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Evaluation of antimicrobial activity of designed peptides against a Novel Class A β-lactamase in Klebsiella pneumoniae

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Abstract

Klebsiella pneumoniae is a Gram-negative bacterium that is one of the WHO'S priority ESKAPE pathogens which are responsible for a significant increase in mortality worldwide. It has also caused a massive economic burden due to presenting multidrug resistance in the causal pathogen at an alarming rate. The aim of this project is to reverse β -lactam drug resistance in *Klebsiella pneumoniae* by binding designed peptides (designed in silico, produced and purified) to the active site pocket of a novel Class A β – lactamase. Antibiotic sensitivity assessment of the cells harboring the β – lactamase in presence and absence of the peptides has shown some promising results. Alongside this, expression and purification of the novel β – lactamase is being approached for further structure-activity relationship studies.

Biography:

Karina Caetano Souza has completed her BSc Biomedicine and holds a Chemistry Technician Degree. Currently pursuing MRes Global Infectious Diseases research-intense programme. Ms Souza is one of the 16 European students selected for a prestigious DUO-India 2020 academic exchange programme. This academic exchange programme created to facilitate educational exchanges between Asia and Europe and encourage academic research collaborations.

Speaker Publications:

1. "Glutamic acid at position 152 and serine at position 191 are key residues required for the metallo-β-lactamase activity of NDM-7"; Kumar G, Issa B, Biswal S, Jain D, Bhattacharjee A, Ghosh AS; International Journal of Antimicrobial Agents/ 2020 Jan;55(1):105824.
2. "Glutamate residues at positions 162 and 164 influence the beta-lactamase activity of SHV-14 obtained from *Klebsiella pneumoniae*"; Kumar G, Biswal S, Nathan S, Ghosh AS;FEMS Microbiol Lett/ 2018 Feb 1;365(2).
3. "A putative low-molecular-mass penicillin-binding protein (PBP) of *Mycobacterium smegmatis* exhibits prominent physiological characteristics of DD-carboxypeptidase and beta-lactamase"; Bansal A, Kar D, Murugan RA, Mallick S, Dutta M, Pandey SD, Chowdhury C, Ghosh AS; Microbiology/ 2015 May;161(Pt 5):1081-1091.
4. "A single amino acid substitution in the Ω-like loop of *E. coli* PBP5 disrupts its ability to maintain cell shape and intrinsic beta-lactam resistance"; Dutta M, Kar D, Bansal A, Chakraborty S, Ghosh AS; Microbiology/ 2015 Apr;161(Pt 4):895-902.
5. "PBP5, PBP6 and DacD play different roles in intrinsic β-lactam resistance of *Escherichia coli*"; Sarkar SK, Dutta M, Chowdhury C, Kumar A, Ghosh AS; Microbiology/ 2011 Sep;157(Pt 9):2702-2707.

7th World Congress and Exhibition on Antibiotics and Antibiotic Resistance; London, UK- March 16-17, 2020.

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