High Performance of In vivo Dual T1/T2 Imaging using Iron Oxide Nanoparticle Complex with EGFR Targeting

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Abstract :
In this study, we would like developed an enhancement contrast agent of magnetic resonance imaging (MRI). It will have greatest advantages of the contrast agent in vitro and in vivo: 1) Dramatic detection sensitivity; Fe₃O₄ nanoparticles conjugated Gd-DTPA (gadolinium-diethylenetriaminepentacetate) complexes will enhance the ability of MR imaging in five times stronger than commercially available contrast agents. 2) Targetable function: Equipment targeting motif of MRI contrast agents avoid to be recognized and cleared by the immune system or reticuloendothelial system, which provides longer visualization time window to perform diagnostic examination. In conclusion, our study presents a dramatic, sensitive diagnostic tool with longer observation time-window than current commercially contrast agents. The lower working dose also decreased the intolerable side effects. 3) Excellent biocompatibility: The core of Fe₃O₄ nanoparticles have been demonstrated the outstanding biocompatibility in vivo by our previous study. Gd-DTPA has been applied in clinical usage. In this study, the cores of synthesized dendrimers are formed by PEG, and many studies have demonstrated their biological stealth function as well as the safety issue in vivo.

KEY WORDS: MR imaging, Dual T1/T2 imaging, nanoparticle, targeting