

P065 Hypoxia increases production of pure MSCs from adipose tissue and bone marrow: potential implications for their use for beta cell replacement

Valorani M.G.^{1,2}, Tropel P.¹, Otto W.R.³, Guglielmi C.⁴, Khoo C.P.¹, Alison M.R.¹, Pozzilli P.^{1,4}

ICMS, Diabetes, Queen Mary University of London, UK ¹; Fondazione Livio Patrizi, Laboratori di Ricerca Gruppo Bios, Rome, Italy ²; Cancer Research UK, Histopathology Unit, London, UK ³; Area di Endocrinologia, Universita' Campus Bio-Medico, Rome, Italy ⁴

Type 1 diabetes mellitus (T1D) is due to pancreatic islet β -cell destruction. Currently there is a lack of cell sources for regeneration of β -cells. We investigated bone marrow (BM) cells and adipocytes (AT) from NOD mice as a source of pure mesenchymal stem cells (MSCs) and assessed the expansion and purification of these cells at low and normal oxygen levels. BM and AT cells were collected from NOD non-diabetic mice. The cells were grown under atmospheric (21%) and low oxygen (2%) levels. Isolated cells were phenotyped for surface antigen expression of CD44 and Sca-1 (as evidence of MSCs) using FACS analysis. Cultured BM-MSCs and AT-MSCs showed that when grown in hypoxic conditions, Sca-1+ cells were increased in both populations and after 92 days, 98% of BM-MSCs were Sca-1+/CD44+, whereas from normoxic culture only 22% were Sca-1+/CD44+. Moreover, after only 10 days in hypoxic culture 81% of AT-MSCs were Sca-1+/CD44+, whereas only 35% were Sca-1+/CD44+ following growth in normoxic culture. To confirm isolated cells were true MSC populations, *in vitro* differentiation into adipocytic, osteocytic and chondrocytic phenotypes was carried out and BM and AT-MSCs were capable of trilineage differentiation when grown in specific media. These preliminary data suggest that both BM cells and AT are possible source of pure MSCs. The purification of these cells is much more efficient at low oxygen levels, yielding an enriched MSC population with true tri-lineage differentiation potential.