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## Bone marrow derived mesenchymal stem cells transplantation as a potential therapy for experimental epilepsy

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Epilepsy affects 0.5-1% of the world's population, relatively large proportion of patients with temporal lobe epilepsy (TLE) are resistant to antiepileptic drugs or experience debilitating side effects from long-term treatment such as cognitive impairment, depression, or dementia. Novel approaches based on stem cell therapy offer the potential for curing epilepsy, rather than treating the symptoms. Given their ability to proliferate, differentiate and regenerate tissues, bone marrow derived mesenchymal stem cells (BMSCs) could restore neural circuits lost during the course of the disease and re-establish the physiological excitability of neurons. Aim of the study is to verify the therapeutic potential of (BMSCs) transplanted either intravenously (IV) or intracranially (IC) on experimentally induced temporal lobe epilepsy in rats. TLE was induced by a single dose of pilocarpine nitrate injected intraperitoneally. Rats were divided into four groups: 1) control group 2) epileptic group 3) IV injected BMSCs group and 4) IC injected BMSCs group. Oxidative stress, proinflammatory cytokines, neurotransmitters, immunohistochemical assay for Insulin growth factor receptor-1, synaptophysin and caspase-3 and histopathological investigation were assessed. BMCs effectively decreased lipid peroxides, TNF- $\alpha$ , IL-1 $\beta$  and glutamate level in both cortex and hippocampus, also a significant decrease in the level of each of IGF-1R, Synaptophysin and caspase -3 was regarded in BMCs - treated rats. Moreover histopathological examination illustrated mature neural cells with prominent granules. It is worth noting, IC transplantation showed to be more effective than IV transplantation. The data demonstrate that BMCs transplantation has potent therapeutic effects and could be a potential therapy for clinically intractable epilepsies.

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