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Establishment of Mesenchymal Stem Cell-like Cells from Human Umbilical Cord Vein

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Mesenchymal stem cells(MSCs) can differentiate into different cell lines including adipocytes, osteocytes, chondrocytes, myocytes, astrocytes, and tenocytes, and can support hematopoiesis. MSCs population can undergo extensive proliferation. They are noncycling and constitutively express telomerase activity *in vivo*. Despite the fact that bone marrow represents the predominant source of MSCs, the use of bone marrow-derived cells is not always acceptable due to a high level of viral infection and a significant drop in cell number and proliferative/differentiation capacity with age. Thus, the search for possible alternative MSC sources remains to be validated. In the present study, we isolated a cell population derived from the endothelium and subendothelium of the umbilical cord vein which possesses morphological and immunophenotypical characters similar to those of MSCs isolated from bone marrow. After 3 days of culture, two kinds of cell populations were found consisting of adherent cells with endothelial cell-like and fibroblast-like morphology. When these cells were subcultured 12 times over a period of 3 months, all cells uniformly exhibited fibroblastoid morphology resembling MSCs obtained from human bone marrow. Results of RT-PCR analyses showed mRNA expression of BMP-4, oct-4, PAX-6, SCF, ADAM-12, nestin, HLA class I and II(DRα) genes but not of GATA-4 and Brachyury genes. Immunohistochemical study of these cells demonstrated positive staining for the antibodies against von Willebrand factor(vWF), collagen I, Fibronectin, CD44(HCAM), HLA class I and II proteins, but negativestaining for the antibodies against alpha-smooth muscle actin, collagen IV, CD106(VCAM-1). Results of telomerase activity analysis showed that every passage of these cells constitutively expressed telomerase activity. From these observations, it is concluded that the umbilical cord obtained from term deliveries is an important source of MSC-like cells that could be used in cell therapy protocols.