C9 | EFFECT OF RESISTANCE EXERCISE TRAINING ON BLOOD ANTIOXIDANT CAPACITY IN RATS UNDERGOING BREAST CANCER TREATMENT WITH DOXORUBICIN

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Introduction: Doxorubicin (DOX) is an efficient chemotherapeutic drug used in the treatment of several types of cancer, such as breast cancer. DOX causes cardiotoxicity that leads to cardiac inflammation and remodeling as a result of oxidative stress and impaired mitochondrial function. Several studies observed a beneficial effect of exercise training on antioxidants, due to upregulation of the activity of some antioxidant enzymes. The most frequently studied antioxidants were superoxide dismutase (SOD) and catalase (CAT) that give us insights of cardioprotective capacity reduction due to DOX administration. This study aims to evaluate the effect of a resistance exercise training program on blood antioxidant capacity in an animal model of breast cancer treated with DOX.

Material & Methods: Twelve 4-week-old Wister rats (150-200g) were randomly divided into six experimental groups: sedentary (SD), SD+(MNU), exercise (EX), EX+(MNU), SD+(MNU+DOX), EX+(MNU+DOX). A 50 mg/Kg dose of the carcinogen N-methyl-N-nitrosourea carcinogen (MNU) was injected at 50 days of age and DOX administration (twice a week, during de following 3 weeks) began 3 weeks after the beginning of the resistance exercise performed following a ladder climbing protocol (4-8 climbs, 8-12 steps, 2min rest), 3 times a week for 8 weeks. Loads were attached to their tails and were progressively increased according to their performance. Two weeks after last DOX administration, 48h after the last exercise session, all animals were sacrificed under anesthesia and blood was collected by cardiac puncture. Enzymatic activity of (SOD) and (CAT) were performed in blood samples. The quantification of the proteins was done by absorbance reading at 240nm for CAT and 560nm for SOD, with the program stipulated in the equipment (BioTek Gen5™). The procedures were approved by UTAD's ORBEA and submitted to DGAV.

Results: The following results of SOD and CAT were found respectively in the groups: SED=5.71U.min-1.mg protein and 2,40mM.min-1.mg-1.protein; SD+(MNU)=3.69U.min-^{1}.mg protein and 2,82mM.min^{-1}.mg^{-1}protein; SD+(MNU+DOX) = 6.16U.min^{-1}.mg protein and 3.05mM.min^{-1}.mg^{-1}protein; EX= 5.33U.min^{-1}.mg protein and 4.84mM.min^{-1}.mg^{-1}protein; EX+(MNU)= 8.22U.min^{-1}.mg protein and 5.75mM.min^{-1}.mg^{-1}protein; Ex+(MNU+DOX)= 7.02U.min^{-1}.mg protein and 6.17mM.min^{-1}.mg^{-1}protein. The total antioxidant capacity will be evaluated to understand the impact of changes in activities observed in these enzymes of the antioxidant system.

Conclusions: The higher values of SOD and CAT enzymes in EX, EX+(MNU) and EX+(MNU+DOX) groups suggested that Resistance Exercise is a promising therapeutic tool in reducing cardiotoxicity caused by DOX. Further investigation including more organ and analysis of more proteins and antioxidant enzymes would be required.