalent in China. A multinational surveillance study based on multi-locus sequence typing (MLST) revealed substantial clonal diversity of CREC, and ST114, ST93, ST90, and ST78 were potential high-risk clones globally widespread in 37 countries (Peirano et al., 2018). ECC strains are intrinsically resistant to cephalosporins due to the production of the chromosomal cephalosporinase bla_{ACT-16} whereas the spread of acquired B β -lactamases has been often documented, such as the class A extended-spectrum beta-lactamases (ESBLs) of the CTX-M and SHV families as well as carbapenemases, such as the VIM- and NDM types (class B), KPC-2 (class A) and OXA-48 (class). (Mavroidi et al 2023). In addition, overexpression of the β -lactamase AmpC, the occurrence of extended-spectrum β -lactamases (ESBLs), such as TEM, CTX-M, and SHV, membrane-associated mechanisms, such as outer membrane permeability, and the overexpression of efflux pumps have been demonstrated to contribute to carbapenem resistance in ECC. *Cloacae*, *M. morganii*, and *C. freundii* respectively. In *C.*