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[3] Wu, C.-H.; Chen, M.-C.; Su, P.-C.; Kuo, H.-H.; Wang, C.-L.; Lu, C.-Y.; Tsai, C.-H.; Wu, C.-C.; Lin, C.-Y., *J. Mater. Chem. A* 2014, 2 (4), 991-999.

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DEVELOPMENT OF CORE-SHELL HYBRID NANOMATERIAL FROM IRON OXIDE NANOPARTICLES AND MODIFIED CHITOSAN FOR TARGETED DRUG DELIVERY

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In this study a tumour selective core-shell hybrid nanomaterial was prepared by using iron oxide nanoparticles as core, folic acid conjugated chitosan as shell and tripolyphosphate (TPP) as crosslinking agent. The iron oxide nanoparticles (Fe_3O_4) prepared by co-precipitation method from iron salts were coated with folate conjugated chitosan. Conjugation of folate to chitosan permits receptor mediated endocytosis via the folate receptor (FR) which is over expressed in wide variety of malignant tumours and delivery of the conjugate into the cytoplasm of cells. The surface morphology, particle size, elemental analysis, crystal structure, presence of polymer-coating, and magnetic property was confirmed by various measurements, including scanning electron microscopy (SEM), x-ray diffraction (XRD), thermo gravimetric analysis (TGA), energy dispersive spectroscopy (EDS), Fourier transform infra-red (FTIR) analysis and vibrating-sample magnetometry (VSM). The characterization results from Fourier transform infra-red (FTIR) spectroscopy, energy dispersive spectroscopy (EDS) and thermo gravimetric analysis (TGA) indicated a successful binding of folate conjugated chitosan on the magnetic nanoparticles and the chitosan content was found to be 33.22% by weight from TGA. SEM images showed that spherical structured particles with an increased particle size were obtained as the magnetic nanoparticles were encapsulated by folate-chitosan layer. The results of XRD analysis implied that the prepared Fe_3O_4 crystals were cubic spinel in structure with crystallite size of 7.2 nm. The VSM analysis indicated that the prepared Fe_3O_4 nanoparticles were superparamagnetic with a magnetization value 57.75 emu/g. These results indicate that the folate-chitosan coated Fe_3O_4 nanoparticles can be used as a potential anticancer drug carrier which will reduce toxic side effects and improve cellular uptake of drugs with selective targeting and sustained release of drugs.