4-4'-DICHLORO-DIPHENYL DISELENIIDE REVERSED MEMORY IMPAIRMENT INDUCED BY EXPOSURE OF CORTICOSTERONE IN MICE

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Introduction: A long-term exposure of corticosterone has been used as an experimental model to induce stress in mice. This study investigated the effect of 4-4'-dichloro-diphenyl diselenide (p-ClPhSe)2 on cognitive impairment and neurochemical changes induced by the administration of corticosterone in mice. Material and Methods: The mice were randomized in six groups: (I) oil mineral + vehicle; (II and III) (p-ClPhSe)2 1 or 5 mg/kg/day (i.g.) + vehicle; (IV) oil mineral + corticosterone (20 μg/ml/day); (V and VI) (p-ClPhSe)2 1 or 5 mg/kg/day (i.g.) + corticosterone. The animals received corticosterone or vehicle (1% EtOH/H2O) in drinking water, during four weeks. At the last week the animals received (i.g) (p-ClPhSe)2 (1 or 5 mg/kg) or mineral oil (10 ml/kg) once daily. After that, animals performed the step-down passive avoidance test (SDPA). Then, the mice were killed and cortex and hippocampus were collected for neurochemical assays. The experiments were approved by Committee on Care and Use of Experimental Animal Resources of the UFSM, Brazil (6997050115). Results and Discussion: Our findings demonstrated that treatment of mice with (p-ClPhSe)2 (1 and 5 mg/kg) was effective in reversing memory deficits caused by corticosterone exposure in the SDPA. The results showed a significant increase of glutamate uptake in hippocampal slices in mice exposed to corticosterone. The impairment of memory found in mice exposed to corticosterone could be attributed to the increase of glutamate uptake which in turn could reduce the neurotransmitter glutamate in hippocampus. By contrast, the glutamate uptake in cortical slices of mice exposed to corticosterone was unchanged. Treatment with (p-ClPhSe)2 restored glutamate homeostasis by normalizing the glutamate uptake in hippocampi of mice exposed to corticosterone. Conclusions: These results demonstrated that (p-ClPhSe)2 reversed memory deficits caused by corticosterone exposure in mice and restored glutamate homeostasis.

Keywords: corticosterone, selenium, memory.

Acknowledgments: UFSM, FAPERGS, CAPES, CNPq.