Endovascular Stem Cell Therapy

The impact of increased BDNF expression in the brain by endovascular delivered mesenchymal stem cells (MSCs) post stroke towards modulating endoplasmic reticulum (ER) stress-mediated neuronal remodeling has not been directly studied. Therefore, the present study investigates ER stress-mediated neuronal remodeling following IA MSCs infusion in a rodent model of ischemic stroke.

Methods: Ovariectomized Sprague Dawley rats were subjected to MCAO followed by 1 × 105 IA MSCs administration at 6 h. Infarct and functional outcomes at different time points post-stroke were evaluated. Further, various gene and protein expression studies were performed to determine the underlying mechanisms of the effect of IA MSCs towards ER stress-mediated neuronal remodeling.

Results: Post-stroke IA MSCs administration significantly increased BDNF expression and decreased ER stress markers expression at day 1 post-stroke. A gradual rise in the expression of growth associate protein-43 (GAP 43) and spinophilin were observed at 7, 14- and 28-days post-stroke indicating an increase in neuronal remodeling towards functional restoration.

The results suggest that IA MSCs post-stroke can modulate neuronal remodeling by BDNF-mediated reduction in ER stress that contributes towards functional recovery [1)].

1)
Kaur H, Sarmah D, Datta A, Borah A, Yavagal DR, Bhattacharya P. Endovascular Stem Cell Therapy Promotes Neuronal Remodeling to Enhance Post Stroke Recovery by Alleviating Endoplasmic Reticulum Stress Modulated by BDNF Signaling. Stem Cell Rev Rep. 2022 Oct 17. doi: 10.1007/s12015-022-10461-6. Epub ahead of print. PMID: 36251114.