

Moving Towards the Cure for Alzheimer's Disease: The Effects of Histone Deacetylase Inhibitors on Neurofibrillary Tangle Formation and Microtubule Stability to Preserve Neuronal Integrity (A Novel in vitro Trial)

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The purpose of this experiment is to prevent the deacetylation of microtubule-associated tubulin protein through the use of the inhibitory mechanisms of histone deacetylase inhibitors, thus decreasing the formation of neurofibrillary tangles within the intracellular networks and synapses of neurons that are affected in Alzheimer's and thereby increasing the stability of the microtubules. The researcher hypothesizes that histone deacetylase inhibitors will inhibit the deacetylation of tubulin protein, therefore decreasing the possibility of neurofibrillary tangle formation within the intracellular networks of the neurons, as well as increasing the stability of the microtubules. Using many processes, such as BCA protein assay and Western Blot, positive results were obtained. The results clearly support the researcher's hypothesis and display the difference in the amount of acetylated tubulin in all three trials. Because the control cells are genetically modified to be affected by Alzheimer's-related symptoms, there is excessive deacetylation, by histone deacetylase, of tubulin within these cells. This project was not meant to produce hyperacetylation, but maintain the normal, physiological acetyl group levels. The results obtained indicate that the histone deacetylase inhibitors maintained the proper amount of acetylated protein levels in the experimental group compared to the control group due to the fact that the results display higher amounts of acetylated protein in the experimental groups of all trials. The results show that it may be possible to inhibit the excessive deacetylation of tubulin proteins, which causes neurofibrillary tangle formation and microtubule degradation, therefore preserving neuronal integrity and delaying the progression of Alzheimer's disease.