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Nanoparticle delivery system for emetine di-hydrochloride as an effective option for malaria treatment

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The field of drug development experiences very low success rates concerning drugs that enter the market. The major disadvantages of conventional antimalarial drugs are the development of multiple drug resistance and nonspecific drug targeting, resulting in the need for high dose administration and subsequent intolerable side effects that ultimately lead to patient non-compliance. To counteract these trends, research has been done in nanotechnology for the development of new biocompatible systems capable of incorporating drugs, lowering the resistance progress, control and treatment of malaria by target delivery. Targeting drugs specifically to their site of action would indeed enable optimal concentration in parasite-infected RBC. Various materials have been used in the formulation of nanoparticles for drug delivery research. Among these, nanoparticles prepared with proteins are biocompatible, biodegradable, non-antigenic, and relatively easy to prepare. We will present here preliminary data investigating the potential of human serum albumin nanoparticles in enhancing the treatment efficacy of antimalarials. Our preliminary validation data on artemether-loaded HSA nanoparticles show a 50% reduction in the IC_{50} values against *P. falciparum* K1 in comparison to drug only controls. Therefore, the current study was undertaken to define the efficacy of human serum albumin (HSA) as a nano carrier strategy to improve and enhance treatment efficacy and reduce non-target side effects for emetine; a drug that discovered through repositioning method at University of Salford. Our *in vitro* results indicated that emetine-loaded HSA nanoparticle permitted ~70% dose reduction compared to emetine only controls. It is expected that this study will eventually lead to a better understanding of nanotechnology delivery system and provide insights into new strategies for developing smart, well-tolerated, and efficacious therapeutic that could be a future ultimate way to cure this disease.

Biography

Muna Abubaker is a Veterinary Graduate who went on to gain a First-Class degree in Biomedical Sciences from the University of Salford (2014). She was awarded Pathways to Excellence PhD studentship to pursue a PhD in Anti-malarial Drug Discovery. She has completed her PhD in 2018. She presented her research at leading national and international parasitology conferences throughout her PhD, including oral and poster presentations at the British Society for Parasitology Conference, American Society of Tropical Medicine and Hygiene Conference and the Natural Product Drug Conference (2017) where she was awarded the Best Poster Prize. She was also awarded the best poster and best oral presentations at the University Salford SPARC conference 2017. She recently co-authored a publication in Nano Medicine titled: Bio-inspired artemether-loaded human serum albumin nanoparticles for effective control of malaria-infected erythrocytes. She is currently finalizing two further manuscripts in order to publish the novel findings from her PhD.

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