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# Alternative source of stem cells derived from human periodontal ligament: a new treatment for experimental autoimmune encephalomyelitis

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Multiple sclerosis (MS) is categorized as an autoimmune disease and is potentially one of the most common causes of neurological disability in young adults. Formation of the sclerotic plaques of which the disease gets its name represents the end stage of a process involving inflammation, demyelination and remyelination, oligodendrocytes depletion, and astrogliosis as well as neuronal and axonal degeneration (1). MS damages the central nervous system and leads to a disabling condition. Recently, the potential role of mesenchymal stem cells (MSCs), derived in promoting tissue repair and disease control has been investigated by using an experimental autoimmune encephalomyelitis (EAE) model (2). The objective of the research was to investigate the product effects by mesenchymal stem cells derived from human periodontal ligament (hPDLSCs) when administered in an experimental model of autoimmune encephalomyelitis (EAE). EAE was induced by immunization with myelin oligodendroglial glycoprotein peptide (MOG)35-55 in C57BL/6 mice. Then, mice were observed every 48 hours for signs of EAE and weight loss. At the onset of disease, approximately 14 days after immunization, EAE mice were subjected to a single intravenous injection of hPDLSCs (10(6) cells/150 μl) into the tail vein. At the point of animal sacrifice on day 56 after EAE induction, spinal cord and brain tissues were collected in order to perform histological evaluation, immunohistochemistry and western blotting analysis. Obtained results reveal that treatment with hPDLSCs may produce neuroprotective effects against EAE, diminishing both clinical signs and histological score typical of the disease (lymphocytic infiltration and demyelination) probably through the production of neurotrophic factors (results focused on brain-derived neurotrophic factor and nerve growth factor expression). Furthermore, administration of hPDLSCs modulates expression of inflammatory key markers (tumor necrosis factor-α, interleukin (IL)-1β, IL-10, glial fibrillary acidic protein, Nrf2 and Foxp3), the release of CD4 and CD8α T cells, and the triggering of apoptotic death pathway (data shown for cleaved caspase 3, p53 and p21). In light of the achieved results, transplantation of hPDLSCs may represent a putative novel and helpful tool for multiple sclerosis treatment. These cells could have considerable implication for future therapies for multiple sclerosis and this study may represent the starting point for further investigations.

## References

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Keywords

Stem cells derived from human periodontal ligament; multiple sclerosis; neurotrophic factors; apoptosis.