



The effects of doxorubicin and acute exercise on nitric oxide levels in heart and liver tissues

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ABSTRACT:

A portion of the reactive species produced as a result of doxorubicin (DOX)-induced oxidative stress is associated with the overproduction of nitric oxide (NO). The subsequent accumulation of DOX in cardiac and liver tissue make these areas particularly susceptible to DOX-induced damage. The purpose of this study was to examine the interaction between DOX administration and exercise on NO metabolism in heart and liver cells. Thirty male Sprague-Dawley rats received an intraperitoneal injection of DOX (4.5 mg/kg) and were randomly separated into 5 experimental groups (n=6). Groups A and E did not perform any exercise and were euthanized at 24 and 48 hours, respectively. Groups B and C underwent a single bout of swimming exercise for 60 min and were sacrificed at 25 and 48 hrs, respectively. Group D exercised at 24 and 48 hrs and were sacrificed at 49 hrs. No changes ($P>0.05$) in NO concentrations were observed in liver tissue following exercise as compared the non-exercised groups. In contrast, a consistent pattern was observed in cardiac tissues that showed a decrease in NO concentrations in the exercised (B, C, and D) vs. the non-exercised groups (groups A and E). For example, the NO concentrations in the left atrium of group A (non-exercised) was 20 ± 1.1 $\mu\text{mol/mg}$ and decreased ($P<0.05$) to 15.6 ± 0.6 $\mu\text{mol/mg}$ in group D (exercised). These results suggest that exercise may play a role in lowering DOX induced elevations in NO levels in cardiac tissue, indicating that exercise may assist in mitigating the cardiotoxic effects of chemotherapy. Supported by NOSMFA.