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Polymeric micelles from PEGylated oleic acid for nano delivery of vancomycin

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Most of the first and second line antibiotics are becoming ineffective against common disease causing bacteria such as *Escherichia coli, Klebsiella pneumoniae* and *Staphylococcus aureus*. In the current scenario of antibiotic resistance and slow rate of development of antibiotics, synthesis of new materials for nano delivery of antibiotics is gaining importance. This approach gives new life to already existing antibiotics by making them more effective against both susceptible and resistant bacterial strains. Lipid-nano delivery systems are popular among drug delivery scientists due to the benefits such as biocompatibility, biodegradability, easy scale-up techniques offered by them. In the present study, we have PEGylated oleic acid, a widely used and bio-safe lipidic pharmaceutical excipient, to obtain an amphiphilic self-assembling polymer, mPEG-OA. The synthesized mPEG-OA was evaluated for formulation development of polymeric micelled (PMs) of vancomycin, a last resort antibiotic to control methicillin-resistant S. aureus (MRSA) infections. The developed PMs were in nano form with particle size, polydispersity index and zeta potential of 120.33±37.7 nm, 0.375±0.108 and -14.6±0.06 mV respectively. Vancomycin was released from PMs, over the period of 48 hours. During *in vitro* antibacterial activity evaluation, PMs showed sustained activity with minimum inhibitory concentrations of 0.4 µg per ml and 5.9 µg per ml against *S. aureus* and MRSA for the period of 48 hours. In conclusion, mPEG-OA and vancomycin loaded PMs thereof can be considered as a promising amphilic polymer for nano drug delivery and nanoantibiotic respectively.

Biography

Calvin Andeve Omolo has completed his BPharmacy from ST John's University of Tanzanzia and is currently a Master of Pharmacy student working in the Novel Drug Delivery Research Group of Professor Thirumala Govender at the University of KwaZulu-Natal. His research is focused on the nano delivery systems for effective antibiotic delivery.

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