

Paper (4)

Title:

The Potential Therapeutic Effect of Orexin-Treated versus Orexin-Untreated Adipose Tissue-Derived Mesenchymal Stem Cell Therapy on Insulin Resistance in Type 2 Diabetic Rats.

Abstract

Type 2 diabetes mellitus is a chronic metabolic disease characterized by resistance to peripheral insulin actions. Mesenchymal stem cells have been studied for years in T2DM therapy, including adipose tissue-derived mesenchymal stem cells (AD-MSCs). Orexin neuropeptides (A and B) are well-known regulators of appetite and physical activity. The aim of this work was to elucidate the possible therapeutic effect of AD-MSC preconditioning with orexin A (OXA) on insulin resistance in rats. Twenty-eight adult male albino rats were divided into 4 equal groups: a normal control group and 3 diabetic groups (a control T2DM group, diabetic rats treated by an AD-MSCs group, and diabetic rats treated by AD-MSCs preconditioned with OXA). We noticed that the treated groups showed a significant alleviation of insulin resistance parameters as shown in lowering the serum levels of glucose, insulin, total cholesterol, inflammatory markers, and HOMA-IR as compared to the control diabetic group with more significant reduction observed in the OXA-pretreated ADMSCs-administrated group. More improvement was also noted in the glucose uptake and GLUT-4 gene expression in the skeletal muscle and adipose tissue in the OXA pretreated AD-MSCs-administrated group compared to the untreated diabetic group. Conclusion. Preconditioning of ADMSCs with OXA can significantly increase their potential to reduce the insulin resistance in the rat model of T2DM.