Development of superparamagnetic iron oxide nanoparticles via direct conjugation with ginsenosides and its in-vitro study - DTU Orbit (13/12/2018)

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The current study focused on direct conjugation of superparamagnetic iron oxide nanoparticles (SPIONs) with ginsenosides CK and Rg3. The direct conjugation approach was low-cost, eco-friendly, simple, fast and high yield. The synthesized conjugates (SPION-CK and SPION-Rg3) were characterized by field emission transmission electron microscopy, dynamic light scattering, zeta potential, X-ray diffractometer, and magnetometer. The characterization results confirmed the formation of SPIONs conjugates. The maximum attaching percentage for ginsenosides to SPIONs was found to be 5%. In vitro cytotoxicity assay in HaCaT keratinocyte cells revealed that the conjugates were non-cytotoxic to normal cells. Moreover, the anti-inflammatory activity of SPION-CK and SPION-Rg3 were investigated. The expression of reactive oxygen species (ROS) in lipopolysaccharide-activated RAW 264.7 (murine macrophage cells) were inhibited by SPIONs conjugates in a dose-dependent manner. In addition, SPION-CK and SPION-Rg3 significantly reduced the production of nitric oxide and inducible nitric oxide synthase (iNOS) in a dose-dependent manner in the lipopolysaccharide-induced RAW 264.7 cells. Overall the results suggested that the SPIONs were conjugated with ginsenosides CK and Rg3 by using direct conjugation approach were non-cytotoxic and can be used as a carrier for intracellular release of ginsenosides in inflammatory diseases.

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