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Positive effect of Mesenchymal Stem Cells therapeutic administration on chronic Experimental Autoimmune Encephalomyelitis

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Multiple Sclerosis (MS) is a crippling chronic disease of the Central Nervous System caused by the presence of self-antibodies which progressively damage axonal myelin sheath, leading to axonal transmission impairment and to the development of neurological symptoms. MS is characterized by a Relapsing-Remitting course, and current therapies rely only on the use of immunosuppressive drugs, which are however unable to reverse disease progression. Encouraging results have been obtained in preclinical studies with the administration of Mesenchymal Stem Cells (MSCs) before disease onset (Zappia et al., 2005).

Here, we investigate the therapeutic potential of MSC administration after disease onset into an animal model of MS, represented by Dark Agouti rats affected by chronic Relapsing-Remitting Experimental Autoimmune Encephalomyelitis (EAE) (Cavaletti et al., 2004).

10^6 MSC were intravenously injected in EAE rats after disease onset. Clinical score was assessed daily, and after 45 days rats were sacrificed and histological analysis of spinal cords performed to evaluate the demyelinating lesions.

After the first peak of disease, no further relapses were observed in EAE rats treated with MSCs, differently from what observed in EAE group.

Histological analysis demonstrated the presence of demyelinated plaques in spinal cords of EAE rats, (Luxol fast Blue staining and anti-MBP immunohystochemistry). On the contrary the therapeutic schedule with MSCs significantly reduces the number and the extension of demyelinated areas in the spinal cords, confirming clinical score evaluations.

These results demonstrated that MSCs ameliorate the clinical course of EAE and hamper the disease relapsing by reducing the areas of demyelinated lesions.

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Keywords
Mesenchymal stem cells, chronic EAE, demyelination.