Letter to the Editor

Hyperinsulinaemia and trace metals

Dear Sir,

Raz and colleagues observed a significant reduction in tissue zinc levels in hyperinsulinaemic-hyperglycaemic sand rats, whereas levels in hyperinsulinaemic-euglycaemic animals were similar to those of normal sand rats [1]. The authors therefore postulated that hyperglycaemia, rather than insulin status, may be an important factor affecting trace metal homeostasis.

We would like to bring to their attention our study of the effect of acute hyperinsulinaemia on serum levels of trace metals in normal female subjects [2]. Five women were studied by the hyperinsulinaemic-euglycaemic clamp technique for 12–16 h. During clamp conditions, mean ($\pm$ SE) serum insulin was 11.25 ± 1.80 nmol/l, while serum glucose was maintained at 6.41 ± 0.28 mmol/l. Mean serum levels of zinc, copper, ferritin, and caeruloplasmin remained unchanged during the infusion of insulin. Non-haeme iron, however, exhibited a more variable response: it rose in 3 subjects, remained unaltered in 1 subject, and decreased in 1 subject. A 3-fold increase in serum iron was observed in the subject with the lowest concentration of this metal at the start of the study.

These results lend support to the hypothesis of Raz and colleagues that hyperinsulinaemia *per se* does not affect zinc homeostasis. However, our results also suggest that hyperinsulinaemia may directly affect iron homeostasis. Additional studies are needed to

define the mechanisms by which hyperinsulinaemia selectively affects the metabolism and, perhaps, the dietary requirements for some essential trace metals.

Yours sincerely

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References

1. Raz I, Adler JH, Havivi (1988) Altered tissue content of trace metals in diabetic hyperinsulinaemic sand rats (psammomys obesus). *Diabetologia* 31: 329–333
2. Nestler JE, Clore JN, Failla ML, Blackard WG (1987) Effects of extreme hyperinsulinaemia on serum levels of trace metals, trace metal binding proteins, and electrolytes in normal females. *Acta Endocrinol (Copenh)* 114: 235–242

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