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Combined effect of linolenic acid and tobramycin on *Pseudomonas aeruginosa* biofilm formation and quorum sensing

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Pseudomonas aeruginosa is a ubiquitous Gram negative opportunistic pathogen capable of causing severe nosocomial infections in humans, and tobramycin is currently used to treat *P. aeruginosa* associated lung infections. Quorum sensing regulates biofilm formation which allows the bacterium to result in fatal infections forcing clinicians to extensively use antibiotics to manage its infections leading to emerging multiple drug resistant strains. As a result, tobramycin is also becoming resistant. Despite extensive studies on drug discovery to alleviate microbial drug resistance, the continued microbial evolution has forced researchers to focus on screening various phytochemicals and dietary compounds for antimicrobial potential. Linolenic acid (LNA) is an essential fatty acid that possesses antimicrobial actions on various microorganisms. It was hypothesized that LNA may affect the formation of biofilm on *P. aeruginosa* and improve the potency of tobramycin. To prove this hypothesis, crystal violet staining assay for biofilm formation and alamarblue cell viability staining assay for biofilm metabolic activity were employed. Quorum sensing, biofilm and virulent factor gene expression levels were analysed with quantitative real time PCR. Phenotypic assays such swarming motility, pyocyanin production, LasA staphylolytic activity and azocasein protease production were also analysed. The present study demonstrated that LNA interfered with cell to cell communication and reduced virulence factor production. It further enhanced the potency of tobramycin and synergistically inhibited biofilm formation through *P. aeruginosa* quorum sensing systems. Therefore, LNA may be considered as a potential agent for adjunctive therapy and its utilization may decrease tobramycin concentration in combined treatment thereby reducing aminoglycoside adverse effects.

Biography

Warren Chanda is a Young Researcher in the field of Microbiology and affiliated with Tropical Diseases Research Centre, Zambia. He is a holds an MSc in Microbiology from Dalian Medical University and BSc in Biomedical Sciences from the University of Zambia. He has much interest in bacteriology and focuses his researches in understanding the host-pathogen interaction, understanding biofilm formation with antimicrobial resistance, and novel drug discovery. He is currently working on understanding the prevalence of poverty-related infections such as tuberculosis and diarrheal diseases, and their drug resistant patterns. His research interests include bacterial biofilm formation, host-pathogen interaction, antimicrobial resistance and novel drug discovery.

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