BRAIN TISSUE RECOVERY IN OBSTRUCTIVE CONGENITAL HYDROCEPHALUS AFTER INTRAVENTRICULAR TRANSPLANTATION OF MESENCHYMAL STEM CELLS

M García-Bonilla[1,4], B Ojeda-Pérez[1], K Shumilov[1], J Vitorica[2], ML García-Martín[3,4], C Muñoz[3,4], A Gutiérrez[1,4], P Páez-González[1,4], AJ Jiménez[1,4]
[1]Department of Cell Biology, Genetics, and Physiology, University of Malaga, 29071, Spain
[2]Department of Molecular Biology and Biochemistry, University of Seville, 41004, Spain
[3]BIONAND, Malaga, 29590, Spain
[4]IBIMA, Malaga, Spain
Name of the corresponding author: María García-Bonilla

Introduction: Bone marrow-derived mesenchymal stem cells (BM-MSC) are a potential therapeutic tool due to their ability for migrating and producing neuroprotector factors when transplanted. The aim of this study was to evaluate the short-time effects of a BM-MSC experimental therapy in the hyh mouse model with severe obstructive hydrocephalus.
Methods: BM-MSC were characterized in vitro and then injected into the ventricles of hyh mice. Wild-type and saline-injected hyh mice were used as controls. Samples were studied by analyzing and comparing mRNA, protein and metabolites level expression in control and damaged tissue.
Results: Undifferentiated BM-MSC were found to: i) spread into the periventricular astrocyte reaction region after four days post-injection, and, ii) be producing neuroprotector factors (GDNF and VEGF). Astrocytes located in periventricular edematous region increased their aquaporin-4 expression, as well as Slit2 expression (neuroprotective and anti-inflammatory molecule). There was also a significant reduction of osmolytes such as taurine and neuroexcytotoxic glutamate. Halved apoptotic cell death was detected in the periventricular walls.
Conclusions: BM-MSC lead to recovery of the severe neurodegenerative conditions associated to congenital hydrocephalus mediated by reactive astrocytes.
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