Umbilical Cord Blood-derived Multipotent Stem Cells;

Present and Future Medicine

Prof. Kyung-Sun Kang, DVM, PhD(kangpub@snu.ac.kr).

Adult Stem Cell Research Center, Laboratory of Stem Cell and Tumor Biology,
College of Veterinary Medicine, Seoul National University, Seoul 151-742, Korea.

Umbilical Cord Blood (UCB)-derived Multipotent Stem Cells (MSCs), because their rich and easy acquired resource as well as the potential to differentiate into several lineages, are regarded as an attractive cell source for cell therapy. One of the main challenge is how to expanding enough UCB-derived MSCs without differentiation for clinical use. Stem cells niche provide the micro-environment for the development of stem cells.

Buerger's disease, also known as thromboangiitis obliterans, is a nonatherosclerotic, inflammatory, vasoocclusive disease. It is characterized pathologically as a panangiitis of medium and small blood vessels including both arteries and adjacent veins, especially the distal extremity, the feet and the hands. There is no curative medication or surgery for this disease. In the present studies, we transplanted human leukocyte antigen (HLA)-matched human umbilical cord blood (UCB)-derived mesenchymal stem cells (MSCs) into 4 men with Buerger's disease who were already treated with medical and surgical therapies. After stem cell transplantation, ischemic rest pain was suddenly disappeared on their affected extremities. The necrotic skin lesions were healed within 4 weeks. Therefore, it is suggested that human UCB-derived MSCs transplantation may be a new useful therapeutic armament for Buerger's disease and other similar ischemic diseases.

Liver fibrosis is the wound healing process to the various liver injury and is characterized by the continuous collagen deposition in the extracellular matrix(ECM). In this study, six week-old one hundred and five Sprague-Dawley rats were housed and ninety of them were induced to the liver fibrosis and cirrhosis using dimethylnitrosamine(DMN) at 3 consecutive day each week for 5 weeks. To confirm whether UCB-MSC can contribute to reduction of liver fibrosis, we performed *in situ* hybridization to detect human specific Alu gene. This result showed that human specific gene was detected in the liver parenchymal cells of rats with liver fibrosis after injection of UCB-MSC. In death rate, UCB-MSC and AD-MSC treated rats were shown to decrease, significantly. Therefore, it is suggested that adult human MSCs may have a good therapeutics for the treatment of liver fibrosis.

Taken together, it is suggested that human UCB-derived MSCs transplantation may be a new and useful therapeutic armament for incurable and intractable human diseases in the future.