EFFECTS OF PHYSICAL EXERCISE ON INFLAMMATORY PARAMETERS IN THE HIPPOCAMPUS OF ANIMALS EXPOSED TO 6–OHDA.

Brescianini, S.M.S; Tuon, T; Pedroso, G.S; Santos, M.F; Pereira, F.T; Souza, P.S; Dutra, R.C; Nesi, R.T; De Souza, C.T; Silveira, P.C.L; Pinho, R.A.

1Laboratory of Physiology and Biochemistry of Exercise, UNESC, Criciuma, Brazil

Background: Experimental studies have shown the regulatory role of physical exercise in various degenerative diseases, however, the effect of exercise on neuroinflammation induced in the Parkinson’s disease (PD) are still inconclusive. This study aimed to evaluate the effect of two different exercise protocols (strength and aerobic training) on inflammatory and mitochondrial parameters in a Parkinson’s disease experimental model induced by 6-OHDA injection. Methods: Six experimental groups were used (n = 6 each): Sham (only surgery); ST (Strength training); AT (Aerobic Training); PI (Parkinson inductor - 6OHDA); ST + PD (Strength Training plus 6 OHDA induction); AT + PD (Aerobic Training plus 6OHDA induction). The animals were submitted to exercise for 8 weeks and PD was induced by 6-OHDA striatal injection 24 hours after the last exercise session, followed by euthanasia. The striatum was surgically removed and homogenized in order to determine some biomarkers as: tyrosine hydroxylase (TH) levels, nuclear factor kappa B (NF-κB) and sirtuin 1 (Sirt1) protein content by western blot, complex I activity and in addition TNF-α, IL-1β, IL-17, IFN-γ, and TGF-β1 by ELISA. Results: The results showed that both training models increased TH, Sirt1 content and the Complex I activity compared to the control groups. Similar results were observed regarding neuroinflammation parameters. The levels of TNF-α, IFN-γ, IL-1β were reduced by the both exercise models, while the NF-κB and TGF-β1 levels were reduced only to strength training compared to the group exposed to 6-OHDA. Conclusion: Our results demonstrated that both, strength and aerobic training were able to promote neuroprotection in the hippocampus mediated by Sirt1 regulated by NF-κB also promoting the mitochondrial activity. On the other hand, only the strength exercise demonstrated to be important in order to attenuate the neuroinflammation.

Keywords: strength exercise, neuroinflammation, mitochondrial activity, Parkinson's disease.