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Abstract

THE EFFECTS OF REGENERATIVE MEDICINE ON STROKE

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Abstract:
Stroke is one of the main causes of death, which can also cause a long-term disability. Approximately 80 percents of all strokes are ischemic strokes, that reduce or block the blood flow in a brain artery (1). Regenerative medicine is a novel paradign in stroke therapy that promises the potential to initiate treatment and re-generation of damaged neurovascular tissue at inaccessible levels. Stem cells differentiate into different cell types, which includes neuronal and endothelial lineage, and it has been widely assumed that when they are implanted they may promote recovery by pop-ulating the necrotic cavity within the area of ischemic damage (2). The anti-inflammatory cell therapy is the transplantation of stem cells which activate downstream cellular pathways and promote infiltration of endogenous NSC to the site of stroke injury. That involves the transplantation of stem cells that have either been repopulated from iPSCs, ESCs, MSCs, or BMSCs to a neural pro-genitor state, or are un-differentiated (3). An increasing number of animal studies and preclinical trials have, however, provided evi-dence that regenerative cell-based therapies can lead to functional recovery in stroke patients. In vitro pre-treatment of stem cells by specific culture conditions and/or biological agents (also known as "preconditioning" or "priming") can improve the survival, en-graftment, immunosuppressive and paracrine properties of stem cells, therefore enhancing their regenerative capacity. For MSCs, preconditioning strategies have been explored in order to enhance the anti-inflammatory properties of MSCs, including exposure to hypoxia/growth factors (4) and inflammatory cytokines (5), whilst the only preconditioning strategy in human stroke patients (STARTING-2) tested the transplantation of autologous MSCs exposed to autologous serum obtained at stroke onset (6)Stem cells can differentiate into neural lineages to replace lost neurons. Moreover, they provide trophic support to tissue at risk in the penumbra surrounding the infarct area, enhance vasculogenesis, and help promote survival, migration, and differentiation of the endogenous precursor cells after stroke (7). Stem cells are highly migratory and seem to be attracted to areas of brain pathology such as ischemic regions. The pathotropism may follow the para-digm of stem cell homing to bone marrow and leukocytes migrat-ing to inflammatory tissue. The molecular signaling therefore may involve various chemokines, cytokines, and integrins. The recogni-tion that stroke not only affects neurons but also other neural cell types, especially vascular cells, prompted the search for alternative

regenerative processes that rescue in tandem neural and vascular cells, under the theme of attenuating the impaired neurovascular unit (8) The delivery of neural progenitor cells to the site of injury triggers recovery through reducing inflammation and reactive glio-sis as well as promoting angiogenesis.

Biography:

He is an Assistant of Professor Ege University, Department of Pe-diatrics, Bone Marrow Transplantation Unit. In the Bone Marrow Transplantation Unit, he has gained experience in the treatment of severe blood disorders like Leukemia, Thalassemia, anemias, and bone diseases. Worked as a Cell culture laboratory manager in UBITAK (Scientific and Technological Research Council of Turkey). Within the "Development of "targeted polymeric struc-tures" as in vivo and in vitro imaging and therapeutic agent for Breast cancer" project he has gained experience in Managing the cell culture laboratory, Solving problems, that occur during cell cultivation and within the cell culture laboratory, 3D cell culture (pioneers in Turkey).

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