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FLUORINATED NANOMATERIALS AS POWERFUL BIOIMAGING TOOLS IN MEDICINE

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This work addresses the current need for novel sensitive, robust, and selective diagnostic tools for non-invasive in vivo imaging, which are able to improve the medical practice through earlier diagnosis of disease, implementation of targeted therapies, and localization of diseased tissues. Our approach is based on the development of sustainable fluorinated probes enabling ^{19}F -MRI, as a complementary tool, to be coupled with other diagnostic imaging techniques such as ^1H -MRI, Raman and fluorescence imaging, in order to overcome their present shortcomings. This talk reports about a unique fluorinated imaging agent (PERFECTA) bearing 36 equivalent ^{19}F atoms and therefore showing a single, intense ^{19}F -NMR signal. Biocompatible nanoformulations of PERFECTA demonstrated excellent cellular compatibility and spectral properties (relaxation times and sensitivity) adequate for in vivo ^{19}F -MRI use (Figure 1) [1-2]. In this presentation PERFECTA ability to work as multiscale and multimodal probe will be shown [3]. Moreover, effects of fluorination on self-assembly of PERFECTA amphiphilic derivatives [4] will be also presented as well as their biological interactions and response.

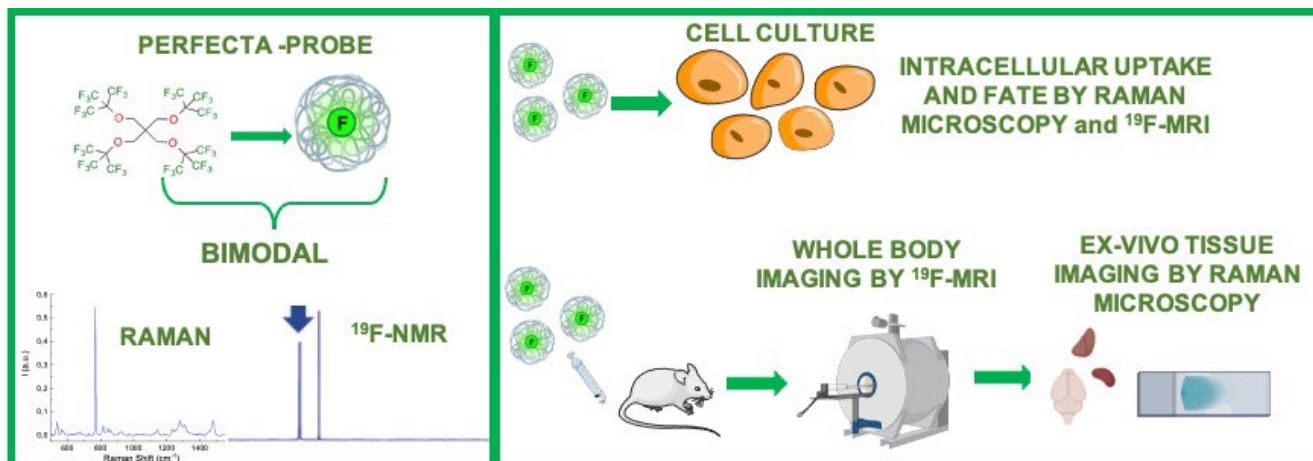


Figure 1. (Left) Molecular structure of PERFECTA and schematic drawing of a representative nanoparticle (F-NP) containing it. Typical Raman and ^{19}F -NMR spectra of PERFECTA NP dispersions. (Right) Representative scheme of F-NP applications in medicine as diagnostic tool for ex-vivo and in vivo cell labelling.

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