

Mn(II)-NODAHep: a new amphiphilic contrast agent for MRI

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Abstract: Magnetic resonance imaging (MRI) is a non invasive technique which is based in the relaxation properties of excited protons of water in tissues. This technique is very useful to visualize soft tissues, taking in advantage the differences in proton density in different tissues to obtain the image contrast. However, the contrast can be enhanced using paramagnetic ions as contrast agents (CA). Gd(III) is the most used paramagnetic ion for this purpose, nevertheless Mn(II) can also be used [1]. Presently, there is only one FDA approved manganese-based CA (Telascan) [2]. In this case the Mn(II) ion is slowly released in the tissues and the contrast observed is due to biomolecules-associated Mn(II).

In this work we present a new ligand (NODAHep = 1,4,7-triazacyclononane-*N,N'*-acetic acid-*N''*-heptane, Figure 1) for Mn(II). The ligand is pentadentate, leaving one coordination site in the inner-sphere of Mn(II) for a water molecule, and presents an alkylic side chain projected to make the chelate amphiphilic, increasing the rotational correlation time and, as a consequence, enhancing the chelate relaxivity [3]. The cmc of the chelate was determined by fluorescence using ANS (8-Anilino-naphthalene-1-sulfonate) as probe. The relaxivity of the chelate was measured at 20 MHz in the presence and absence of bovine serum albumin. The pH and temperature dependence of the relaxivity was also studied. Furthermore, relaxivity measurements enabled investigating the stability of the chelate in the presence of Zn(II).

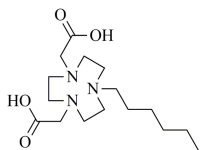


Figure 1 – NODAHep.

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