

Polymer-based Gene and Cell Delivery for Immunocancer Therapy

In this study, we designed polymeric gene carrier consisting of polymer and drug, and applied it to anti-cancer therapy. We prepared hypoxia-responsive mesoporous silica nanocarrier for an enhanced immunocancer therapy assisted by photodynamic therapy. Nanocarrier was designed as a hypoxia-responsive transforming carrier to improve the intracellular uptake of nanocarriers and the delivery of adjuvants to DCs.

As a cell therapy strategy, we used tumor-homing ability of natural killer (NK) cells for the delivery of drug-loaded polymeric micelle. NK cells are decorated with the immunological synapse environment-responsive micellar system to ensure the release of payload when they attack cancer cells. Harnessing the intrinsic mechanism for the recognition of abnormal cells and the tumor-homing effect of NK cells limit the adverse systemic effects of chemotherapeutic drugs. The overall design concept, physicochemical properties of polymeric micelles, in vitro behaviour and in vivo tumor-targeting ability will be presented in this presentation.