CBR

The Centre for Blood Research Seminar Series

Wednesday, May 20th, 2015
LSC 3 - Life Sciences Centre
2350 Health Sciences Mall
12-1pm

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"Bombesin-Directed Magnetic Polymersomes for Cancer Therapy"

Polymersomes consist of amphiphilic synthetic block copolymers that form relatively stable membrane vesicles. In this presentation, the preparation and use of polymersomes is reviewed. Specific anticancer-drug filled polymersomes will then be discussed. Specifically, polymersomes were prepared from pluronic L121 and loaded with magnetic nanoparticles (MNP) and an anti-cancer drug (camptothecin) using a continuously operating micromixing device. Characterization by TEM confirmed the successful incorporation of the MNP and narrow size distribution of the hybrid polymersomes. Drug release of loaded magnetic polymersomes was sustained over several days. Camptothecin polymersomes reduced the cell viability of human prostate cancer cells (PC-3) measured after 72 h significantly, while drug-free polymersomes showed no cytotoxic effects. The polymersomes were then further functionalized with bombesin, a targeting peptide that binds specifically to the GRPR (gastrin releasing peptide receptor) of tumor cells. Specific cell binding and uptake in PC-3 cells was quantified by flow cytometry while imaging was done with fluorescence spectroscopy, confocal microscopy and magnetic resonance imaging. Polymersomes are very versatile agents, can be prepared at large scale with ease using a micromixer, and offer many different options of functionalizing them to turn them into diagnostic, therapeutic or even theranostic targeting and imaging agents.