

Accepted Manuscript

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PII: S0021-9797(16)30887-6
DOI: <http://dx.doi.org/10.1016/j.jcis.2016.11.014>
Reference: YJCIS 21742

To appear in: *Journal of Colloid and Interface Science*

Received Date: 13 September 2016
Revised Date: 3 November 2016
Accepted Date: 5 November 2016

Please cite this article as: A. Mashhadi Malekzadeh, A. Ramazani, S.J.T. Rezaei, H. Niknejad, Design and construction of multifunctional hyperbranched polymers coated magnetite nanoparticles for both targeting magnetic resonance imaging and cancer therapy, *Journal of Colloid and Interface Science* (2016), doi: <http://dx.doi.org/10.1016/j.jcis.2016.11.014>

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Design and construction of multifunctional hyperbranched polymers coated magnetite nanoparticles for both targeting magnetic resonance imaging and cancer therapy

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Abstract

Magnetic drug targeting is a drug delivery strategy that can be used to improve the therapeutic efficiency on tumor cells and reduce the side effects on normal cells and tissues. The aim in this study is designing a novel multifunctional drug delivery system based on superparamagnetic nanoparticles for cancer therapy. Magnetic nanoparticles were synthesized by coprecipitation of iron oxide followed by coating with poly citric acid (PCA) dendritic macromolecules via bulk polymerization strategy. It was further surface-functionalized with poly(ethylene glycol) (PEG) and then to achieve tumor cell targeting property, folic acid was further incorporated to the surface of prepared carriers via a facile coupling reaction between the hydroxyl end group of the PEG and the carboxyl group of folic acid. The so prepared nanocarriers (Fe₃O₄@PCA-PEG-FA) were characterized by X-ray diffraction, TEM, TGA, FT-IR, DLS and VSM techniques. The room temperature VSM

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