

Disparate Mesenchyme-lineage Tendency in Mesenchymal Stem Cells from Human Bone Marrow and Umbilical Cord Blood

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Abstract

Bone marrow and umbilical cord blood are reported to be the main sources of mesenchymal stem cells (MSCs), which have been proposed for many clinical applications. This study evaluated and quantitated the differentiation potential of bone marrow-derived MSCs (bmMSCs) and cord blood-derived MSCs (cbMSCs) by in vitro induction. Results indicated that cbMSCs had a significantly stronger osteogenic potential but lower capacity for adipogenic differentiation than bmMSCs. Leptin, an important regulator of mesenchymal differentiation, has a significantly stronger effect of promoting osteogenesis and inhibiting adipogenesis in bmMSCs than in cbMSCs. Moreover, Cbfa1 mRNA expression in bmMSCs and cbMSCs was affected to different degrees by leptin during osteogenesis. In contrast, leptin reduced PPARgamma2 mRNA expression to the same level during adipogenesis in both types of MSCs. These results demonstrate the disparate capacities of MSCs from bone marrow and cord blood and suggest that they be used differently in experimental and therapeutic studies. In addition, the disparate differentiation tendencies of MSCs from different sources should be considered in further applications.