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12th World Congress on

Advances and Innovations in Dementia

September 17-18, 2018   Singapore

Potential application of human neural crest-derived nasal stem cells in models of Alzheimer's disease as a clinically applicable therapy

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Potential application of human neural crest-derived nasal stem cells in models of Alzheimer's disease as a clinically applicable therapy: Stem cell transplantation is a promising therapeutic strategy for the treatment of many neurological disorders. The therapeutic effects, however, are sometimes inconsistent and unpredictable. Human Neural Crest-Derived Nasal Stem Cells (hNCNSCs) are an excellent alternative source of adult stem cells for clinical use because they can be obtained easily by minimally invasive collection procedures and expanded rapidly ex vivo for transplantation. Moreover, the characteristics of hNCNSCs, including their proliferation, differentiation and immunophenotype are not affected by donor age or passage number, while other kinds of stem cells exhibit age and passage-related reduction in multiple characteristics. In the present study, we investigated its potential for treatment of Alzheimer's Disease (AD) in comparison with Human Bone Marrow-Derived Mesenchymal Stem Cells (hBMSCs), which is the most commonly used cell type for regenerative medicine. Here, hNCNSCs is protective against amyloid-β peptide ($A\beta1$-42) toxicity in culture of human Neural Stem Cells (hNSCs). Likewise, in a transgenic mouse model of AD, transplantation of hNCNSCs greatly reduces the levels of $A\beta42$, plaque formation and inflammatory microglia expression, concomitant with increased survival of hippocampal and cortex neurons when compared with transplantation of hBMSCs. In addition, hNCNSCs showed better cell survival and greater inhibition in $A\beta1$-42-induced up-regulation of the BDNF pro-domain and their receptor p75NTR in a mouse brain of AD. These results suggest that the potential application of hNCNSCs of future treatment for patients with AD.

Biography

Jung Yeon Lim has completed her PhD from Department of Neurobiology, The Catholic University of Korea and Postdoctoral studies from the Catholic University of Korea and University of Cambridge, UK. She is a Research Professor in Postech-Catholic Biomedical Engineering Institute, The Catholic University of Korea. She was mainly involved in numerous publications relating to high performance stem cells therapy for treatment of serious neurological diseases such as strokes, spinal cord injury and Alzheimer's disease. Moreover, she has investigated the function of the nerve support factor called BDNF and its possible role in Alzheimer's disease.

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