Designing Synthetic, Membrane-Active Polymers for Intracellular Delivery and Therapy

Rongjun Chen

Centre for Molecular Nanoscience, School of Chemistry and the Astbury Centre for Structural Molecular Biology, University of Leeds, UK
r.chen@leeds.ac.uk

Abstract

There is a need to better understand the mechanisms of entry into the cell cytoplasm and nucleus in order to design optimal delivery systems for biological molecules. On the one hand, this would open up significant opportunities to deliver potent drug payloads against intracellular targets to positively impact human health. In addition we aim to develop a more general understanding of the rules governing the uptake of biological molecules into cells. This talk will cover our recent efforts to develop biodegradable, membrane-active polymer-based classes of synthetic, self-assembly nanoparticles. This technology mimics the factors that enable efficient viral transfection. The polymers are designed to traverse across extracellular and membrane barriers. They can respond to environmental cues to facilitate the targeted delivery of small molecule and biopharmaceutical agents to the cell interior efficiently for various biomedical applications including anticancer therapy.