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Exploring mechanisms of antimicrobial action of extracts and phytochemicals isolated from medicinal plants from Zimbabwe

Stanley Mukanganyama, Batanai Moyo, Lionel Gota, Brendnar Jenda, Gamuchirai Chinogwenya, Rumbidzai Nyamuriya, Benjamin Bhunu, Bridget Mtisi, Tendai Mabhumbo, Santana Mapfunde, Tafadzwa Nyambuya, Tichaona Mtasa, Rumbidzai Mangoyi, Tariro Chitemerere and Simbabrashe Sithole
University of Zimbabwe, Zimbabwe

The World Health Organization suggests that medicinal plants are the best source of obtaining a variety of drugs; therefore, there is need for better understanding of their properties, efficacy and safety. Humans are afflicted with many microbial pathogens that include bacteria, fungi and mycobacteria. However, due to the abuse of antimicrobial agents, most microbes have developed resistance. Plant species used by herbalists might be used as alternative sources of novel antimicrobial agents. Our research focus has been to study the effects of plant extracts and or their pure constituents on the growth of bacteria, fungi and mycobacteria. Chief to our investigations was the need to determine the mechanism by which herbal medicines and their phytochemicals work at a molecular level. Our results showed that many of the plant derived compounds work by interfering with cell membrane integrity and these results in protein leakage or nucleotide leakage from the cells of pathogens. Some of the extracts work by interfering with transport across the membrane where the efflux of compounds from the inside to the outside is blocked. It was also noted that other phytochemicals targeted the virulence factors of the microbial species and these included inhibition of excretion of exoenzymes such as phospholipases and proteases. Bacterial biofilms are structured communities of bacterial cells embedded within a self-produced matrix. Our results also showed that disruption of biofilm formation is another mechanism by which phytochemicals work. Phytochemicals that exhibit multiple mechanisms of actions and novel mechanisms of action need to be identified.

Biography

Stanley Mukanganyama has completed his PhD from University of Zimbabwe and did his Post-doctoral studies at the Department of Chemical Pathology from the University of Cape Town, South Africa. He is an Associate Professor of Biochemistry and the Head of the Department of Biochemistry at the University of Zimbabwe. He has published more than 35 papers in reputed journals.

smukanganyama@medic.uz.ac.zw

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