

*As part of our “Nano & Micro-Systems for Cell Biology” seminar series,
we are delighted to invite you to attend this seminar to be given in english by :*

Claire Wilhelm

**Université Paris 7
Biophysic**

Biomedical applications of nanoparticles

**Thursday 17 july 2014
2pm**



Magnetic nanoparticles for cell imaging, tissue engineering, cell therapies and to engineer biogenic therapeutic nanovectors.

**Salle des séminaires (M220)
LMGP
3 parvis Louis Néel - 38000 GRENOBLE
[ACCESS MAP]**

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Magnetic nanoparticles for cell imaging, tissue engineering, cell therapies and to engineer biogenic therapeutic nanovectors.

Cell therapies and medically oriented nanotechnologies are currently among promising biotechnologies. One promising approach is to associate magnetic nanoparticles with cells in order to supply them with sufficient magnetization to be detectable by MRI, manipulated by magnetic forces, or treated with therapeutic hyperthermia. A decade ago, we proposed the use of anionic iron oxide nanoparticles as efficient agents for cell internalisation without impacting cell functions. Recently we examined the influence of the amount of internalized iron and the state of nanoparticle aggregation on the capacity for mesenchymal stem cell differentiation and MRI single cell tracking. We demonstrated that high resolution Magnetic Resonance Imaging (MRI) allowed combining cellular-scale resolution with the ability to detect two cell types simultaneously at any tissue depth. In parallel, we adressed the challenge to create a functional tissue from stem cells in vitro. The aim is to confine stem cells in three dimensions at the millimetric scale by using home-designed miniaturized magnetic devices, in order to create cellular patterns for stem cell differentiation and tissue engineering. Finally, we investigated the issue of the becoming of the nanoparticles after their internalization, and evidenced some release within microvesicles. These biogenic vesicles could be engineered to attain multiple responsiveness, and provide them with therapeutic and imaging functions.

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