STEM CELLS IN INFLAMMATORY DISEASES

Kyung-Sun Kang

Adult Stem Cell Research Center, Seoul National University (Seoul, Korea)
kangpub@snu.ac.kr

The systemic application of MSCs derived from various origins including bone marrow, adipose tissue, gingiva, and umbilical cord has been tested for its efficacy to suppress chemically induced colitis in animals. Most studies showed that the application of MSCs exhibits a protective and therapeutic effect against Atopic dermatitis, inflammatory bowl diseases and Rheumatoid arthritis etc. Recently, autologous bone marrow MSCs have been successfully applied in a phase I study for the treatment of refractory Crohn's disease without serious adverse effects. These findings suggest that MSCs can be an effective therapeutic candidate for inflammatory bowel disease, although the underlying mechanism of their effect remains to be elucidated.
Our study revealed that NOD1 and NOD2 are functionally expressed in human umbilical cord blood-derived mesenchymal stem cells (hUCB-MSCs) and regulate the differentiation of hUCB-MSCs. Although some Toll-like receptors (TLRs) are known to enhance the immunosuppressive activity of MSCs, the role of NOD2 in the immunomodulation of MSCs has not been investigated. We report here that NOD2 activation enhances the protective and therapeutic effects of hUCB-MSCs against inflammatory diseases in both mice and human. MDP stimulation augmented the ability of hUCB-MSCs to suppress the proliferation of hMNCs by producing PGE2 via the NOD2-RIP2 pathway.