

3rd International Conference on Tissue Science & Regenerative Medicine

September 24-26, 2014 Valencia Convention Centre, Spain

The maintenance of human bone marrow mesenchymal stem cells after transplantation into a rat focal cerebral ischemia

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Stem cells have been recognized as a potential tool to restore cells damaged by cerebral ischemic injury. Key functions such as the replacement of neural cells have been recently challenged by intrinsic bystander capacities of undifferentiated donor cells. One of opportunity for neurological disorder treatment is the transplantation of mesenchymal stem cells (MSCs) which have neuroprotective, neuroregenerative and anti-inflammatory properties. However, a comprehensive knowledge how transplanted MSCs exert their therapeutic achievements is still lacking. *The aim of the project* was to analyze the presence, distribution and quantity of human bone marrow mesenchymal stem cells (hBM-MSCs) transplanted into focal brain ischemic rats. The experiments were performed in adult male Wistar rats with brain focal ischemia induced with 1µl/50nmol ouabain (sodium-potassium pump inhibitor) injection into right striatum. Then 5x10⁵ hBM-MSC (Lonza) stained with iron nanoparticles and rhodamine (Molday, BioPAL) were transplanted into internal carotid artery, 48 hours after brain insult. At 1, 3, 7 and 14 days rat brains were removed. Immunocytochemical analysis of human markers using different antibodies anti: CD44, STEM121 and Ku80 were performed. The preliminary results showed that after intra-arterially injection of hBM-MSC, the donor cells were present in the ipsilateral rat hemisphere between cortical cortex and striatum near the ischemic lesion. The positive staining for Molday particles and human antigens were observed at 1, 2, 3 and 7 days after hBM-MSC transplantation. The further studies relating to the function of transplanted cells are in progress.

Biography

Sylvia Koniusz has graduated from the Warsaw University of Life Sciences with master's degree in biotechnology. She did the research for her Bachelor's degree at the Department of Cellular Engineering at the Cancer Centre in Warsaw and the research for her master's degree at the NeuroRepair Department at the Mossakowski Medical Research Centre Polish Academy of Sciences in Warsaw. In October 2013 she has started at the same department the MMRC-KNOW Interdisciplinary PhD Studies with the project „The role of bone marrow mesenchymal stem cells and microvesicles derived from these cells in CNS repair of brain ischemia disorders”.

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