Nanosized magnetofluorescent Fe_3O_4-curcumin conjugate for multimodal monitoring and drug targeting

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Abstract: Magnetic drug targeting, the targeting of a drug conjugated with a magnetic material under the action of external magnetic field constitutes an important drug delivery system. This paper describes the strategy to design a multifunctional, nanosized magnetofluorescent water-dispersible Fe_3O_4-curcumin conjugate and its multiple ability to label, target and treat the tumor cells. The conjugate possesses magnetic nano Fe_3O_4 core, chitosan (CS) or oleic acid (OL) as outer shell and entrapped curcumin (Cur), serving dual function of naturally autofluorescent dye as well as anti-tumor model drug, delivered to the cells with the help of macrophage (Cur possesses anti-oxidant, anti-inflammatory and anti-tumor ability). Fe_3O_4-Cur conjugate exhibited a high loading cellular uptake which was clearly visualized dually by Fluorescence Microscope, Laser scanning confocal microscope (LSCM) as well as magnetization measurement (Physical properties measurement systems, PPMS). Preliminary magnetic resonance imaging (MRI) study also showed a clear contrast enhancement by using Fe_3O_4-Cur conjugate. ?? 2010 Elsevier B.V.

Author Keywords: Chitosan (CS); Curcumin (Cur); Laser scanning confocal microscope (LSCM); Macrophages; Magnetofluorescent Fe_3O_4; Oleic acid (OL); Physical properties measurement systems (PPMS)

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