Neuroprotective Effects of a Combination of Celastrol and Naproxen on Acute Traumatic Brain Injury in a Drosophila melanogaster Model as a Potential Novel Pharmaceutical

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Traumatic brain injury (TBI) is the leading cause of death among all traumatic injuries. While there are some treatments, such as nonsteroidal anti-inflammatory drugs (NSAIDs), most cause debilitating side effects including cerebral ischemia and neurodegenerative diseases. Alternatively, some clinical trials have demonstrated that natural compounds, including celastrol, can be effective in administering neuroprotective effects following TBI. This experiment developed a novel pharmaceutical treatment for TBI containing a natural compound, celastrol, and the NSAID, naproxen. For this experiment, Drosophila melanogaster were administered TBIs, and given either 1. naproxen, 2. celastrol, or a combination of both in order to ascertain if a combination of celastrol and naproxen was equally neuroprotective to naproxen alone. The experiment results indicate that the combination treatment significantly increased neurological function to the same extent as solely naproxen. With further research, this novel pharmaceutical could be used as an alternative to naproxen alone to eliminate neurological deficits caused by TBIs as each medication works via a different mechanism. All experimental groups demonstrated a significant level of neuroprotection (one-way ANOVA p-value < 0.0001), with respect to a climbing assay. Further research should be conducted to verify these findings, in both in vivo and in vitro models. Keywords: Traumatic brain injury, neuroprotectivity, non-steroidal anti-inflammatory drug (NSAID), celastrol, Drosophila melanogaster

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