

HYBRID NANOPARTICLES FOR MRI AND PHOTOLUMINESCENCE IMAGING APPLICATIONS IN CELLS TRACKING

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Molecular complex type contrast agents (CA) which are used for in vivo MRI measurements have a full body distribution decreasing its concentration within the vicinity of a targeted site. This requires the injection of very high CA amounts. Our goal is to synthesize new MRI contrast agents containing inorganic nanoparticles able to complex lanthanide chelates. This has the following advantages: (i) locally increases the CA concentration, and (ii) significantly increases the degree of contrast in T1, as shown by preliminary tests.¹ (iii) affords bifunctional nanoparticles (contrast and optical).²

Our aim is to combine in the same particle, contrast, optical and targeting agents, in order to have a strong potential of specific recognition of certain tissues or organs. Tissues specificity will improve the clinical diagnosis and decrease the used CA amounts, because the contrast agent may concentrate close to the target. The chemical nature of the nanoparticles we are looking at is multiple: silica SiO₂, γ -Fe₂O₃@SiO₂ core-shell particles and silica shell. Lanthanide chelates (for their paramagnetism or photoluminescence properties) are grafted on these particles and we study the properties especially in the interactions between the iron oxide T2 and Ln T1 contrast agents. The final aim is to introduce these nanoparticles in living cells and follow their behaviour.

References:

¹ Voisin, Pierre; Ribot, Emeline Julie; Miraux, Sylvain; Bouzier-Sore, Anne-Karine; Lahitte, Jean-Francois; Bouchaud, Veronique; Mornet, Stéphane; Thiaudiere, Eric; Franconi, Jean-Michel; Raison, Lydia; Labrugere, Christine; Delville, Marie-Helene. *Bioconjugate Chemistry* **18(4)** (2007), 1053-1063.

² Yu, Shi-Yong; Zhang, Hong-Jie; Yu, Jiang-Bo; Wang, Cheng; Sun, Li-Ning; Shi, Wei-Dong. *Langmuir* **23** (2007), 7836-7840