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Wharton's jelly mesenchymal stem cells and Insulin effect on BDNF expression in CA1 and CA3 regions of rats' hippocampus after Chronic Hypoxia

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Objectives: Brain is vulnerable to deprivation of oxygen supply during hypoxia, and therefore undergoes neurodegeneration and cognitive dysfunction. Regarded to Regenerative capacities of Wharton's jelly -MSCs and insulin at the site of injury, we were aimed to evaluate the effect of Wharton's jelly -MSCs and insulin on degenerative consequences induced by chronic hypoxia.

Methods: 36 male rats were randomly divided in 6groups: Control(C), Sham1-saline (Sh1), Sham2-surgery (Sh2), Hypoxia (H), Hypoxia+ Insulin (HI), Hypoxia+ MSCs (HCs). Animals were exposed to hypoxic chamber (8% O2, 92% N2) for 30 days (4hours/day) in H, HI and HCs groups. Intranasal insulin and stereotaxical MSCs in HI and HCs was used, respectively. Spatial learning and memory were analyzed using the Morris water maze task. BDNF gene expression was studied in the hippocampus by real time-PCR.

Results: BDNF had the significant depletion in HI group and magnification in HI and HCs groups comparing with C and Sh groups ($p < 0.05$). Insulin and MSCs improve Hypoxia's signs such as BDNF gene expression fallen and memory impairment.

Conclusions: In conclusion, we indicated that use of insulin hormone and MSCs as neuroprotective and stimulating factors for neurogenesis, could be beneficial in neurodegenerative damage induced by hypoxia.

Speaker Biography

Simin Mahakizadeha has completed her PhD from Tehran University of Medical Sciences, Iran and received her master's degree in Anatomy from Golestan University of Medical Science, Iran. Her Bachelor's degree was received from Shiraz University of Medical Sciences in the field of physiotherapy. She has published her papers and participated in many national and international conferences.

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