Rapamycin as a Novel Therapeutic for Alzheimer's Disease: Prevention Assessed through Neuroimaging

Wang, Amy
Ma, David

Alzheimer's disease (AD) is the sixth leading cause of death in the nation. Although AD research is bustling, a concrete and effective treatment has yet to be found. The purpose of this project is to test the potential of a common FDA approved drug, Rapamycin (Rapa), in treating pre-symptomatic AD and preventing further development of AD. Rapa is capable of increasing lifespan in mammals and inhibiting unwanted cell mobility, such as cancer cell growth. This project will be the first to tie Rapa's capabilities and AD together. In order to analyze Rapa's efficacy, neuroimaging and behavioral tests were conducted on mice that carry the apolipoprotein E4 gene (APOE4), the strongest genetic risk factor for AD. Methods include magnetic resonance imaging (MRI), magnetic resonance spectroscopy (MRS), Radial Arm Water Maze (RAWM), and Novel Object Recognition Test (NOR.) In tandem, these methods provide a comprehensive analysis of the subjects' cognitive function, health, and performance. Data reflected the mice's cerebral blood flow, brain metabolites, spatial memory, recognition memory, and neuroinflammation. Data strongly supported the initial hypothesis that with the introduction of Rapa, APOE4 mice will show improved cognition, memory, and neurological health. Cerebral blood flow and crucial brain metabolites were restored in Rapa mice; Rapa mice exhibited cogent memory in comparison to their counterparts in RAWM and NOR tests; Rapa was also able to reduce neuroinflammation. Thus far, Rapa has shown favorable effects. Rapa restores and improves memory, cognition, and neurological health in mice at risk of AD, leading to the conclusion that Rapa has great potential in preventing the development of AD.

Awards Won:
Third Award of $1,000