Comparaison of multimeric DO3A and DOTAGA gadolinium dendron conjugates

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The multivalent character of dendrimers has positioned these well-defined and highly branched macromolecules at the forefront in the development of new contrast agents for magnetic resonance imaging (MRI). In recent years, several research groups have explored the use of dendrimers as a new class of MRI contrast agents^(2,3). Indeed, by modifying the periphery of the dendrimer with gadolinium (III) chelates grafting, the relaxivity of the resulting MRI contrast agent is increased considerably compared to low molecular weight Gd(III) chelates⁽¹⁾.

The aim of our project is therefore to synthesize a bimodal contrast agent for MRI and optical imaging, specific for the detection of atherosclerotic plaques. In the poster, the dendrimer 1 and 2 (scheme below) syntheses will be described. They correspond to a generation 1 dendrimer, synthesized via 6-step reaction from Bis(3-aminopropyl)amine. They exhibit 4 primary amine functions on the periphery which can be functionalized either with an organic ligand derived from Gd-DO3A (compound 1) and then metalated with Gd-DOTAGA chelate (compound 2). The efficiency of these two structures to improve MRI sensitivity will be compared.



Compound 1

compound 2

As perspectives, we will optimize the grafting conditions to obtain a tetra gadolinium product in sufficient quantity. After grafting an optical probe and a peptide, *in vitro* and *in vivo* tests will be performed at the Center for Microscopy and Molecular Imaging (CMMI) and toxicity tests on HUVEC cell lines will be done at the University of Ghent.

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