

# 28th ECSS Anniversary Congress, Paris/France, 4-7 July 2023

Hepcidin levels during the season of elite rowers – a useful marker of iron need supplementation

Nováková, M.1, Woronyczová, J.1,2, Cíсарová, K.1,3, Bolek, E.1

1 - CASRI - Sports Research Institute of the Czech Armed Forces, Prague, 2 - 1st Faculty of Medicine, Charles University, Prague, 3 - Faculty of Biochemical Engineering CTU, Prague

## INTRODUCTION:

Top sports performance and elite training make significant demands on an athlete's iron metabolism. Iron deficiency is one of the most common nutrient deficiencies in athletes, especially females. Hepcidin emerges as a key regulator of iron metabolism. It regulates the absorption of iron in the intestine and the export of iron from macrophages. Although methods for hepcidin determination have become more available recently, hepcidin is not routinely used as a diagnostic parameter for assessing iron stores. The reason is also the unavailability of reliable reference values. In this study, the iron status is monitored in a group of elite female rowers throughout one year. The study aims to follow the hepcidin levels and correlate them with ferritin as the most commonly used diagnostic parameter for athlete's iron stores. In addition, part of the results will be compared with a group of elite male rowers.

## METHODS:

In a group of elite female rowers (n=8, age=22.4±2.7 years), iron stores were monitored at 8 time points (F1-F8) during the one-year period (April – April). In a group of elite male rowers (n=9, age=21.4±1.4 years) iron stores were monitored at 4 time points during the pre-season training from November to April (M5-M8). The level of serum iron, transferrin, ferritin, hepcidin and C-reactive protein were measured in the morning fasting venous blood. Samples with CRP above 5 mg/L were excluded from further analysis. Female athletes with low iron stores supplemented 200 mg of iron (Fe<sup>2+</sup>) orally every day for three months (June-August). All female athletes supplemented with twice the daily recommended iron intake 7 days per month during the whole year to prevent iron loss due to menstruation.

## RESULTS:

In the female rowers, ferritin and hepcidin levels were initially 28.1±19.9 µg/L and 3.76±2.83 ng/mL, respectively. Both levels increase to the statistically significant maximum of 63.8±12.7 µg/L and 12.0±6.07 ng/mL after supplementation. Further, in the period F5-F7 ferritin keeps above 50 µg/L, while hepcidin fluctuates significantly (ANOVA, n=28, F=4.93, p<0.01). At the final time point F8 during the final pre-season training ferritin and hepcidin level decrease to a minimum. In comparison, in the male rowers there are no significant changes in ferritin and hepcidin levels between the time points M5-M7. Hepcidin correlates with ferritin, transferrin saturation and serum iron, but the strongest correlation is found for ferritin (r=0.66, n=94, p<0.05).

## CONCLUSION:

To our knowledge, this is the first study following hepcidin levels in elite athletes regularly on a long-term basis. We demonstrated that ferritin and hepcidin levels fluctuate significantly in female rowers during the season in comparison to male rowers. Our data suggest that hepcidin could be a useful additional marker for the need for iron supplementation in female elite athletes, especially when a history of individual ferritin levels is not available.

Topic: Molecular Biology and Biochemistry

Presentation: Oral

European Database of Sport Science (EDSS)

Supported by SporTools GmbH



35103