

International Conference on
CELL AND STEM CELL RESEARCH
&
International Conference on
MEDICAL AND SURGICAL NURSING

August 17-18, 2018
Singapore City, Singapore

Mesenchymal stem cells labelling using magnetic particles for *in vitro* applications

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Cell-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 was 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 is 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 to improving the spatial tracking of transplanted stem cell, and therefore improve their efficiency for therapeutic applications.

Biography

Reem Alkharji is a medical laboratory specialist owning a bachelor degree in Clinical Laboratory Sciences. He supported my laboratory work experiences in the hospital with two masters' degree; master in health and hospital administration and MSc in Stem Cell Technology. Stem cell research is my passion to improve patients' life. He 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 we provide the right service at the right time.

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