Versatile silica nanoparticle coating for intracellular and *in vivo* targeting analysis

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Particle selective accumulation in target tissues is pivotal in nanomedicine to improve treatment efficacy while reducing the undesired toxic side-effects. Unfortunately, identifying the location of the NPs after administration in cells or in animal models can be challenging. Silica coating represents a useful strategy to overcome these difficulties, and shows high biocompatibility, optical transparency and strong chemical and colloidal stability [1]. In addition, this surface modification improves nanoparticle dispersion in aqueous media, reducing aggregation that often limits the use of many materials in biomedicine. Furthermore, silica coating can be easily labeled with fluorophores [2], or modified with a wide variety of ligands like proteins, drugs, or other nanomaterials such as carbon nanotubes [3].
Here we present a method that allows the coating of different nanoparticles with an organic fluorescent dye embedded in a silica shell. This labelled-coating allows the tracking of non-luminescent nanoparticles intracellularly, while maintaining the innate properties of the nanomaterials that make them suitable for subsequent therapeutic applications. This method opens the possibility to design multifunctional nanomaterials with different and complementary properties.

References

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Figures

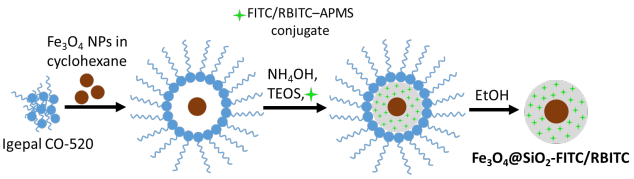

Figure 1: Steps for fluorescent silica coating of hydrophobic magnetite nanoparticles