

## Potential role of dental stem cells in the cellular therapy of cerebral ischemia

Yalvac M., Rizvanov A., Kilic E., Sahin F., Mukhamedyarov M., Islamov R., Palotás A.  
*Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia*

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### Abstract

Stem cell based therapies for cerebral ischemia (CI) utilize different cell sources including embryonic stem cells (ESCs), neural stem cells (NSCs), umbilical cord blood cells (UCBCs), mesenchymal stem cells (MSCs), and some immortalized cell lines. To date, experimental studies showed that all of these cell sources have been successful to some extent in attenuating the ischemic damage and improving functional recovery after brain injury. Bone marrow derived MSCs seem to be the most widely used and well characterized cell source, which can be also employed for autologous transplantation. Currently, there are two main theories behind the therapeutic effect of stem cell transplantation for treating CIs. The first concept is cell replacement theory in which transplanted stem cells differentiate into progenitor and specialized somatic cells to supersede dying cells. The other hypothesis is based on immunomodulatory, neuro-protective and neuro-trophic abilities of stem cells which help reducing stroke size and increasing the recovery of behavioral functions. Recent studies focusing on alternative stem cell sources have revealed that dental stem cells (DSCs), including dental pulp stem cells (DPSCs) and dental follicle cells (DFCs) possess properties of MSCs and NSCs. They differentiate into neural lineage cells and some other cell types such as osteocytes, adipocytes, chondrocytes, muscle cells and hepatocytes. This review is intended to examine stem cell therapy approaches for CI and emphasize potential use of DSCs as an alternative cell source for the treatment of brain ischemia. © 2009 Bentham Science Publishers Ltd.

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### Keywords

Cerebral ischemia, Dental stem cells, Stem cell therapy