IJAE
Vol. 120, n. 1 (Supplement): 165, 2015
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

BBB-endothelial tight junction response to mesenchymal stem cells in a model of MOG EAE

Mariella Errede[1], Francesco Girolamo[1], Giovanna Longo[1], Sara Morando[2], Valentina Petrosino[2], Luisa Roncali[1], Nicole Kerlero De Rosbo[2], Antonio Uccelli[2], Daniela Virgintino[1]

[1] Department of Basic Medical Sciences, Neurosciences and Sensory Organs, Human Anatomy and Histology Unit, Bari University School of Medicine, University of Bari, Bari, Italy - [2] Department of Neurology, Rehabilitation, Ophthalmology, Genetics, Maternal and Child Health - Center of Excellence for Biomedical Research, University of Genoa, Genoa, Italy

Experimental autoimmune encephalomyelitis (EAE), an induced autoimmune disease of the central nervous system, simulates the main histopathological and clinical aspects of multiple sclerosis including the impairment of the blood-brain barrier (BBB). In several experimental models of human neurodegenerative diseases, the intravenous (iv) injection of bone marrow-derived mesenchymal stem cells (MSCs) ameliorates clinical symptoms and histopathological features [1,2]. On the basis of these data, we have analyzed the status of BBB tight junctions (TJs) of cerebral cortex microvessels in a model of MOG-EAE with iv injection of MSCs (EAE-MSC). The observations were carried out on EAE-MSC mice sacrificed at 6-24 hrs and 10 days after MSCs iv injection. The expression of endothelial TJ proteins, claudin-5 and occludin, was analyzed in healthy, EAE, and EAE-MSC mice by immunofluorescence confocal microscopy, together with the evaluation of barrier function by FITC-Dextran, as an exogenous permeability tracer. The results demonstrate that unlike EAE animals, characterized by an interrupted junctional staining and a barrier leakage, EAE-MSC mice show together with attenuate disease symptoms, a continuous, control-like claudin-5 and occludin junctional pattern and a functionally recovered barrier efficiency. Overall, these findings suggest that during EAE, the neuroprotective effect of the injected MSCs includes a reparative BBB response that in turn may contribute to the reduction of the inflammatory infiltrates and to the significant amelioration of the disease.

References

[1] Kassis et al., (2008) Arch. Neurol. 65 (6): 753–761.
[2] Uccelli et al., (2012) Mol Med. 18:794-804. doi: 10.2119/molmed.2011.00498.

Keywords
Experimental autoimmune encephalomyelitis; Mesenchymal stem cells; Blood-brain barrier; Tight junctions; Claudin-5; Occludin.