In vitro effects of caffeic acid on acetylcholinesterase activity in different brain structures of rats

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Abstract

The enzyme acetylcholinesterase is distributed throughout the body in both neuronal and non-neuronal tissues and plays essential role in the regulation of physiological events. Caffeic acid is a phenolic compound that has antioxidant, anti-inflammatory and neuroprotective properties. The aim of this study was to investigate whether caffeic acid at different concentrations (0.1; 0.5; 1.0; 1.5 and 2 mM) alters in vitro the AChE activity in brain structures. Methods: The AChE activities in brain structures were determined according to methods previously described. The reaction mixture was composed of 50mM K+-phosphate buffer, pH 7.5 and 1mM of DTNB. The enzyme was pre-incubated with different caffeic acid concentrations (0, 0.1; 0.5; 1.0; 1.5 and 2mM) for 2 min. The reaction was initiated by adding 0.8 mM acetylcholine iodide. The enzyme activity was expressed in µmol AcSCh/h/mg of protein. The results showed that caffeic acid increased the AChE activity in the cerebral cortex and cerebellum at concentrations of 1.0 mM; 1.5 mM and 2.0 mM and in hypothalamus at concentrations of the 1.5 mM and 2.0mM when compared to control group (P<0.05). In striatum and hippocampus caffeic acid did not affect in vitro the AChE activity at any concentration. Our results demonstrated that caffeic acid can interfere the cholinergic signaling in CNS. These findings suggest that caffeic acid is a natural and promising compound and should be considered potentially therapeutic in disorders involved in the cholinergic system.

Key words: acetylcholinesterase, caffeic acid, brain.

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