

Baicalin and Rhoifolin prevents scopolamine-induced memory impairment and brain oxidative stress in zebrafish (*Danio rerio*)

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Alzheimer's disease (AD) is a multifactorial progressive and irreversible neurodegenerative disorder. AD is the most common form of dementia affecting about 10% of people over the age of 65. The disease is characterized by the massive loss of neurons and synaptic connections in the cortex and hippocampus, leading to memory difficulties, anxiety, and depression. For the simulation of AD disease, *Danio rerio* fish had been used successfully. AD is associated with a significant problem in cholinergic transmission, so there is a growing interest in the discovery of different agents with an inhibitory role on acetylcholinesterase (AChE). Numerous studies show that certain natural flavonoids significantly improve cognitive abilities and may have an inhibitory effect on AChE. We focused on two natural flavonoids, namely Rhoifoline (Rho) and Baicalin (Bac), which are described in previous studies as having beneficial effects on cognitive processes, with no adverse reactions. Substances were administered by immersion of zebrafish once daily for 16 days. To induce anxiety and memory impairment, scopolamine was administered. Anxiety was measured using the Novel Tank Diving Test (NTT), and memory was assessed by the Novel Object Recognition Test (NOR) and Y-maze test. We also evaluated the impact of the two flavonoids on the oxidative state of this animal model. Our data show that Rho and Bac improved spatial memory in the Y-maze tasks and also improved the recognition memory of the zebrafish in the NOR test and reduced anxiety levels in NTT.

Moreover, our data indicate that these compounds reduced the level of oxidative stress caused by the administration of scopolamine and increased the activities specific to catalase and glutathione peroxidase, which suggests the antioxidant profile. Our results argue that Rho and Bac can restore memory degradation and induce neuroprotective effects in dementia animals. Therefore, they could be used as therapeutic agents in AD.