Reducing the Risk of Alzheimer's in Type II Diabetes Patients

Witmer, Marissa

The purpose of the experiment was to identify an insulin sensitizer that would decrease the pathogenesis of Alzheimer's disease in Type II Diabetes patients, and to compare the effect of insulin sensitizers on WT HFE/SH-SY5Y (WT) and H63D HFE/SH-SY5Y (H63D) neuroblastoma cell lines. During the experiment, the effects of Metformin, 27-Hydroxycholesterol (27-OHC), Succinic acid, Succinic acid disodium salt, cloves (water extract), and cloves (chloroform extract) on ß-amyloid (Aß42) production were observed. First, toxic and non-toxic concentrations of the tested compounds were calculated. Next, it was determined whether Metformin and 27-OHC could induce Aß42 in WT and H63D cell lines. Finally, the Aß42 production of Metformin was compared with other insulin sensitizers in both the WT and the H63D cells hoping to find that Aß42 production of one of the insulin sensitizers was lower than that of Metformin because there is a higher incidence of Alzheimer's in Type II Diabetes patients who take Metformin. The final results indicated no conclusive trend between insulin sensitizers and the decrease of Aß42 production in both differentiated and undifferentiated neuroblastoma cells. Results also showed that there is no induced Aß42 secretion by Metformin in 6-day differentiated cells, but there is an induced secretion of Aß42 by Metformin (1 mM) in 4-day differentiated cells. Results indicated that differentiated H63D cells were more vulnerable to chemicals and had more total Aß42 production than WT cells when mediated by 27-OHC (1-10 µM), and WT cells secreted more Aß42 than they retained while H63D cells secreted less. This research can potentially impact the quality of life for people with Type II Diabetes and Alzheimer's disease, thus having a very substantial impact.

Awards Won: