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Potential role of bone marrow mesenchymal stem cells in management of Alzheimer's disease in female rats

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Alzheimer's disease (AD) is a chronic and neurodegenerative disease affecting the population over 65 years of age. This study aimed to evaluate the therapeutic role of mesenchymal stem cells (MSCs) against AD in rats. The MSCs were harvested from bone marrow of femoral bones of male rats, grown and propagated in culture then characterized morphologically and by the detection of CD14, CD29, CD34, CD44, CD45 and CD106 genes expression. Fifty female rats were classified into 5 groups. Group (1): was control. Groups from (2) to (5) were orally administered with aluminum chloride for induction of AD. Group (2): was left untreated; groups (3) and (4): were treated orally with rivastigmine and intraperitoneally with cerebrolysin respectively and group (5): was infused with a single dose of BM-MSCs intravenously. Y-chromosome gene was assessed in the brain tissue of the female rats. Brain seladin-1 and nestin genes expression were detected by RT-PCR. While, brain ChAT and survivin expressions were determined by immunohistochemistry. Histopathological investigation of brain tissues was done. The AD group showed significant decrease in the number of positive cells for ChAT and survivin expressions while, treatment with rivastigmine, cerebrolysin or BM-MSCs produced significant increase in the number of positive cells for them. Also, AD group showed significant decrease in brain nestin and seladin-1 genes expression while, the groups treated with rivastigmine, cerebrolysin or BM-MSCs showed significant increase in their expressions. Brain sections of AD rats showed acellular plaques in the hippocampus. While, all treated groups showed intact histological structure of the hippocampus. These improvements might be attributed to the anti-apoptotic and neurotrophic efficacy of BM-MSCs.

Biography

Hanaa Hamdy Ahmed has completed her Ph.D. at the age of 35 years from Faculty of Science, Cairo University and postdoctoral studies from National Research Centre, Medical Research Division. She has been a Head of Hormones Department at the National Research Centre since 2012 uptil now. She has published more than 110 papers in the field of Medical Research in reputed journals. She won a Scientific Encouraging award in Medical Sciences in 2006. She is serving as an Editorial Board Member and as a reviewer board member in more than 30 International Journals.

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