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Distribution of human bone marrow mesenchymal stem cells transplanted systemically into focal brain injured rat and their contribution to modulate immune response of the host

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Mesenchymal stem cells (MSCs) are a potential tool for cell-based therapies in regenerative medicine. Many studies revealed that they produce tropic factors which being responsible for their protective and anti-inflammatory properties. The aim of the study was to evaluate migration of human bone marrow mesenchymal stem cells (hBM-MSCs) transplanted i.a. into focal brain ischemic rats and to check their effect on the host immune response induced by brain injury. The experiments were performed in adult Wistar rats with stroke induced with 1µl/50nmol ouabain (Na+/K+ ATPase pump inhibitor) injected into right striatum. Two days after brain injury, 5x105hBM-MSCs (Lonza) labelled with iron nanoparticles conjugated with rhodamine (Molday, BioPAL) were infused into the right internal carotid artery and the inflow of transplanted cells in the rat brain was monitored using MRI. On day 1.3 and 7 post-transplantation rat brains, spleens and cervical lymph nodes were removed and the immunocytochemical analysis of human markers was performed using anti-CD44 and -STEM121 antibodies. Additionally, immunological host response was accomplished by detection of ED1, CD5, CD45RA and GFAP – positive cells in the brain, spleen and lymph nodes. MRI analysis revealed the positive signal for Molday particles in the right hemisphere, mostly in cortex, corpus callosum and striatum. Viable hBM-MSCs were observed in the rat brain up to 7 days after their grafting. This was accompanied with the activation of immune cells. Whether hBM-MSCs transplantation contributes to attenuate host immune response induced by focal brain ischemia remains to be evaluated in the further studies.

Biography

Sylwia Koniusz has graduated from the Warsaw University of Life Sciences with Master's degree in biotechnology. In October 2013 she has started the MMRC-KNOW Interdisciplinary PhD Studies at the Neuro Repair Department at the Mossakowski Medical Research Centre Polish Academy of Sciences in Warsaw with the project "The role of bone marrow mesenchymal stem cells and microvesicles derived from these cells in CNS repair of brain ischemia disorders". She has already attended 5 international conferences during which she presented the results of her study. Moreover, she has published one paper and has two more works in preparation.

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