



SEMINAIRE ISMO

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Magnetic nanoparticles in cancer therapy and tissue engineering

Magnetic nanoparticles bring multiple assets to the biomedical field, for therapeutic and/or diagnostic approaches. I will show some of the recent applications that we explored, adopting the materials angle from the outset. On one hand, we proposed combined and synergistic cancer solutions by applying multiple stimuli to the same magnetic nanoparticle. In particular, we explored the heating potential of magnetic nanoparticles under magnetic hyperthermia or photothermia, with plasmonic nanoparticles under photothermia, or the combination of both. On the other hand, we investigated the use of magnetic nanoparticles as a tool for tissue engineering. We developed magnetic-based methods to manipulate living cells, towards the goal to provide magnetic artificial tissue replacements, that can be stimulated on demand, for instance to induce magnetically (mechanically) stem cells differentiation. Finally, the use of nanoparticles in therapeutic applications raise more general issues of nanoparticles biosafety. In particular, we focused on how the properties of magnetic nanoparticles can be affected once achieving their therapeutic mission, as they journey within their cellular targets. We developed original magnetic and photothermal techniques to follow the fate of nanoparticles and their assimilation within a living tissue, and evidenced that a massive biodegradation of iron oxide can occur at the endosome site, but can be protected by a gold shell, and can also be the basis for the biosynthesis of biomade nanoparticles anew.

Mardi 26 novembre 2019 à 11 h
Amphithéâtre du bât 520 (3^{ème} étage)
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