Improved Treatment for Alzheimer's by Enhancing Tyrosine Phosphorylation of the DAB1 Protein through Lauric Acid

Goel, Siya (School: West Lafayette Junior/Senior High School)

Alzheimer’s is a progressive neurological disorder that affects memory and is the third leading cause of death. Downregulation of apolipoprotein E (ApoE) gene is involved in late-onset Alzheimer’s. VLDLR and ApoER2 genes lead to downregulation of ApoE gene. The reduction of response is because of messages from DAB1 protein which interacts with cadherin proteins on receptors for VLDLR and ApoER2, thus causing tyrosine phosphorylation. When this process occurs, more signals are sent to maintain neuron stability, therefore preventing formation of amyloid plaques, a key symptom for Alzheimer’s. Prior studies show role of unsaturated fatty acid in downregulation of ApoE, however, till date, role of saturated fatty acid in Alzheimer’s is unclear. Purpose of this research was to examine whether adding lauric acid, a saturated fatty acid, to DAB1 protein increases tyrosine phosphorylation hence decreasing risk of Alzheimer’s. Bioinformatics tools like GEO2R and string-db were implemented to find connection between VLDLR, DAB1, and ApoER2. Further, Schrodinger’s construction was used to examine which saturated fatty acid improved signals. Results suggested most spontaneity between lauric acid and DAB1 when bounded to cadherin proteins. Next, using NIH-3T3 cells, three-staged experimental study was conducted which included cell culturing, plasmid preparation, transfection with PEI, crosslinking beads, immunoprecipitation, protein quantification, combining lauric acid and DAB1 protein, merging DAB1 protein/ lauric acid mixture and cadherin protein, and recording results with fluorescent microscope. Results supported the hypothesis and further, indicate that saturated fatty acids like lauric acid can potentially be applied as preventative treatment to minimize risk of Alzheimer’s.

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