Synthesis of a bimodal contrast agent for MRI and photoacoustic
Devreux Marie [a], Henoumont Céline [a], Dioury Fabienne [b], Laurent Sophie [a][c]

[a] Université de Mons, UMONS, RMN & imagerie moléculaire, 23 Place du Parc, 7000 Mons (Belgique)
[b] Conservatoire national des arts et métiers, Laboratoire CMGPCE, EA 7341, Paris (France)
[c] Centre de microscopie et d’imagerie moléculaire, 8 rue Adrienne Bolland, 6041 Charleroi (Belgique)

Magnetic resonance imaging (MRI) is a technique used to obtain anatomical information thanks to its high resolution. It has however a low sensitivity and the use of a contrast agent can improve the quality of images. To compensate this weakness, it is interesting to couple MRI with another technique like photoacoustic imaging (PI). In fact, PI has a greater sensibility than MRI but it has a low resolution. Consequently, it may be useful to set up a bimodal contrast agent.

The strategy to obtain this targeted probe is to use a lysine as a linker to allow the connection between the probe for MRI and PI. The probe for MRI is the PCTA chelated with gadolinium ion and the probe for PI is the fluorophore ZW800-1. Each molecule was characterized by NMR and mass spectrometry. After complexation with gadolinium ion, molecules were characterized also by relaxometry, NMRD profile and oxygen-17 NMR. This study has shown the loss of one molecule of water in the inner sphere and the formation of π-stacking after the addition of ZW800-1. Moreover, one function is still available on the linker to add a peptide or another organic molecule to make the bimodal contrast agent specific.