AbstractID: 9473 Title: Magnetic Resonance Imaging to Track Mesenchymal Stem Cells (MSCs) in a Murine Myocardial Infarction Model

Purpose: To track the migration and engraftment of the mesenchymal stem cells (MSCs) with micrometer-sized particles of iron oxide (MPIO) labeling into myocardial infarcted site using MRI in mice. **Method and Materials:** MSCs with GFP fluorescence were labeled with MPIO. Mice were irradiated with a dose of 8 Gy and received rescuing bone marrow transplantation 24 hrs later. The labeled MSCs (~3-7x10^5cells) were then transplanted into the tibial modullary space of mice. The mice were randomly divided into two groups. At 14 days post-MSCs transplantation, one group underwent myocardial infarction (MI; n=4; open chest with ligation of the left anterior descending coronary artery (LAD)) and the other group underwent sham-operated surgery (Sham; n=2; open chest without ligating the LAD). MRI was performed at baseline, 3 days (D3), 7 days (D7) and 14 days (D14) post-surgery. Short-axis cardiac images were acquired using T_2*-weighted imaging and T_2 mapping technique. The results were confirmed by fluorescent microscopy. The contrast-to-noise ratio (CNR) at the MI zone was calculated. For the Sham group, a CNR at a region of interest (ROI) designated in the left ventricular anterior wall was also calculated and compared with the MI group. **Results:** Pronounced signal intensity attenuation at the MI zone was observed by MRI at D7 and D14, potentially due to the accumulation of MPIO labeled stem cells. Both accumulation of stem cells with GFP signal and MPIO deposition in the heart were detected in the fluorescent microscopic images. The CNR were significantly different between the MI and Sham groups at D7 and D14 ($p<0.05$). **Conclusion:** Hypointense signal was observed at the MI zone in MRI, suggesting the infiltration of labeled MSCs. Current study may support a potential approach in cell therapy to noninvasive monitor migration of labeled cells post myocardial injury.