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An Trivalent Chromium Nutrition and Biochemistry

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Letter

The nutritional biochemistry of trivalent Cr is a poorly studied subject of research; biochemistry studies of the other important transition metals have not proven to be as difficult. Despite almost four decades of effort, a picture of Cr's potential role has only lately begun to emerge [1]. The trivalent ion is the biologically relevant form. In mammals, Cr3+ appears to be essential for appropriate carbohydrate and lipid metabolism, albeit Cr shortage is difficult to induce. Urinary Cr production is increased by conditions that enhance circulating glucose and insulin concentrations. Cr is most likely excreted as the oligopeptide chromodulin. Chromodulin has been identified to bind to activated insulin receptors, boosting their kinase activity, and so may be the key to understanding Cr's role at the molecular level. A mechanism for chromodulin action has recently been described; this mechanism could serve as a foundation for future research into Cr's role in metabolism. An examination of the chromium pollinate dietary supplement demonstrates some of the problems connected with biochemical testing [2].

Cr has grown extremely popular as a nutritional supplement, weight-loss aid, and muscle-building aid in the previous decade. Cr-containing supplements are second only to Ca-containing supplements in terms of sales among mineral supplements. However, the level of awareness of how Cr acts in the body, or even whether the element is important, does not reflect its popularity [3]. The first-row transition elements V to Zn (as well as the heavier transition elements Mo and W) have been proved to be needed for at least one type of life, with one exception. In addition, the three-dimensional structure of a biomolecule containing all of these metals except one has been determined. Cr is an exception.

While it is widely agreed that Cr is a necessary component, the evidence is strong but not conclusive. To support the importance of Cr as a trace nutrient for mammals, four forms of evidence have been presented: Five individuals on total parenteral nutrition (prior to the addition of additional Cr to total parenteral nutrition solutions) showed symptoms of adult-onset diabetes, which were reversed when Cr was introduced to the whole parenteral nutrition solution. In glucose tolerance tests, rats fed a low-Cr sucrose-based diet had more areas under the curve for insulin, pointing to the onset of insulin resistance in human beings [4] Cr absorption is inversely related to food intake. Increases in blood glucose are accompanied by increases in urine Cr excretion, whereas changes in glucose metabolism (such as pregnancy, type 2 diabetes, and other metabolic stressors) are linked to changes in urinary Cr output. These findings point to a link between optimal glucose metabolism and Cr, which is most likely linked to insulin action.

Each of these pieces of evidence, however, has flaws. In contrast to human individuals, Cr absorption in rats is not inversely related to consumption. Increased Cr excretion in the urine could simply be a result of changes in Fe mobilization in response to insulin. It is critical to develop a biomarker for Cr status [5]. Methodological issues plagued studies conducted before 1990 that looked into the impact of Cr-deficient diets.

References

1. Frauchiger MT, Wenk C, Colombani PC (2004) Effects of acute chromium supplementation on postprandial metabolism in healthy young men. J Am Coll Nutr 351-357.
2. Joseph LJ, Farrell PA, Davey SL, Evans WJ, Campbell WW (1999) Effect of resistance training with or without chromium picolinate supplementation on glucose metabolism in older men and women. Metabolism 546-53.
3. Volpe SL, Huang HW, Larpadisorn K, Lesser II (2001) Effect of chromium supplementation and exercise on body composition, resting metabolic rate and selected biochemical parameters in moderately obese women following an exercise program. J Am Coll Nutr 293-306.
4. Bailey CH (2014) Improved meta-analytic methods show no effect of chromium supplements on fasting glucose. Biol Trace Elem Res 1-8.
5. Althuis MD, Jordan NE, Ludington EA, Wittes JT (2002) Glucose and insulin responses to dietary chromium supplements: a meta-analysis. Am J Clin Nutr 148-55.

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