Microanatomical evidences for potential of mesenchymal stem cells in amelioration of striatal degeneration

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Huntington’s disease is an inherited neurodegenerative disorder, characterized by loss of spiny neurons in the striatum and cortex, which usually happens in the third or fourth decades of life. In advanced form of the disease, progressive striatum atrophy happens and medium spiny neurons, which occupy more than 80% of the striatum, become atrophic. Gradually, the atrophy expands to the neocortex and other regions of the brain. To our knowledge, there is no effective therapeutic strategy for diminishing the motor disorders of Huntington’s disease. In recent years, cellular transplantation has been an effective therapeutic method for neurodegenerative diseases. In the present study, the potential of bone marrow derived mesenchymal stem cells in amelioration of striatal degeneration was assessed in animal model of Huntington’s disease. After unilateral lesion in striatum was caused by quinolinic acid (QA), bone marrow derived mesenchymal stem cells, which were isolated and purified from 4–6 weeks old rats, were transplanted into the damaged striatum. After 9 weeks of transplantation, the volume of striatum, lateral ventricles and hemispheres were measured in control (normal) and test (QA injected + cell transplanted) groups. After volume determination, the atrophy percentage of both striatum and damaged hemisphere and volume extension of lateral ventricles were calculated. Histologic results showed significant difference in amount of striatum atrophy between sham (only QA injected) and test groups. These results confirm the potential of bone marrow derived mesenchymal stem cells in treatment of microanatomical defects in motor disorders of Huntington’s disease. According to our results, cell therapy by means of bone marrow derived adult stem cells could be considered as a good candidate for treatment of neurodegenerative diseases, especially Huntington’s disease. [Neurol Res 2008; 30: 1086–1090]

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