

32. Chromium

Physiology

The precise biological role of chromium has not been established ^{1,2}. It is thought that chromium facilitates the activity of insulin, possibly by optimising the number of membrane insulin receptors or their interaction with insulin or both. It is reported to have been beneficial in the management of both hyperglycaemic and hypoglycaemic responses to glucose loads. However, its use in the management of patients with diabetes mellitus has produced inconsistent results and this has created scepticism about the essentiality of chromium ³. The element may also have a role in the metabolism of lipids and of nucleic acids. It has been suggested that some of these effects may arise from a non-specific effect on phosphoglucomutase ³.

Chromium (III) absorption is low at 0.5 to 2.0 % of dietary intake. Organic chromium is absorbed more efficiently but its bioavailability is low since it is excreted rapidly in the urine.

Deficiency and excess

Chromium deficiency has been reported in adults and in a child who had received prolonged parenteral nutrition. The features involved an insulin-resistant hyperglycaemia, elevated serum lipids, weight loss, ataxia, peripheral neuropathy, and encephalopathy. The adult patients responded to intravenous chromium chloride (CrCl_3), but the response in the child was less conclusive ^{3,4}.

Trivalent chromium has a low level of toxicity but hexavalent chromium is more toxic. In experimental animals intakes of 50 $\mu\text{g/g}$ diet cause renal and hepatic necrosis and growth retardation.

Requirements

Since data on the essentiality and metabolism of chromium are so sparse the Committee is unable to specify any requirements.

References

1. Stoecker BJ. (1990). Chromium. In: Brown M, ed. *Present Knowledge in Nutrition* 6th ed. Washington DC: International Life Sciences Institute Nutrition Foundation, 287-293.
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3. Anonymous. (1988). Is chromium essential for humans? *Nutr Rev*, 46: 17-20.
4. Brown RO, Forloines-Lynn S, Cross RE, Heizer WD. (1986). Chromium deficiency after long-term total parenteral nutrition. *Digest Dis Sci*, 31: 661-664.