

Effects of chromium picolinate supplementation on insulin sensitivity, serum lipids, and body weight in dexamethasone-treated rats.

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Chromium (Cr) is essential for the regulation of insulin action, and Cr supplementation has been studied as a potential therapy of insulin resistance and lipid abnormalities. Corticosteroid treatment is well known to cause the abnormality of carbohydrate metabolism. Recently, it has been reported that corticosteroid increases urinary loss of Cr, and Cr supplementation recovers steroid-induced diabetes mellitus. In this experiment, rats were treated daily with dexamethasone (DEX) (0.2 mg/kg, intraperitoneal [IP]) for the first 7 days and were further treated with DEX plus either chromium picolinate (CrP, 30 mg/kg/d) orally or a placebo for a period of 14 days. At the end of experiment (D21), the control rats, which were treated only with DEX weighed 320 g (80% of initial weight) on average, but CrP-treated rats weighed 364 g (91% of initial weight. $P < .05$). Glucose tolerance tests (GTTs) and insulin sensitivity tests were conducted. During insulin sensitivity tests, the area under the curve (AUC(0-->120)) of the time-glucose concentrations curves in CrP-treated group were decreased compared with those in the control group (271.4 +/- 74.9 v 1,097.4 +/- 722.2 mmol/L/min, $P < .01$). Fasting serum insulin levels in CrP-treated rats were clearly decreased by 46.9% compared with those in the control group (0.52 +/- 0.19 v 0.98 +/- 0.36 nmol/L, $P < .05$). During the GTTs, the AUC(0-->120) for time-glucose concentrations curves in CrP-treated group was not significantly different from the control group, but the AUC(0-->120) of serum insulin concentrations in the CrP-treated group were 55.8% lower than those in the control group (123.1 +/- 42.5 v 278.2 +/- 59.1 nmol/L/min, $P < .01$). The mean AUC(0-->120) of time-cholesterol concentration curves during GTTs did not significantly differ between the 2 groups (867.6 +/- 155.2 v 827.7 +/- 94.3 mmol/L/h, $P =$ not significant [NS]). In contrast, 1-hour and 2-hour plasma triglycerides were significantly lower in the CrP-treated group, and the mean AUC of the time-triglyceride curve was significantly lower in CrP-treated group than in the control group (3.4 +/- 0.5 v 5.9 +/- 1.3 mmol/L/h, $P < .05$). We suggest that Cr supplementation in DEX-treated rats can relatively reverse a catabolic state and increase insulin sensitivity. Our results support the hypothesis that Cr supplementation can be considered to improve carbohydrate and lipid metabolism in patients receiving corticosteroid treatment. Copyright 2002, Elsevier Science (USA). All rights reserved.

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