Caffeine and Diphenyl Diselenide Improve the Impairment of Long-term Memory in Middle-aged Rats

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Introduction: The increase life expectancy in recent decades has reflected directly in increased incidence of age-related diseases. Particularly, it is observed a deficiency on cognitive functions in elderly individual. Thus, the age-dependent loss of cognitive functions has stimulated the development of strategies to contain this decline. Animal studies have reported the effectiveness of caffeine and diphenyl diselenide (PhSe)₂ in enhancing cognition. Based on these considerations, the aim of the present study was to evaluate the effects of (PhSe)₂-supplemented diet associated to caffeine on the memory in middle-aged rats. Materials and methods: Male adult (3 month-old) and middle-aged (18 month-old) Wistar rats were submitted to the object recognition task to assess the short and long-term memory. The groups were divided into: adults and middle-aged rats treated with standard diet chow and saline; middle-aged rats treated with (PhSe)₂ supplemented diet (10 p.p.m.), caffeine (15 mg/kg p.o.) or both (PhSe)₂ and caffeine. Results and discussion: The present findings show that the (PhSe)₂-supplemented diet induced an improvement in the short-term memory of middle-aged rats in the object recognition task. By contrast, the same effect was not observed with respect to the long-term memory. Moreover, (PhSe)₂-supplemented diet associated with caffeine administration reversed the impairment of long-term memory in middle-aged rats. The animals treated only with caffeine showed no improvement in the short and long-term memory. Glutamate uptake only was reduced in slices of hippocampus from middle-aged rats treated with (PhSe)₂ and (PhSe)₂ more caffeine. In addition, the number of crossings in the open field were increased in middle-aged rats treated with (PhSe)₂ and (PhSe)₂ more caffeine. Conclusion: These results suggest that (PhSe)₂ and caffeine administration improved the impairment of memory caused by aging. The reduction in glutamate uptake seems to be related to the mechanism by which (PhSe)₂ ameliorated the short-term memory.

Keywords: caffeine, organoselenium, memory, object recognition, middle-aged.

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