EVALUATION OF NEUROTOXIC EFFECTS OF LIPOPOLYSACCHARIDE AND PARAQUAT: THE ROLE OF INFLAMMATION ON PARKINSON’S DISEASE


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Introduction: Studies suggest that environmental factors like exposure to pesticides and inflammatory process are involved in the development of the Parkinson’s disease (PD). Thus, this project aimed to investigate the neurotoxic effects induced by the lipopolysaccharide (LPS) and the pesticide paraquat (PQ), whereas one factor would be interfering on the susceptibility to the other.

Material and methods: Swiss male mice (10-12 weeks) were submitted to seven days of neurotoxicants exposition via i.p.: days 1, 3 and 5 the animals received LPS (3, 5 e 7 mg/kg, respectively) and on days 2, 4, 6 e 7 the animals received PQ (5 mg/kg/day). Four groups were settled: control; PQ; LPS and LPS plus PQ; the experimental protocol were previously established based on disruption of blood-brain barrier evoked by LPS. At day 9, part of the animals were submitted to behavior tasks and thereafter encephalic structures were removed to evaluate the activity of mitochondrial respiratory complex I and II and catalase. A parallel subgroup of animals was submitted to behavior tasks on days 22, 25, 38 and 45. Results: There was an increased in striatal complex I activity in the group that received only LPS. There was a significant decreased in catalase activity in the cortex of mice that received only LPS and in the cortex and hippocampus of mice that received LPS plus PQ. Furthermore, animals treated with LPS plus PQ displayed significant deficits in olfactory recognition and social memory recognition tasks. Conclusions: The present findings are the first to show that LPS plus PQ can cause loss of social memory and olfactory ability. This impairment could be related to the decreased in catalase activity in hippocampus. Systemic inflammation and pesticide exposure seems to induce the first non-motor symptoms related to PD; however, further studies are necessary to confirm this finding.

Acknowledgements: CAPES (PNPD and PROAP), CNPq, FAPESC and UFSC.

Keywords: Parkinson's disease, lipopolysaccharide, paraquat.