Fluorous Probes as Smart Imaging Tools

Valentina Dichiarante[1]
Francesca Baldelli Bombelli,[1] Pierangelo Metrangolo,[1] Claudia Pigliacelli,[2] Giancarlo Terraneo[1]

[1] Laboratory of Supramolecular and Bio-Nanomaterials (SBNLab), Dept. Chemistry, Materials, and Chemical Engineering "Giulio Natta", Politecnico di Milano, via L. Mancinelli 7, 20131 Milano, Italy
[2] Hyber center of Excellence, Dept. Applied Physics, Aalto University, Puumiehenkuja 2 FI-00076, Espoo, Finland

valentina.dichiarante@polimi.it

Abstract

The search for novel sensitive, robust, and selective diagnostic tools for non-invasive *in vivo* imaging is a priority of current medical practice, in order to improve early diagnosis of diseases and implementation of targeted therapies. Our research in this field is focused on the development of new fluorinated contrast agents enabling ^{19}F-MRI, as a complementary tool to be coupled with other diagnostic imaging techniques, such as ^{1}H-MRI and ultrasound imaging (US), in order to overcome their present shortcomings, particularly in terms of sensitivity. ^{19}F-MRI has emerged as one of the most promising diagnostic tools providing hot spot imaging [1]. We recently reported aqueous emulsions of a unique fluorinated imaging agent (PERFECTA, Figure 1) bearing 36 equivalent ^{19}F atoms and therefore showing a single, intense resonance peak. Preliminary investigations have demonstrated excellent cellular compatibility and spectral properties (relaxation times and sensitivity) adequate for *in vivo* ^{19}F-MRI use [2]. Chemical modification of PERFECTA's branched scaffold allows its coupling to other functional moieties, giving multimodal nanoplatforms. Following this approach, a novel class of highly fluorinated gold clusters were obtained [3], and confined in protein-stabilized supraparticles working as water-soluble nanocontainers for fluorinated guest molecules [4].

Figures

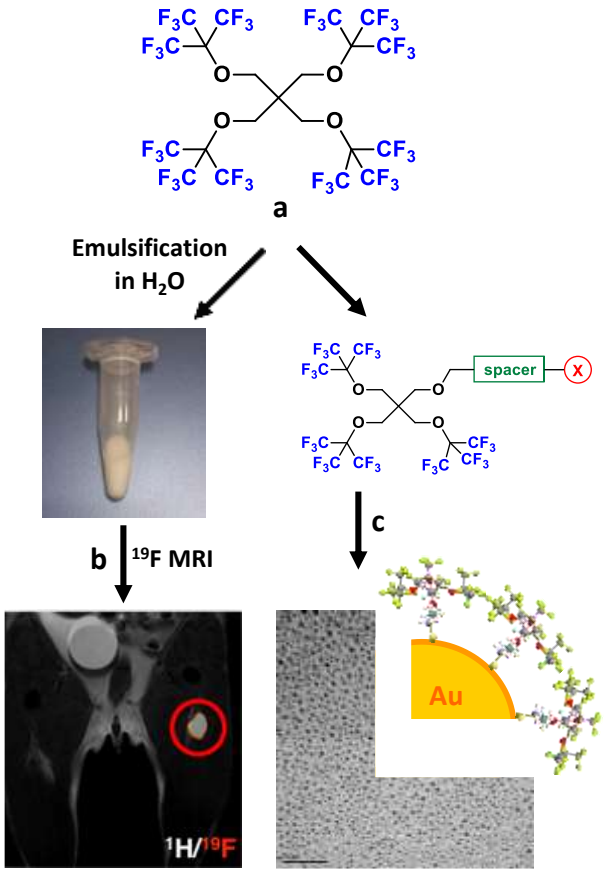

Figure 1. PERFECTA (**a**) yields stable aqueous emulsions that are suitable as contrast agents for *in vivo* ^{1}H/^{19}F-MRI (**b**). Chemical modification of its scaffold led to a highly fluorinated ligand that was efficiently used for the synthesis of fluorous gold clusters (**c**).

References

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