Implications of Resveratrol on Memory Retention in Dugesia tigrina

Albeik, Alina (School: George C. Marshall High School)

Age-related memory loss affects nearly 40% of the global population and for some, it leads to neurodegenerative diseases such as Alzheimer's and dementia. With no cure and limited treatment options, the search for natural compounds to aid in cognitive preservation becomes necessary. Resveratrol is a naturally-occurring, polyphenolic compound found in grapes, berries, and peanuts and is known for its antioxidant and neuroprotective properties. Studies suggest resveratrol activates Sirt1, a protein that promotes synaptic plasticity and memory formation. Furthermore, because of the similarities between planaria and human central nervous systems, this experiment provides insight into how resveratrol affects human cognition. In this study, planaria navigated a 3D-printed Y-maze on six consecutive days in a dark environment, using light and food cues to activate associative learning. After establishing baseline memory, planaria were exposed to different concentrations of resveratrol solutions for three days. Elapsed maze completion times were recorded pre- and post-administration to evaluate the speed of maze navigation and memory recall. These data reveal an increased concentration of resveratrol decreased the time for planaria to complete the maze as maze times decreased by an average of 51 seconds between the control and highest concentration. Thus, the results indicate that resveratrol enhances planarian memory retention, suggesting its potential to serve as a natural intervention in preventing or mitigating cognitive decline and neurodegenerative diseases.

Awards Won: