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## Training-Level Induced Changes in Blood Parameters Response to On-Water Rowing Races

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ScholarGoogleFrançois Denis Desgorces<sup>1,2</sup>✉, Marc Testa<sup>1</sup>, Cyril Petibois<sup>3</sup>

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### ABSTRACT

The study investigated blood markers allowing discriminating physiological responses to on-water rowing races, notably regarding training volume of athletes and race duration. College (COL) and national (NAT) rowers performed a 1000- or 2000-m race. Capillary blood samples obtained before and post-race allowed an analysis of a wide range of serum parameters. COL rowers had a lower rowing experience and training volume than NAT. Races induced a higher lactate concentration increase in NAT compared to COL ( $10.45 \pm 0.45$  vs  $13.05 \pm 0.60$ ;  $p \leq 0.001$ ). Race distance (2000 vs. 1000 m) induced a higher increase in fatty acids ( $0.81 \pm 0.31$  vs  $+0.67 \pm 0.41$ ;  $p \leq 0.05$ ) and triglycerides concentration in NAT ( $0.33 \pm 0.07$  vs  $0.15 \pm 0.09$ ;  $p \leq 0.01$ ), but remained comparable between NAT and COL for the 1000-m races. Amino acids concentrations increased in NAT ( $0.19 \pm 0.03$ ,  $p \leq 0.01$ ), but urea concentration increased only for NAT rowers having performed the 2000-m race ( $0.72 \pm 0.22$ ,  $p \leq 0.05$ ). Transferrin concentration decreased after the 2000-m race ( $-0.60 \pm 0.25$ ,  $p \leq 0.05$ ), and concentration changes of haptoglobin differed between NAT<sub>2000</sub> (tendency to be reduced) and COL (tendency to be enhanced) ( $p \leq 0.05$ ). Our results confirmed that the training level in rowing is associated with higher glycolysis utilization during maximal 1000- and 2000-m exercise and no difference for similarly trained subjects at these two distances. Our study also demonstrated that a 2000-m race could initiate fatty and amino-acid metabolisms in highly trained subjects. Therefore, these changes in blood parameter responses to a characteristic rowing exercise

highlighted the importance of monitoring the physiological effects of training in sporting conditions and according to individual characteristics.

**Key words:** Energy metabolism, training, intensive exercise, endurance performance

### Key Points

- Rowing races despite their short duration could initiate fatty and amino-acids metabolisms.
- Effects of maximal exercise on metabolic blood parameters depend on individual capabilities, suggesting that the effects of exercise or training on a given blood parameter may be monitored relatively to individual maximal concentrations rather than by inter-individual comparison.
- High training level may lead to marked disruption of homeostasis which could be easily reversed by high recovery capabilities.

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board

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