

Stromal cells from different sources exhibit similarity in molecular phenotype and dissimilarity in differentiation prospective

Vishnubalaji R^{1,2}, Al-Nbaheen M¹, Kadalmani B², Alajez NM¹ and Aldahmash A¹

¹King Saud University, Kingdom of Saudi Arabia

²Bharathidasan University, India

Multipotent stem cells have been successfully isolated from various tissues and are currently utilized for tissue-engineering and cell-based therapies. Traditionally, hMSCs have been isolated from bone marrow, but the number of cells obtained is limited. Here, we compared the stromal cell (SCs) populations, obtained from alternative sources for human bone marrow MSC (BM-MSCs): adipose tissue (hATSCs) and skin (adult skin, (hASSCs) and human new-born skin (hNSSCs)), with the standard phenotype of BM-MSCs. Microarray-based approach have unveiled a common MSC molecular signature composed of 33 CD markers including known MSC markers and several novel markers e.g. CD165, CD276, and CD82. When exposed to in vitro differentiation, every SCs exhibited quantitative differences in their ability to differentiate into adipocytes and to osteoblastic cells. In endothelial induction culture system in vitro and in vivo angiogenesis assay, hNSSCs exhibited the highest tube-forming capability. CD146 was highly expressed on hNSSCs and HUVEC followed by hASSCs, and BM-MSCs, while its expression was almost absent on hATSCs. Similarly, higher vascular density (based on the expression of CD31, CD34, vWF, CD146 and SMA) was observed in neonatal skin, followed by adult dermal skin and adipose tissue. Thus, our preliminary data indicated a plausible relationship between vascular densities, and the expression of CD146 on multipotent cells derived from those tissues. However, significant differences in the proliferation, differentiation and molecular phenotype between these different stromal cells were observed suggesting ontological and functional differences, which should be taken into consideration when planning their use in clinical protocols.

Biography

Vishnubalaji received his masters and philosophy from Bharathidasan University, INDIA, for the work on Stem cells and Regenerative Medicine. He has published numerous peer-reviewed papers in reputed journals and serves as reviewer for relevant journals. He has also been worked as an auditor of AABB (American association blood bank), ISO (International Organization for Standardization) and human Clinical Trials with cGMP, cGLP, GCP and GTP compliance under USFDA (2004-2009). His current research interest includes elucidation of molecular and cellular mechanisms of various adult stem cells and cancer stem cells.

vishnubalaji.lr@gmail.com