PHYSICAL TRAINING AND FISH OIL SUPPLEMENTATION ON HEART OXIDATIVE BALANCE AND METABOLISM

Freitas, C. M. 1,3; Souza, S. M. 1,2; Braz, G.R.F. 1; Macêdo, P.F.C. 4; Melo, J.S.V. 4; Costa, L.A.R. 4; Fonseca, K.T. 4; Batista-de-Oliveira-Hornsby, M. 4; Lagranha, C.J. 1,2,3
1Department of Physical Education, Federal University of Pernambuco, Brazil; 2Graduate Program in Neuropsychiatry and Behavioral Sciences, Federal University of Pernambuco, Brazil; 3Graduate Program in Biochemistry and Physiology, Federal University of Pernambuco, Brazil; 4Department of Nutrition of the Federal University of Pernambuco, Pernambuco, Brazil.

Introduction: An imbalance in the production and elimination of reactive oxygen species (ROS) can induce oxidative stress. Studies suggest that polyunsaturated fatty acids ω-3 (PUFAs) and physical exercise can decrease levels of the oxidative stress. However, there is no data in the literature studying the combined treatment in cardiac oxidative balance and metabolism. Objective: Investigate whether ω-3 present in fish oil supplementation, along with moderate exercise training improves the oxidative balance and metabolism in adult rat hearts. Materials and methods: Wistar male were divided into four groups according to the treatment received, as follows: Vehicle/Sedentary (V/S; n=8) Vehicle/Exercised (V/E; n=8) Fish oil/Sedentary (FO/S; n=8) and Fish oil/Exercised (FO/E; n=8). At 90 days of life animals were submitted concurrently to exercise and supplementation over a period of 4 weeks. At 120 days was evaluated oxidative stress marker: Malondialdehyde-MDA (Buege, 1979), protein oxidation by carbonyls levels (Levine, 1990), activity of superoxide dismutase-SOD (Misra, 1972), catalase-CAT (Aebi, 1984), glutathione S-transferase-GST (Habig, 1974), glutathione peroxidase-GPx (Flohé, 1984), reduced glutathione-GSH (Hissin, 1976) total sulfhydryl-SH (Riddles, 1983) and oxidative metabolism marker citrate synthase-CS (Alp, 1976). The procedures followed the recommendations of the Brazilian Committee of Animal Experimentation and approval of the Ethics Committee Center of Biological Sciences, UFPE (Protocol#:23076.016320/2012-45). Results: Carbonyls levels (V/S vs V/E: decreased 67%; p<0.05); SOD (V/E vs FO/E: increased 45%; p<0.05), (FO/S vs FO/E: increased 63%; p<0.01); CAT (V/E vs FO/E: increased 248%; p<0.01), (FO/S vs FO/E: increased 91%; p<0.05); GPx (V/S vs FO/S: increased 32%; p<0.05) and (V/E vs FO/E: increased 35%; p<0.05); CS (V/E vs FO/E: increased 43%; p<0.01), (FO/S vs FO/E: increased 30%; p<0.05). The other markers of oxidative damage showed no difference. Conclusions: Our data suggest that the combined treatment improves in rat hearts antioxidant capacity and metabolism that can prevent the deleterious effect of oxidative stress.

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Key words: physical training, fish oil supplementation, oxidative stress