

Post-doctoral position (24 months): Perfluorinated nanocapsules for targeting endothelial cells

Institut Galien Paris-Sud is developing novel ^{19}F -MRI contrast agents by encapsulating liquid droplets of perfluorooctyl bromide (PFOB). Although most PFOB-based ^{19}F -MRI contrast agents consist in emulsions, we have designed polymeric nanocapsules of poly(lactide-co-glycolide)-*b*-polyethyleneglycol (PLGA-PEG) since this polymer is biodegradable [1], biocompatible [2] and can be loaded with drugs[3]. The PEG layer provides protection from protein adsorption, promotes stability and prolonged circulation (Figure 1). Once injected intravenously, capsules can passively target solid tumors by the EPR effect [4-5] as shown *in vivo* by ^{19}F -MRI in mice [6].

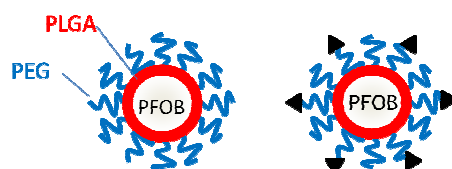


Figure 1 : Schematic representation of a PEGylated capsule (left) and ligand-decorated capsule (right).

To further enhance the signal of nanocapsules we would like to consider RGD (Arginine-Glycine-Aspartic acid) or metalloprotease inhibitors as ligands. PEGylated PLGA nanocapsules containing a PFOB liquid core will be surface-functionalized with a RGD peptide or metalloprotease inhibitor. Different chemistries will be considered. Since capsule morphology is exquisitely sensitive to interfacial phenomena, occurring during the formulation process, the nanocapsules will be imaged with CryoTEM, before and after surface modification. The PFOB encapsulation efficiency will be assessed by ^{19}F NMR. Finally, the ability of the decorated capsules to interact with receptors will be tested *in vitro* on cell cultures.

The post-doc candidate would be either a pharmacist with a background in polymer-chemistry or a chemical-engineer willing to perform biological studies on cells. The monthly salary would be around 2000€ (health insurance included).

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