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Smart nano-systems based on polymeric lipid vesicles and their applications in tumor diagnosis and therapy

Nanoparticles, have emerged as one of the most fascinating drug delivery systems for the controlled delivery of antitumor drugs to improve therapeutic efficacy and reduce systemic toxicity. The design and development of "smart" nanoparticles seek to expand upon the benefits. In this dissertation, amphiphilic modified dextran and its derivatives were synthesized successfully. Based on these polymers, a smart responsive polymeric lipid vesicle (PLV) system was successfully fabricated. It can be used as a multi-functional platform for tumor diagnosis and therapy. The details are as following:

1) The synthesis of the amphiphilic modified dextran and its derivatives.

2) The preparation of smart polymeric lipid vesicles (PLVs) and their application in drug delivery.

3) The preparation of magnetic PLVs (SPIO&DOX-PPLVs) and their applications in tumor magnetic resonance imaging (MRI) diagnosis and therapy.4) The preparation of smart pH-responsive upconversion nanoparticles (RB-UPPLVs) and their application in near-infrared (NIR) light-triggered photodynamic therapy.5) The preparation of smart upconversion nanocarriers and their application in combination tumor treatment.

All of the results suggest that the PLVs can be used as a kind of platform technology to develop different nano-systems, may be promising nanocarriers for tumor diagnosis and therapy applications.

Biography

Jin Chang has completed his PhD at the age of 31 years from Nankai University and Postdoctoral Studies from School of Chemical Engineering, Tianjin University, China. He is the Vice Dean of Health Science Platform, Tianjin University and the Director of Tianjin Engineering Research Center of Micro-Nano Biomaterials and Detection-Treatment Technology. He has published more than 200 papers in reputed journals and has been serving as a Deputy Editor of Biomedical Engineering and Clinical Medicine.

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