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Recent acquisition of CTX-M-15-encoding gene by *Pseudomonas aeruginosa*

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Abstract

The acquired Ambler class B metallo beta-lactamases (IMP-, VIM-, SPM-, GIM-types) and extended spectrum beta-lactamases (ESBL: GES-, VEB-, PER-types) are widely described among *Pseudomonas aeruginosa* isolates, an opportunistic pathogen that causes severe infections in hospital settings. However, CTX-M-15 has not been reported among non-fermentatives and $bla_{\text{CTX-M-2}}$ is restricted to *P. aeruginosa* isolated from nosocomial infections. In a study conducted to evaluate the dissemination of resistant phenotypes in *Enterobacteriaceae* from Brazilian swine herds, were isolated three *P. aeruginosa* strains with reduced susceptibility to third-generation cephalosporins. One single isolate (190A) harbored $bla_{\text{CTX-M-15}}$ and both (220B and 228A) strains produced CTX-M-2-type ESBL, which were grouped in two clusters according to ERIC-PCR fingerprinting. The 228A and 220B strains exhibited a minimal inhibition concentration (MIC) of 128 mg/L and 190A of 32 mg/L to ceftriaxone, a broad-spectrum cephalosporin currently used in Brazil to treat *P. aeruginosa* infections (Picão, 2009). Moreover, additional resistance to quinolones was confirmed. Here, for the best of our knowledge, it is described for the first time the acquisition of $bla_{\text{CTX-M-15}}$ by *P. aeruginosa* and the establishment of $bla_{\text{CTX-M-2}}$ in Brazilian swine herds, which is a major public health concern because the spread of these resistance genes may result in treatment failure, increasing morbidity and mortality, longer hospital stays, higher costs, and further carbapenems administration, which are often reserved as the drugs of last resort for multidrug resistant pathogens. These findings demonstrate the need of rational use of antimicrobials in livestock and implementation of measures to control dissemination of resistant pathogens through food-production chain.

Biography

Ketrin Cristina da Silva has completed her MSc at the age of 24 years at São Paulo University. Currently, she is a doctoral student supported by FAPESP- Fundação de Amparo a Pesquisa do Estado de São Paulo, and investigates beta-lactamases production by Gram-negatives isolated from food-producing animals in Brazil. She is a young researcher and has recently published her master results in a high impact journal in antimicrobial resistance area.