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## Mesenchymal stem cells labeled with ferumoxytol-poly-l-lysine and non-invasive MR imaging

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Magnetic resonance (MR) imaging along with the development of SPIO nanoparticle have a promising effect on tracking of stem cells. However, SPIOs are no longer being manufactured. Therefore, it is urgent to find out a new reagent to label cells for in vivo monitoring. The present study aims to evaluate the efficiency and the safety of labeling minipigmesenchymal stem cells (MSCs) with ferumoxytol- poly-l-lysine (PLL). MSCs were cultured and incubated with ferumoxytol-PLL. Labeling efficiency was. The effect of ferumoxytol-PLL at iron concentration of 50ug/ml on cell viability, cell migration, proliferation and cell cycle were determined by MTT assay, transwell migration assay, 5-ethynyl-2'-deoxyuridine (EdU) staining assay and flow cytometry analysis respectively. A 1.5T MR system with T2\* mapping sequences was used for in-vitro and in-vivo MR imaging. The labeling efficiency was 100%. The iron content of each cell was liner correlated with the iron concentration of the labeling media ( $p < 0.05$ ). There were not significant impairments were documented in cell viability, proliferation, migration and cell cycles at 50  $\mu\text{g/ml}$  ( $p > 0.05$ ). The ferumoxytol-PLL labeling caused a stronger low signal attenuation effect on T2\*WI. T2\* value were negatively correlated with cell numbers and iron concentration of the labeling media, and positively correlated with cell culturing passages ( $p < 0.05$ ). Hypointense signals on T2\*-weighed images were detected in infarcted myocardium after transplantation of MSCs pre-labeled with ferumoxytol-PLL. Significant increases in graft area and T2\* value were observed 7 days follow-up versus 1 day ( $p < 0.05$ ). Further increase in T2\* value occurred at 15 days ( $p < 0.05$ ), paralleled with a decrease in graft area ( $p < 0.05$ ). The result of Prussian blue staining was closely corresponded to MR findings. Ferumoxytol-PLL labeled MSCs can significantly shorten the T2\* value without interference in cells' biological features. In-vivo MRI visualization in infarcted myocardium is feasible.

### Biography

Bin Zhu is the Director of the Department of Radiology, Affiliated Drum Tower Hospital, Nanjing University School of Medicine. He has published more than 30 papers in reputed journals and has been serving as an Editorial Board Member of reputed.

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