

PLASMA MEMBRANE REDOX SYSTEM IN THE ERYTHROCYTES OF ROWERS: PILOT STUDY

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Background: The oxidative stress results from a change in the physiological balance between oxidant and antioxidant species. The purpose of this study is twofold: first, to investigate the effects of long-term training in sports with high energy requirements on the redox balance which exists between the plasma vs. the erythrocytes; second, to study the activity of the PMRS (Plasma Membrane Redox System), which is a compensatory mechanism of cellular redox homeostasis, in the rowers' erythrocytes in order to determine the rowers' counteraction to oxidative stress.

Methods: Venous blood samples was collected from rowers and control group; then FRAP (Ferric Reducing Activity Power) method has been used to determine the antioxidant capabilities both in the plasma and in the erythrocytes of 22 rowers vs. 26 sedentary subjects. For the same groups of subjects, the PMRS in erythrocytes has been also evaluated.

Results: The plasmatic antioxidant activity was 21% lower in the group of rowers compared to the sedentary group ($p = 0,02$). In contrast, no significant differences were found in the reducing activity of the erythrocytes; however the erythrocytes of the rowers have shown values of the PMRS 35% higher than the untrained group ($p < 0.0001$).

Conclusions: Rowing induces a significant oxidative stress in the plasma corresponding to the high intensity training, while this effect lacks in erythrocytes. At the same time an increased quantity of the PMRS has been observed in the erythrocytes. In conclusion, in well trained athletes this not lead to established an oxidative stress condition because long-term training adaptatively improves the efficiency of the antioxidant systems.