Bone marrow derived mesenchymal stem cell transplantation in cerebellar degeneration: a behavioral study.

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Source

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Abstract

In addition to its key role in complex motor function, the cerebellum is increasingly recognized to have a role in cognition. Thus, motor and cognitive deficits can be associated with cerebellar degeneration. After unilateral lesion in cerebellum (folia VI) was caused by Quinolinic acid, CM-Dil labeled mesenchymal stem cells (MSCs), which were isolated and purified from bone marrow, were transplanted into the damaged folium. Motor function was assessed using the cylinder test, rotarod, hanging wire and beam balance during 6 weeks after transplantation. Cognitive function was assessed using the Morris water maze learning paradigm in 3 weeks after transplantation. Six weeks after transplantation surviving MSCs were detectable in QA-treated animals. The MSC-transplanted group showed markedly improved functional performance in spatial memory, motor learning, locomotor asymmetry, dysmetria, abnormality in neuromuscular strength and equilibrium 2-6 weeks compared with the controls. We found that cerebellar lesions produced deficits (folia VI) in motor and cognitive aspects of a spatial task. The results indicate that transplantation of MSCs can significantly reduce the behavioral abnormalities of these animals during six weeks after engraftment. According to results of this assay, cell therapy by means of bone marrow derived adult stem cells promises for treatment of cerebellar diseases.

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