Megdi Eltayeb et al., J Nanomed Nanotechnol 2014, 5:5
http://dx.doi.org/10.4172/2157-7439.S1.017

OMICS Group Conferences
Accelerating Scientific Discovery

4th International Conference on
Nanotek & Expo

December 01-03, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

Hybrid nanoparticles for controlled active component loading and release

Megdi Eltayeb[1], Eleanor Stride[2] and Mohan Edirisinghe[1]
[1]University College London, UK
[2]University of Oxford, UK

A key challenge in the production of multicomponent nanoparticles for healthcare applications is obtaining reproducible monodisperse nanoparticles with the minimum number of preparation steps. We report the engineering of novel electrosprayed core-shell polymer-lipid nanoparticles as an active component delivery platform, with high active component encapsulation efficiency, tunable and sustained active component release profile, excellent stability, and potential for active component nanoencapsulation and delivery applications. The nanoparticles comprise two distinct functional components: (i) a hydrophobic polymeric core wherein poorly water-soluble active components can be encapsulated; (ii) an amphiphilic lipid monolayer shell which acts as a molecular barriercontrolling active component release. The physicochemical properties of the nanoparticles including size and electrical conductivity are controlled by varying the composition and concentration of the precursor materials and the electrospraying process parameters. *In vitro* testing indicated that nanoparticle size and active component loading had the greatest influence on the release rate. This method for preparing hybrid nanoparticles in a single step may be useful for combinatorial synthesis of nanoparticles with different properties for active component delivery applications.

Biography

Megdi Eltayeb was awarded his first degree in Medical Engineering from the Queen Mary University of London; subsequently he gained his Master's degree in Biomaterials and Tissue Engineering from the University College London. He is currently a final year PhD research student in the Mechanical Engineering Department, at University College London. His research focuses on novel nanotechnologies to enhance food and bioprocessing application. He has published in the *Journal of Nanotechnology and International Food Research* and has presented in various national and international meetings.

m.eltayeb.11@ucl.ac.uk