Marjan M et al., J Med Microb Diagn 2016, 5:4(Suppl)
http://dx.doi.org/10.4172/2161-0703.C1.002

In vitro activity of ceragenins against colistin-resistant clinical isolates of *Klebsiella pneumoniae*

Marjan M. Hashemi, Paul B. Savage, Brian Hilton, Scott Weber
Brigham Young University, USA

The emergence of drug-resistance bacteria such as *Klebsiella pneumoniae* is of global concern and underscores the urgent need for development of novel antibiotics. Ceragenins were designed to mimic the antibacterial activities of endogenous antimicrobial peptides (AMPs), and ceragenins have been shown to possess broad-spectrum activities against Gram-positive and -negative bacteria and fungi(1, 3). As small molecules, ceragenins can be produced at large scale relatively inexpensively, and because ceragenins are not peptide-based, they are not substrates for proteases(2). The objective of this work was a comparative study of representative ceragenins and AMPs, including LL-37, cecropin A, and magainin I, against six clinical isolates of colistin-resistant *K. pneumoniae* (MICs ranging from 16 to 200 μg/mL). MIC assays demonstrated high antibacterial activity of ceragenins against the colistin-resistant strains (MICs ranging from 1 to 8 μg/mL). Killing curves confirmed MBC results and showed that ceragenins, at concentrations of MIC × 2 and MIC × 4, were bactericidal for all tested colistin-resistant and susceptible strains. Through serial passaging, a highly colistin resistant strain (MIC >300 μg/mL) was generated; this strain remained susceptible to lead ceragenins (MICs 1 to 3 μg/mL). Additionally, the disruptive antibacterial effect of a lead ceragenin, CSA-131, on the cell membrane of bacteria was observed through scanning electron microscopy and transmission electron microscopy. The evolutionarily conserved antibacterial mechanism common to AMPs is mimicked by ceragenins, and these antimicrobials retain activity against highly drug resistant *K. pneumoniae.*

Biography

Marjan M Hashemi is a PhD student at Department of Chemistry and Biochemistry, Brigham Young University. She has published 3 papers in reputed journals and attended 6 conferences.

marjan.mhashemi@gmail.com

Notes: