Bio-identity of protein-coated SPIONs evaluated in cells and *in vivov*by the *C. elegans* model

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Superparamagnetic iron oxide nanoparticles (SPIONs) are already demonstrating huge potential in nanomedicine. SPIONs are investigated as MRI contrast agents, in hyperthermia treatment, for drug delivery, targeting therapies, biosensing and magnetic separation. The stability of SPIONs in complex biological environments remains a challenge and simple surface coatings to stabilize the nanoparticlesenhancing at the same time their therapeutical effect are currently being investigated.

The talk will include a brief introduction to some synthetic approaches used in my group.[1] Then I will present that bovine serum albumin (BSA) can be used to preform a protein corona on the nanoparticles surface to stabilize them in biological media. Cellular uptake, intracellular particle distribution and cytotoxicity of the newly acquired bio-identity of the protein coated SPIONswill be addressed.[2]

The *in vivo* physiological response to the nanoparticles evaluated on the Caenorhabditis elegans model will also be presented.[3]

Finally, I will demonstrate the application of magnetic nanoparticles and nanocapsules to promote angiogenesis as a brain neurorepair therapy after stroke. [4] [5]

Figure1. Prussian Blue stained C. elegans: where SPIONs appear blue.

Anna Roig graduated in Physics and received a PhD in Materials Science from the Autonomous University of Barcelona. She completed her education at the KTH in Stockholm and at Northeastern University in Boston. More recently she spent over two years as a seconded national expert at the Research Directoratein Brussels. At present, she is Senior Researcher at the Materials Science Institute of Barcelona (www.icmab.es) where she leads the Nanoparticles and Nanocomposites Group (www.icmab.es/nn). Her group interests turn around developing inorganic nanoparticles with a soft spot for magnetic materials.In addition to bio-related applications and studies on nano-bio-interfaces, the group has research activities in uncommon iron oxides phases, such the multiferroic epsilon-Fe_2O_3. http://www.researcherid.com/rid/E-7616-2011.

[1] Rapid synthesis of water-dispersable SPIONs by microwave assisted route for safe labeling of endothelial progenitor cells, Carenza et al. *Acta-Biomaterialia*10 (2014) 3775
[2] Bio-identityandfate of albuminpre-coated SPIONs evaluated in cells in vitro and in vivo with the C. elegans model, Si-Ming Yu, et al. submitted
[3] Protective effects of Bovine Serum Albumin on superparamagnetic iron oxide nanoparticles evaluated in the nematode Caenorhabditis elegans Gonzalez-Moragas et al., ACS Biomaterials Science & Engineering. 1, 11 (2015) 1129
[4] In vitro Angiogenic Performance and in vivo Brain Targeting of Magnetized Endothelial Progenitor Cells for Neurorepair Therapies, Carenza et alNanomedicine: NBM 10, 1 (2014) 225
[5]Encapsulation of VEGF165 in magnetic PLGA nanocapsules for potential local delivery and bioactivity into human brain endothelial cells, Carenza et al, J. Mater. Chem. B, 2015,