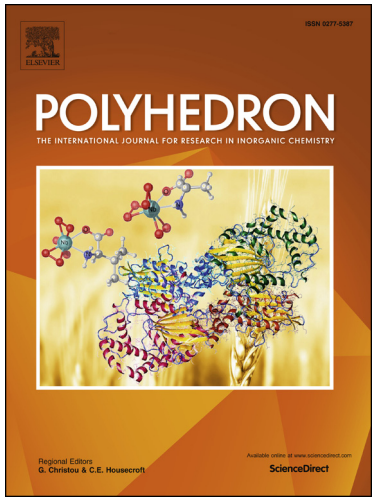


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# Binuclear gadolinium(III) complex based on DTPA and 1,3-bis(4-aminophenyl)adamantane as a high-relaxivity MRI contrast agent

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**ABSTRACT**

A novel dimeric gadolinium(III) complex, bis(4-Gd-DTPA-aminophenyl)adamantane (**5**), was successfully synthesized using bis(4-aminophenyl)adamantane to link two Gd-DTPA units. All the intermediates and bis(4-Gd-DTPA-aminophenyl)adamantane (**5**) have been characterized by $^{1}$H NMR,$^{13}$C NMR, ES-API-MS, HR-ESI-MS, FT-IR and elemental analysis (EA). The longitudinal relaxivity of bis(4-Gd-DTPA-aminophenyl)adamantane is 8.43 $mM^{-1}Gd^{-1}s^{-1}$ at 0.43 T (32 °C, pH 7.0), and 4.89 $mM^{-1}Gd^{-1}s^{-1}$ at 3.0 T (32 °C, pH 7.4). The $T_1$-weighted imaging in vitro showed that bis(4-Gd-DTPA-acetylaminophenyl)adamantane can enhance the contrast of images distinctly. But most of all, the kinetic inertness of bis(4-Gd-DTPA-aminophenyl)adamantane (**5**) was comparable to that of $[Gd(DTPA)(H_2O)]^{2-}$(Magnetvist®). Moreover, cytotoxicity tests indicated that the bis(4-Gd-DTPA-acetylaminophenyl)adamantane exhibited low toxicity to healthy liver cells (L-02 cells). These results demonstrate that the Gd(III) complex **5** may be a promising MRI contrast agent candidate.

*Keywords:* adamantane, DTPA, rigid linker, MRI contrast agent, high relaxivity

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