

The use of autologous mesenchymal stromal cells for treatment of neurodegenerative disorders - past achievements and future goals

Shimon Slavin¹ and Chaya Brodie^{2,3}

¹International Center for Cell Therapy & Cancer Immunotherapy (CTCI), Israel

²Bar-Ilan University, Israel

³Hermelin Brain Tumor Center, USA

Future treatment of multiple sclerosis (MS) aims at restoring myelination and neurological functions as well as re-induction of self-tolerance. We studied the role of mesenchymal stromal stem cells (MSC), known to be anti-inflammatory on the one hand and multi-potent on the other, in experimental autoimmune encephalitis (EAE), and found that treatment of mice with bone marrow derived MSCs resulted in significant suppression of anti-self reactivity and improved clinical and pathological disease manifestations. Our preliminary results of a phase I/II open clinical trial to evaluate the feasibility and safety of intrathecal and intravenous administration of autologous bone marrow derived MSCs in patients with severe MS including patients with primary or secondary progressive disease suggested that treatment with MSCs is feasible, safe and potentially effective. No major side effect developed during >4 years follow up period. Based on our successful preliminary pilot study in 13 patients with MS and 14 with ALS, a total of >200 patients with MS, ALS and some additional neurodegenerative disorders were similarly treated at our center. MSCs were administered partially intrathecally (10^6 MSC/Kg) and additional $1-2 \times 10^6$ MSC/Kg intravenously. The treatment was uneventful except for headache due to lumbar puncture (70%), subfebrile temperature (25%) and no other serious side effect. Approximately 60% of patients reported improved outcome, few with very significant objective improvement of disease manifestations. More recently, we have discovered a new technology which allows differentiation of MSCs derived from bone marrow, adipose tissue and cord/placenta into neural stem cells, motor neurons, dopaminergic neurons, astrocytes and oligodendrocytes that may be used to induce remyelination. These results suggest that treatment with MSCs and hopefully in the near future differentiated MSCs as well, may become the treatment of choice for MS, also applicable for treatment of other neurodegenerative disorders

Biography

Shimon Slavin, MD is Professor of Medicine, currently serving as the Medical & Scientific Director of the International Center for Cell Therapy & Cancer Immunotherapy (CTCI), Tel Aviv, Israel. Slavin pioneered the use of immunotherapy mediated by donor lymphocytes and innovative methods for stem cell transplantation for malignant and non-malignant disorders, and more recently, using multi-potent stem cells for regenerative medicine. Professor Slavin authors 4 books and >600 scientific publications and serves on many editorial boards of distinguished scientific and medical journals and a member on many national and international advisory boards. Slavin received many international awards in recognition of his contributions for innovative treatment of malignant and non-malignant disorders including regenerative medicine

slavin@CTCICenter.com