**THE EFFECT OF HYPOXIA PRE-TREATMENT ON STEM CELL BIOLOGY**

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The use of mesenchymal stem cells (MSCs) cells is associated with poor survival after transplantation. There is a significant interest in ways to improve their survival after transplantation. When in the bone marrow niche, MSCs are in a region of hypoxia which has a significant effect on their metabolism, phenotype and functionality. These effects have been hypothesized to be beneficial to the MSCs in improving their therapeutic efficacy in cardiac disease models. Further, the utilization of bioscaffolds as a platform for the delivery of MSCs for their improved survival has also been proposed. In the current work, we examined the response of MSCs, stably transfected with a viability reporter gene, to a hypoxic environment (1% for 24 h) and evaluated their consequent viability and functionality. Pre-treatment of MSCs with hypoxia led to an increase in cell viability (**Fig 1A**) as well as an increase in mitochondrial number (FACS, **1B**) and function (XTT corrected by µg protein). Hypoxia also improved the viability of MSCs in a biomaterial scaffold, compared to control conditions (Fig**1 C&D**). Collectively, these data suggest that hypoxia can be used to modulate the biology and potentially improve the efficacy of MSCs, alone or when delivered via bioscaffolds.

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