

# 陸上長距離選手の鉄剤摂取が 生体に及ぼす影響について

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## The Effects of Iron Ingestion in the Bodies of Long Distance Runners

by

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### ABSTRACT

High-performance liquid chromatographic (HPLC) analysis of human serum albumin (HSA) using an ion-exchange (DEAE-form) column shows three components; the principal component corresponds to human mercaptalbumin (HMA), the secondary to nonmercaptalbumin (HNA) having mixed disulfide with cystine (HNA (Cys)) or oxidized glutathione (HNA (Glut)), and the tertiary to HNA oxidized more highly than mixed disulfide. The purpose of this study was to examine HSA redox state to determine the effects iron ingestion may have on oxidative stress levels in long distance runners. Subjects for the study were university track athletes (n=8; 19.8 ± 0.4 years old). Students were divided into two groups, those who took iron (iron group) and those who did not (no iron group). Blood samples were taken before and after an intensive three-day training camp, and then analyzed by HPLC. The amount of iron ingested by the iron group was 39 mg/day.

The overall average percentage ( $\bar{f}$ [HMA]) of reduced form albumin for both groups was  $78.9 \pm 0.5\%$  before camp, and  $68.0 \pm 1.2\%$  after camp, with both groups showing significant post-camp decreases ( $p < 0.05$ ). Examined separately, ( $\bar{f}$ [HMA]) values for the iron group was  $78.6 \pm 0.7\%$  before camp and  $69.2 \pm 1.4\%$  after camp, and values for the no iron group were  $78.5 \pm 1.0\%$  and  $69.0 \pm 1.5\%$  respectively. While decreases were seen for both groups, a significant difference between the two groups was not found. These results suggest that iron, taken in this amount, has no particular effect on oxidative stress levels.

## 要 旨

イオン交換カラムを使用したヒト血清アルブミン (HSA) の高速液体クロマトグラフィ (HPLC) 分析では3つの成分を示す。1番目はメルカプトアルブミン [HMA], 2番目はSH基がシスチンや酸化型グルタチオンと結合したノンメルカプトアルブミン [HNA (Cys) & HNA (Glut)], 3番目はSH基がさらにそれ以上酸化されたノンメルカプトアルブミン [HNA (Oxi)] である。

本研究は大学生陸上長距離選手 ( $n = 8$ ;  $19.8 \pm 0.4$  歳) を対象に鉄剤の摂取が酸化ストレスに及ぼす影響をヒト血清アルブミン (HSA) の酸化・還元状態から検討することを目的とした。学生を鉄剤を摂取する群 (以下, 摂取群) としない群 (以下, 非摂取群) の2群に分け, 3日間の強化合宿前後に採血を行い, HPLC分析を行った。摂取群の鉄剤摂取量は39mg/日とした。還元型アルブミンの割合の平均値 ( $\bar{f}$ [HMA]) は全体では合宿前  $78.9 \pm 0.5\%$ , 合宿後  $68.0 \pm 1.2\%$  で合宿後有意に減少した ( $p < 0.005$ )。群別では摂取群が合宿前  $78.6 \pm 0.7\%$ , 合宿後  $69.2 \pm 1.4\%$ , 非摂取群が合宿前  $78.5 \pm 1.0\%$ , 合宿後  $69.0 \pm 1.5\%$  であった。合宿後両群ともに減少したが, 両群間に有意な差はみられなかった。

これらのことから今回の鉄剤摂取量では, 鉄剤摂取が酸化ストレスレベルにとくに影響を与えないことが示唆された。