

Hidden potential of a nutrient for athletes

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Research topics

Background

- Anemia and menstrual abnormalities are common among long-distance track athletes and esthetic athletes, and special support is required for each sport.
- Hepcidin (Figure 1) was discovered in this century, and it has been shown to play a central role in iron metabolism.

Purpose

- Focusing on hepcidin as anemia prevention in female athletes, I analyzed the effects of nutrient intake which has an anti-inflammatory effect. By clarifying the presence of hepcidin as a new intrinsic factor that affects anemia and performance of female athletes, I aim to establish a hepcidin research base in the field of sports and nutrition science, and eventually to develop effective nutrition intake methods.

Results and Hypothesis

- Figure 2 shows the results for our male sports athletes. I hypothesized that obese individuals have high levels of hepcidin in their blood, but elevated levels of hepcidin in low energy availability conditions (that is, inflammation caused by lack of food). Low energy availability is just one of the three main characteristics in female athletes, so female athletes may have high blood hepcidin levels.

Prospects for collaboration

[Agriculture, forestry and fisheries industry and food industry] I would like to provide safe and secure foods produced in healthy land and sea as effective and delicious meals in cooperation with registered dietitians to improve athletes' competitive performance and health of the general population.

[Collaboration with health promotion related organizations] I would like to combine the knowledge got from athletes' food research with engineering and AI technologies to apply them to improve health and contribute to the physical and mental health of general population.

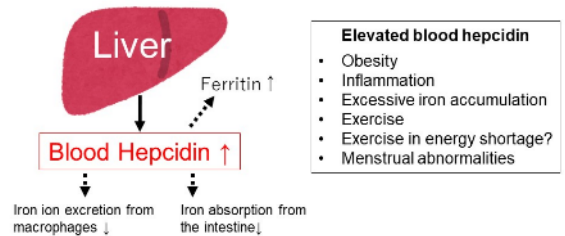


Fig 1. Regulation of iron metabolism by blood hepcidin

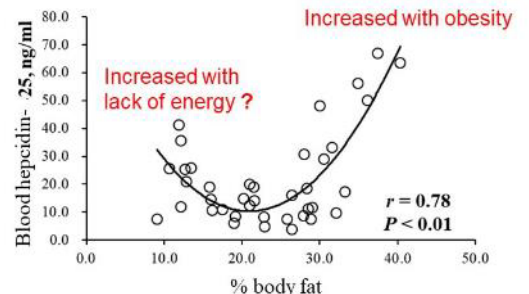


Fig 2. Blood hepcidin is associated with body fat percentage and U-shape

Hepcidin (Central role of iron metabolism)

Inflammation/stress ↑ ⇒ Serum iron ↓: Anemia

Ingestion of EPA, DHA and α-linolenic acid

- (1) Inflammatory suppression
- (2) Effects of inflammation suppression
- (3) Hepcidin ↓ Serum iron ↑: Improve Anemia

Fig 3. hypothesis: Inhibition of inflammation suppresses elevation of blood hepcidin level



Research features

I will utilize safe and secure ingredients made in abundant nature to improve athletes' competition results and, eventually to improve general people's health.