

Improvement of memory by dieckol and phlorofuofuroeckol in ethanol-treated mice: possible involvement of the inhibition of acetylcholinesterase.

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Abstract

Phlorotannins, the polyphonic compounds found in brown *Eisenia* and *Ecklonia* algae, have several pharmacologically beneficial effects such as anti-inflammation. In addition, our recent data show that these compounds may improve the cognitive functions of aged humans suggesting the potential ability to enhance memory in several neurodegenerative disorders. To examine the experimental hypothesis that two effective components of *Ecklonia cava*, dieckol and phlorofuofuroeckol (PFF), have memory-enhancing abilities, both were administered orally to mice before a passive avoidance test. The repeated administration of either dieckol or PFF dose-dependently reduced the inhibition of latency by the administration of ethanol. To investigate the mode of memory-enhancing actions, the levels of major central neurotransmitters in three different regions (striatum, hippocampus, and frontal cortex) of the mouse brain were measured. The levels of some of the neurotransmitters were significantly changed by ethanol. Both dieckol and PFF altered the levels of some neurotransmitters modified by the ethanol treatment. It is noteworthy that both dieckol and PFF increased the level of acetylcholine, and they exerted anticholinesterase activities. Overall, the memory-enhancing abilities of dieckol and PFF may result from, at least in part, the increment of the brain level of acetylcholine by inhibiting acetylcholinesterase.