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Stem cells therapy as an emerging therapy in neurology

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Stem Cells (SC) therapy emerges as a potential new hope for neurological patients as it could accomplish the immune-modulatory as well as the neuro-protective functions. There is a growing body of literature that supports the potential of the SC for immunomodulation and re-myelination. Here we focus on examining the registered published and on-going clinical trials using stem cells especially the Mesenchymal Stem Cell (MSC) therapy in neurological disorders such as MS, ALS, Stroke, spinal cord injuries and also some types of devastating neuropathies like POEMS. There are evidence showing that the MSC can alter the phenotype of NK cells and suppress proliferation, cytokine secretion and cytotoxicity against HLA-class-I expressing targets. Some of these effects require cell-to-cell contact, whereas others are mediated by soluble factors, including transforming growth factor-beta1 (TGFbeta1) and prostaglandin E2, pointing to the existence of diverse mechanisms for the MSC-mediated NK-cell suppression. The MSC have been reported to block the differentiation of monocytes into Dendritic Cells (DC) and impair antigen presentation as well as IL-12 production. Also the human MSC (hMSC) alter cytokine secretion and induce more anti-inflammatory responses. Specifically, the hMSC by induction of mature dendritic cells decrease tumor Necrosis Factor alpha (TNF-alpha) secretion and increase IL-10 secretion. The hMSC inhibit Th1 cells, decrease interferon gamma and affect Th2 cells by increasing secretion of IL-4. This causes an increase in the proportion of T-Regulatory cell switches the CD4+ T cell responses from a Th1 to a Th2 polarized phenotype resulting in a decrease secretion of IFN-gamma from NK cells.

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