The 1st International Neuroinflammation Congress
and 1st Student Festival of Neurosience
Shefa Neuroscience Research Center, Tehran, Iran, 11-13 April, 2017
The Neuroscience Journal of Shefaye Khatam
Volume 5, No. 2, Suppl 2

Poster Presentation

Stem Cells in Multiple Sclerosis

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***Published:* 11 April, 2017**

Abstract

Multiple sclerosis (MS) is an inflammatory disease of the central nervous system (CNS). Inflammation caused by immune cells destroy the myelin and then axon. CNS failure to complete repair results in permanent disabilities. Some types of stem cells have special potentials to repair these injuries and even cure MS. Neural crest stem cells with a mutual origin with CNS and the ability of differentiation to different types of neural cells can replace lost cells. They also increase survival and development of neurons by secreting neurotrophins. Mesenchymal stem cells have a high potential to identify affected areas and migrate to there. They reduce inflammation and autoimmune reactions by affecting on all types of immune cells. Mesenchymal stem cells change phenotypes of T cells from inflammatory form to anti-inflammatory form by decreasing of INF and increasing of IL4 production. It also increases regulatory T cells (Treg) and reduce killer T lymphocytes proliferation. And on the other hand reduce pro-inflammatory factors interaction with nerve cells by improving the blood-brain barrier performance. Also their impact on demyelination and restoration of nerve cells has been demonstrated. Olfactory ensheathing cells leads to regeneration of axons and myelin by production and secretion of growth factors and principal components of nerve cells membranes. It accelerates the healing by reorganization of glial scar, tissue support and stimulate vascularization. Hematopoietic stem cells can rebuild the immune system and completely suppress autoimmune reactions. Oligodendrocyte precursor cells regenerate myelination by differentiation to oligodendrocytes. Endothelial precursor cells suppress inflammation. Conclusion: Stem cells have significant potential to treat MS with various mechanisms. Knowing the features of these cells and their effect mechanisms are very important to find an effective treatment for MS.

Keywords: Multiple sclerosis, Stem cell, Neuroinflammation

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