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Obesity leads to iron retention in the duodenum of mice likely due to increased production of adipose-derived hepcidin

Shougang Wei, Wanshan Zhang, Chen Wang and **Yanqiang Cao**
Capital Medical University, China

Obese people and animals have higher rates of iron deficiency (ID) than their normal weight peers. It was still uncertain whether obesity-related ID is a true or functional deficiency of iron. This study was to determine the effects and the possible underlying mechanisms of obesity on duodenal iron absorption and liver iron accumulation. C57BL/6J mice were randomly divided into high-fat diet-induced obese (DIO) group and normal control (NC) group to be fed respectively for 16 weeks. Oral iron absorption was tested by measuring serum iron, liver iron and the retained duodenal iron 90 min after intragastric administration of 57 $FeSO_4$ solution. The protein expression levels of iron transporters in duodenum and liver were evaluated by Western blotting. Hepcidin mRNA levels in the liver and adipose tissues were quantified by real-time RT-PCR. The results showed that DIO mice had significantly higher iron retention in the duodenum, lower iron concentration in plasma and liver than NC mice. The protein expression levels of ferroportin-1 (Fpn1) in duodenum and transferrin receptor-2 (TfR2) in the liver were markedly decreased in DIO mice. Hepcidin mRNA levels in visceral adipose tissue but not in the liver were higher in DIO mice than NC mice. In conclusion, obesity-related ID may attributed to impaired intestinal iron absorption of which iron being retained in the duodenal enterocytes, not to that iron being accumulated in the liver. Increased expression of visceral adipose hepcidin probably is the immediate cause for the malabsorption of iron in obesity by inducing reduction of the duodenal Fpn1.

Biography

Shougang Wei serves as professor, Ph.D. supervisor and deputy director at the Department of Children's and Women's Health, School of Public Health, Capital Medical University, Peking, China. Mr. Wei has been engaged in the study of child and adolescent health, mainly focused on the field of childhood obesity about its health risks, pathogenic factors and preventive and treatment measures.

shangwei@ccmu.edu.cn

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