Relationship between gastrin and iron in mice with haemolytic anaemia

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The biological activity of non-amidated gastrins is dependent on their ability to bind two ferric ions, and our studies have indicated a reciprocal relationship between circulating gastrins and iron status in mice and humans. The present study had two aims: 1. to explore the interaction between gastrin and iron homeostasis, at a molecular level, in 4 week (early post-weaning) and 10 week old agastrinemic and hypergastrinemic mice and wild type (wt) controls; and 2. to observe the effects of alteration of iron homeostasis by induction of acute haemolytic anemia using phenylhydrazine (PHZ) in 10 week old mice. Transcription of the genes for liver hepcidin, a putative iron homeostasis regulator, and the duodenal iron transporter DMT-1 was quantified using real time PCR, serum gastrin amide levels were measured using radioimmunoassay, and liver iron was assayed colorimetrically. Hepcidin mRNA expression was reduced and DMT-1 mRNA increased in the 4 week old agastrinemic mice compared to wt mice. In the hypergastrinemic mice both hepcidin and DMT-1 mRNA expression concentrations and liver iron loading were increased compared to wt mice. After PHZ treatment a significant increase in hepatic iron loading, a reduction in hepcidin mRNA and an increase in DMT-1 mRNA were observed in both agastrinemic and hypergastrinemic mice and in wt controls. PHZ treatment caused increases in circulating gastrin in both hypergastrinemic and wt mice. The observation that increased liver iron loading correlated with increased serum gastrin concentrations is consistent with a role for gastrin in iron uptake.