Does chromium supplementation improve glycemic control in patients with type 2 diabetes?

**Bottom line**
Chromium may improve glycemic control in patients with type 2 diabetes, but the supporting clinical trials have significant heterogeneity. The American Diabetes Association (ADA) and the FDA state there is not enough solid evidence to recommend chromium supplementation in this setting.

**Background**
Case reports of patients receiving total parenteral nutrition show insulin-resistant glucose intolerance that corrects with the addition of chromium to the nutrition regimen. Although severe chromium deficiency is rare in healthy people, diets high in simple sugars are thought to reduce chromium absorption.

**Review of the evidence**
A systematic review identified 41 RCTs, each with at least 10 diabetic or glucose-intolerant patients who were supplemented with chromium for ≥3 weeks, but almost half the studies were of poor quality. Most of 17 studies evaluating the effect of various chromium supplements on fasting glucose showed no effect.

A meta-analysis of 9 studies (N=256) found that chromium picolinate lowered fasting glucose by 0.8 mmol/L (95% CI, –1.2 to –0.3). (1 mmol/L is equivalent to 18 mg/dL blood glucose.) Doses of 400 to 1,000 mcg/d had a greater effect than 200 mcg/d. Only 1 of 7 studies using chromium picolinate found a significant improvement in 2-hour postload glycemia. However, glucose load, measurement timings, and outcomes varied tremendously among the 7 trials.

Finally, a meta-analysis of 11 studies (N=381) showed that chromium supplementation reduced glycosylated hemoglobin (HbA1c) by 0.6% (95% CI, –0.9 to –0.2), but 11 of 14 intervention arms found a null or nonsignificant effect.

A recent RCT was conducted on 40 patients with new-onset type 2 diabetes. Half received 9 g brewer’s yeast (with 42 mcg chromium) daily while the other half received brewer’s yeast without chromium for 3 months.

The treatment group had reduced fasting glucose levels (from 197 to 104 mg/dL; P<.001) and HbA1c (from 9.5% to 6.9%; P<.001). The placebo group had a smaller reduction in HbA1c (from 9.30% to 8.71%; P<.01); however, no comparative statistics were given. It was unclear what medications, if any, the patients were started on after their new diagnosis.

**Clinical application**
The ADA stated in 2002 that there is “no clear evidence of benefit from vitamin or mineral supplementation for patients with diabetes (compared with the general population), who do not have underlying deficiencies.” In 2005 the FDA concluded that the existence of a relationship between chromium picolinate and improved insulin resistance in type 2 diabetes is highly uncertain due to the lack of good studies. Both of these statements were made prior to the systematic review above.

The recommended daily allowance of chromium is 25 mcg for women and 35 mcg for men. Chromium is found naturally in broccoli, brewer’s yeast, grape juice, and whole grains. Physicians considering chromium supplementation for patients with type 2 diabetes may wish to use 400 to 1,000 mcg chromium picolinate daily, based on the results of the meta-analysis above.

Srivani Sridhar, MD
U of Wisconsin
Madison, WI

**REFERENCES**