Multimodal polymeric nanocapsules for imaging and therapy. Application to neurorepair.

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A key challenge in nanomedicine, especially in difficult-access tissues such as the brain, is the non-invasive administration of nanocarriers and the controlled release of their therapeutic cargo. New biocompatible formulations for *in vivo* neuroimaging monitoring are necessary during pre-clinical research phases. I will present some chemical routes to attain theranostic poly(lactic-co-glycolic acid) (PLGA) nanocapsules incorporating "3-in-1" multimodal imaging capacities (MRI, fluorescence at different wavelengths and ^{89}Zr-radiolabeling for PET) and their biodistribution studies [1,2]. The proposed modular synthetic approach allows the simultaneous combination of contrast agents without affecting the size or shape of the nanocapsules, nor interfering with the therapeutic agent.

Those novel polymeric magnetic nanocapsules are proposed for brain tissue imaging and repair in the context of an ischemic event by delivering therapeutic growth factors into the peri-infracted areas [3]. Their engrafting into mouse brain can be assisted by an external magnetic field [4,5]. We expect that in the future, our approach will provide an advanced therapy that could be translated to the clinics as noninvasive, safe, and available to most stroke patients.

REFERENCES

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MAGBBRIS project (Euronanomed III & PCIN-2017-090) is acknowledged,
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FIGURES

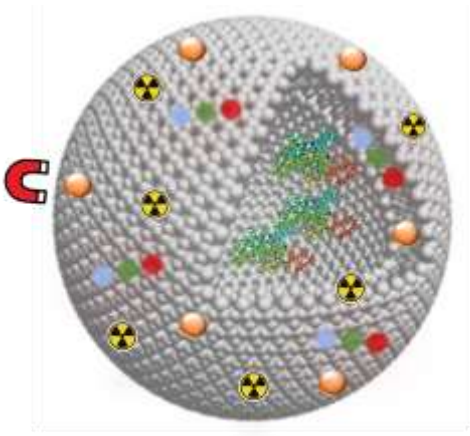

Figure 1: Schematic illustration of a polymeric nanocarrier with imaging probes and therapeutic cargo