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Scientific Tracks & Abstracts

35 YEARS OF EXCELLENCE IN MEDICAL PUBLISHING

Overview of the Advantages and Disadvantages of Different Mucosal Sites for the Delivery of Nanoparticles

Nashwa Osman
Liverpool John Moores University, UK

Nanoparticles (NPs) often improve the efficacy of therapeutic actives, and their delivery to mucosal sites allows for unique and localized effects compared to parenteral delivery. Sites of mucosal surfaces include the eyes, nasal cavity, lungs, and the entire gastrointestinal tract from mouth to anus, and offers extensive areas for the delivery of therapeutics. However, each mucosal site has unique physiological properties that affect aspects such as stability during the transit to the mucosal surface, release of the active molecules, and absorption of NPs into the body. The required NPS properties also differ based on if the goal is for absorption of intact NPs or release of the active molecules at the mucosal site. Therefore, the interaction of the NPS, with the medium that is in contact with the mucosal surface, the mucus layer, and the epithelial cells, must be considered during the formulation process. This chapter focuses on the advantages and disadvantages of delivering NPS through each major mucosal site and offers indications on NPS properties that may be ideal for each site.

Keywords: Nanoparticles, Collagen, delivery.

Biography

Nashwa Osman obtained my Doctor of Philosophy (PhD) in nanotoxicology where the evaluation of polymeric nanocarriers for pulmonary drug delivery was carried out using in vitro cell lines, from Liverpool John Moores University, and entitled 'Toxicology and Cellular Interactions of Polymer-based Nanocarriers for Pulmonary Drug Delivery '. Upon completion of my PhD, I have joined the FDD group as a Postdoctoral Research Fellow at Liverpool John Moores University, developing vaccines for inhalation delivery using nanocarriers.

N.M.Osman@ljmu.ac.uk

Microfluidics-Prepared Uniform Conjugated Polymer Nanoparticles for Photo-Triggered Immune Microenvironment Modulation and Cancer Therapy

Eshu Middha
National University of Singapore, Singapore

Photothermal therapy (PTT) has shown great promise to spatiotemporally ablate cancer cells and further understanding of the immune system response to PTT treatment would contributes to improvement in therapeutic outcomes. Herein, we utilize microfluidic technology to prepare biocompatible conjugated polymer nanoparticles (CP NPs) as PTT agents and assess the immune response triggered by CP-based PTT treatment in vitro and in vivo. Through careful control of the anti-solvent, CP NPs with uniform diameter of 52 nm were obtained. The c-RGD functionalized CP NPs exhibit high photothermal conversion efficiency, inducing effective cancer cell death under 808 nm laser illumination. Using macrophage cells as the model, CP NPs demonstrate effective activation of pro-inflammatory immune response. Furthermore, in tumor-bearing mice model, a single round of CP NPs assisted PTT could efficiently induce anti-tumor immunity activation and ultimately inhibit tumor growth. The study provides detailed understanding of both microfluidic technology for CP NPs fabrication and photothermal-triggered anti-tumor immune responses.

Biography

Eshu Middha expertise in the fabrication of microfluidics devices and nanocarriers for biological applications. Specialized in the production of high-quality polymeric nanocarriers through microfluidics mixers. Keen interest in technology development & commercialization of innovations from the lab. Published 11 research journal papers and hold 2 patents (1 commercialized). Research experience of around 5 years in the formulation of polymer-encapsulated nanoparticles. Industrial experience of over 2 years as a Technologist at Reliance Oil Refinery, India.

eshu@luminicell.com