High iron intake at night may disrupt glucose metabolism

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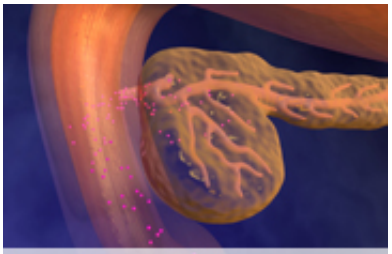

Image courtesy of Blausen Medical

(HealthDay)—Dietary intake of iron may affect the circadian rhythm of glucose metabolism in the liver, according to research published online Oct. 14 in *Diabetes*.

Judith A. Simcox, Ph.D., of the University of Utah in Salt Lake City, and colleagues assessed the effects of dietary intake of iron on circadian gluconeogenesis in mouse models.

The researchers found that dietary iron affects circadian rhythms of glucose metabolism via heme-mediated regulation of the interaction between nuclear receptor subfamily 1 group d member 1 and its cosuppressor nuclear receptor co-repressor 1. Aminolevulinic acid (ALA) treatment of mice or cultured cells bypassed the rate-limiting enzyme in hepatic heme synthesis, ALA synthase 1 (ALAS1), and

resulted in loss of regulated heme synthesis. ALA treatment abolished differences in hepatic glucose production and in the expression of gluconeogenic enzymes observed with variation of dietary iron. The differences among diets are also removed with inhibition of heme synthesis with isonicotinylhydrazine. Dietary iron modulates levels of peroxisome proliferator-activated receptor gamma, coactivator 1α, which is a transcriptional activator of ALAS1, to affect hepatic heme.

"The studies suggest mechanisms that may underlie the interplay among iron, altered circadian rhythms, metabolic regulation, and diabetes risk," the authors write.

More information: Abstract
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