**HISTOLOGICAL AND FUNCTIONAL ASSESSMENT OF HUMAN PLACENTAL STEM CELLS IN A MYOCARDIAL RAT INFARCTION**

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Objectives: Examine the survival, differentiation, and functionality of xenogeneic human placental mesenchymal stem cells (hpMSCs) when implanted into an induced myocardial rat infarction.

Background: Human bone marrow mesenchymal stem cells (hbmMSCs) are extensively studied in myocardial regenerative therapy. However, such cells require invasive collection and suffer from donor age-related declining quality. Recently, a more abundant source of young MSCs has been isolated from an otherwise discarded organ: the hpMSCs.

Methods: HpMSCs underwent an In Vitro cardiomyocytes differentiation. Cells were then tested in an induced myocardial rat infarction. Four groups of Lewis rats underwent left coronary artery ligation. Group 1 was injected with hpMSCs in the peri-infarct region. Groups 2, 3, and 4 received respectively: hbmMSCs, In Vitro differentiated hbmMSCs into cardiomyocytes, and cell free medium. Echocardiography was performed at baseline, day 4, weeks 3, 6, and 9 after ligation. Myocardial tissues were later harvested and studied for Actin and Troponin I.

Results: In Vitro, HpMSCs achieved cardiomyocytes differentiation. In Vivo, hpMSCs were detected at 6 weeks of their implantation. They stained positively for Actin and Troponin I. Preliminary echocardiographic data show a cardiac functional increase in group 1. Comparison of hpMSCs implants to hbmMSCs and differentiated hbmMScs is being investigated.

Conclusions: hpMSCs were capable of differentiating into cardiac cells In Vivo and In Vitro. These cells were tolerated and appeared to increase cardiac function in an induced myocardial rat infarction. With the advantages of easy availability and young age, hpMSCs could be more suitable for myocardial regenerative therapy.