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Microfluidic approaches for drug delivery applications

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Progress in drug design has led to the development of new peptides, proteins and drug molecules. However, the limited ability to selectively deliver these molecules at well-defined dosing regimens and without invoking drug-resistance remains a significant challenge. Microfluidic devices provide many advantages for applications in drug delivery and crystallization; they require small sample volumes, provide high-throughput screening and allow control of the crystallization. Microfluidics is a multidisciplinary field of science based on the manipulation of fluids in submillimeter dimensions and the conditions that microfluidics offer are completely different from those of bulk set-ups. Other advantages include more thoughtful use of sample and reagent resources, the opportunity to carry out separations and detections with higher resolution and sensitivity, lower cost of the whole procedure, quicker analysis and small footprints for the analytical devices. The first part of the presentation will focus in the formulation of liposomes that have been the centre of attention in research due to their potential to act as drug delivery systems. Although its versatility and manufacturing processes are still not scalable and reproducible. Therefore, the microfluidic method for liposomes preparation will be presented and the results from this preparation process will be compared with traditional methods (e.g. film hydration method and extrusion) in order to understand benefits and drawbacks of microfluidics. The second part will focus on other systems such as polymeric nanoparticles and also studies on continuous microfluidic devices for crystallization.

Biography

Dimitrios A Lamprou is Professor in Pharmaceutical Engineering and MSc Director at the School of Pharmacy in Queen's University Belfast, UK; a member of the Prestigious Russell Group and Visiting Professor at University of Strathclyde, Glasgow, UK with experience of teaching in higher education, conducting research (60+ publications, 200+ conference abstracts, 55+ invited presentations). His group research interests focused on five distinct areas: Biosurface engineering, electrospinning, microfluidics, nanoanalysis, and printing of medicines.

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