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ALLOPURINOL ADMINISTRATION EFFECT ON OXIDATIVE STRESS DURING EXERCISE

ABSTRACT

The number of studies demonstrating that exercise induces oxidative stress has been increased over the last three decades. Nevertheless, the role of xanthine oxidase, the main contributor of free radicals during exercise, in oxidative stress and performance has not been elucidated yet. This enzyme has a dual role since it leads to generation of free radicals and production of uric acid, which is considered the most important antioxidant in plasma. In the present study, xanthine oxidase activity was inhibited via administration of the chemical compound allopurinol before aerobic exhaustive swimming in rats. This inhibition resulted in induction of oxidative stress and a marked decrease in physical performance, which can be probably attributed to inhibition of uric acid production and is not related to carbohydrate and lipid metabolism. A concurrent approach in this study involved xanthine oxidase inhibition by physical inhibitors potentially present in diet. Several antioxidant grape extracts were found to inhibit xanthine oxidase activity *in vitro*. A potent antioxidant grape extract was administered in rats before the aforementioned exercise protocol to examine if it possesses antioxidant properties *in vivo*. Although the concentration of the injected extract is commonly used in relative studies it induced oxidative stress in blood and tissues. Exercise performance was not affected by the extract, as it did not inhibit xanthine oxidase activity to the extent that allopurinol did. This study clearly demonstrates that the *in vitro* antioxidant activity might not apply in an *in vivo* system. Therefore, the antioxidant activity of a compound seems to be related to its concentration and the system studied. Thus, the administration of antioxidants before exercise might not be probably advisable.