Abstract Template

Title: Mesenchymal stem cells labelling using magnetic particles for in vitro applications

ALKharji R[1, 2], Sottile V[2],

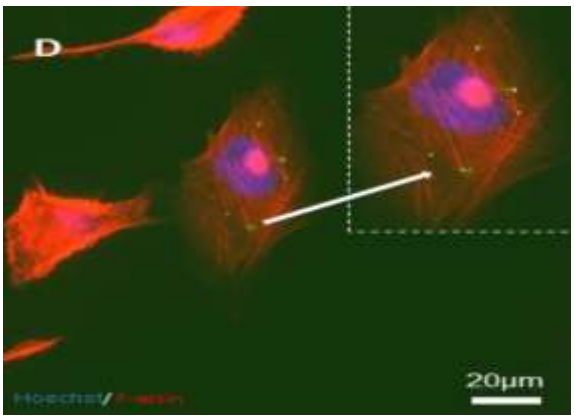
[1]Department of Flowcytometry and Stem Cells, Prince Sultan Military Medical City, Riyadh, Saudi Arabia
2 Wolfson Centre for Stem Cells, Tissue Engineering and Modelling, Centre for Biomolecular Sciences, University of Nottingham, UK

Keywords: Stem cells, Mesenchymal stem cells, SPIONs, Cell culture

I. Abstract Body (up to 250 words)

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.

II. Image:



III. Reference:

1. Carrancio, S., Villarón, E., Barbado, V., Tabera, S, et al.,(2008). Optimization of 534 mesenchymal stem cell expansion procedures by cell separation and 535 culture conditions modification. *Experimental Hematology*, 36(8), pp.1014-536 1021.
2. Connell, J., Patrick, P., Yu, Y., Lythgoe, M. et al.,. (2015). Advanced cell 541 therapies: targeting, tracking and actuation of cells with magnetic 542 particles. *Regenerative Medicine*, 10(6), pp.757-772.
3. Harrison, R., Richards, P., El Haj, A. Sottile, V et al.,. (2016). Autonomous 582 magnetic labelling of functional mesenchymal stem cells for improved 583 traceability and spatial control in cell therapy applications. *J Tissue Eng* 584 *Regen Med*.
4. Heathman, T., Nienow, A., McCall, M., Coopman, K., et al.. (2015). The 586 translation of cell-based therapies: clinical landscape and manufacturing 587 challenges. *Regenerative Medicine*, 10(1), pp.49-64.

IV. Biography:

I am a medical laboratory specialist owning a bachelor degree in Clinical Laboratory Sciences. I 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. I believe 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.

V. Presenting author details

Full Name: Reem Alkharji
Contact number: 00966505107308
Twitter account:
Linked In account:
Session name/ number:
Category: (Oral presentation/ **Poster presentation**)
Passport Number: **V556945**