

# MAGNETIC LABELING AND SPECIFIC TARGETING OF CELLS USING IRON OXIDE NANOPARTICLES

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## ABSTRACT

Iron oxide nanoparticles are MRI contrast agents that have been recently used to magnetically label cells *in vitro*. Bone marrow contains not only haematopoietic precursor cells, but also mesenchymal stem cells that can be implanted in animals (for example in the brain). Their magnetic labeling allows for a MRI monitoring of cells migration after implantation (1). Our aims are to quantify the non specific internalization of small particles of iron oxide (SPIO) and to identify the internalization mechanisms of these SPIO by bone marrow mesenchymal stem cells. A specific labeling of cells can be obtained when iron oxide nanoparticles are specifically targeted against a cell surface molecule. *In vitro* tests were realized using ultra small particles of iron oxide (USPIO) grafted with a sialyl-LewisX mimetic or with Wheat Germ Agglutinin (WGA), in order to respectively target E-Selectin at the surface of TNF- $\alpha$  stimulated endothelial cells, and N-acetylglucosamine at axon terminals of neurons (2, 3). Different methods were used to measure the retention or internalization of iron oxide nanoparticles by cultured cells: relaxometry at 60 MHz (Bruker Minispec mq60), T<sub>2</sub>-weighted MRI (Bruker Avance-200 imaging system , 4.7 T) and colorimetry after iron staining with Prussian blue on digested cells. Our results showed that these measurements methods can be applied to study of the internalization of iron oxide nanoparticles by different types of cells, or their binding to different types of cells.

## REFERENCES

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