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# Mesenchymal stem cell labelling using magnetic particles for in vitro applications

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**C**ell-based therapy is not a new concept; it is considered as one of the most promising approaches for treating diseases and for regenerative medicine. In addition, effective cell therapy can greatly benefit from the ability to monitor transplanted stem cells post-intervention. Mesenchymal stem cells (MSCs) represent one of the leading candidate population for regenerative medicine. Superparamagnetic iron oxide nanoparticles (SPIONs) represent contrast agents offering a possible way to track labelled cells after administration using MRI. Moreover, we have demonstrated that these magnetic particles (MPs) do not affect cell viability, proliferation, differentiation or migration. The aim of the present study is to determine the ability to use these iron particles to label MSCs and test their potential to control cell migration when exposed to a magnet. This aim was achieved by culturing labelled and unlabelled cells in 2D and 3D models in presence or absence of magnet. Significant response to magnet exposure was observed in 2D culture where 76% of labelled cells moved to the magnet side when compared to unlabelled cells. There was

only 45% of unlabelled cells found to have moved to the magnet side. Additionally, 64% of labelled cells moved to the magnet side in a 3D culture model, while the unlabelled cells showed around 50% cells moving to the magnet side. Briefly, we have shown that MSCs can be labelled with MPs in vitro, and this strategy can contribute in improving the spatial tracking of transplanted stem cell and therefore improve their efficiency for therapeutic applications.

## Biography

Reem Alkharji is a Senior Medical Laboratory Specialist; has completed her Bachelor's Degree in Clinical Laboratory Sciences. She supported her laboratory work experiences in the hospital with two masters degree; Master's in Health and Hospital Administration and Master's in Stem Cell Technology. Stem cell research is her passion to improve patients' life. She believes that some waste in the medical field (as umbilical cord blood) could be changed to worth products and the quality of people life improve if provided the right service at the right time.

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