Hybrid nanoparticles for multimodal imaging and therapy

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One of the areas of nanotechnology that has captured great interest by scientific community worldwide is the development of nanoengineered multifunctional systems, which may be potentially used in a clinical strategy that simultaneously combine a (multi)diagnostic test and single or combined therapies based on the test results, the so-called nanotheranostic devices [1]. In this work, we present different hybrid nanoplatforms either with an inorganic or an organic core with anisotropic shape recently developed by our research group which are able to combine different elements in their structure to provide several simultaneous imaging (magnetic resonance (MR) and fluorescence imaging) and therapeutic (photothermal (PTT), photodynamic (PDT), chemo- and/or silencing therapies) capabilities in a single nanodevice. These nanodevices can be passively accumulated or targeted to specific receptors by suitable functionalization and are obsevred to be extensively accumulated in cancerous cell and tumors, exerting an enhaced dual imaging contrast and cytotoxic functions as observed *in vitro* and *in vivo*.

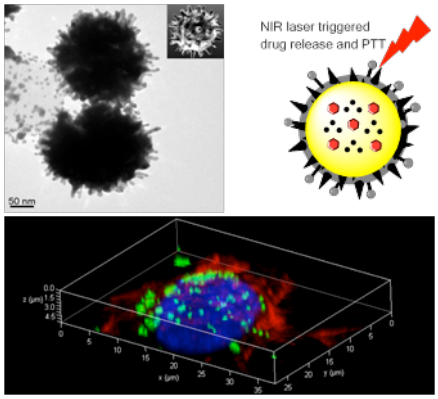

Figure: TEM image (left) and scheme of one of the proposed anistropic theranostic nanodevices. Below a 3D reconstructed fluorence image of nanohybrid localization (in green) inside a HeLa cell is shown.

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