Chromium

History

- Chromium is an essential trace mineral which is present in a wide variety of foods including grains, nuts, mushrooms, meats, brewer's yeast, and dairy.
- In the 1960's evidence emerged that it played a role in glucose metabolism.

Most studied use

Glycemic control in type 2 diabetes.

Other common uses

Weight loss, increasing muscle mass in body builders, dyslipidemia (raising HDL), glycemic control in type 1 diabetes.

Summary of the evidence

- The results from a small number of clinical trials testing chromium supplements in patients with type 2 diabetes have been mixed.
- Chromium is well-tolerated and is generally considered safe.

Pharmacology

- Chromium supplements come in several salt forms. The most common are chromium picolinate, nicotinate, and chloride.
- Chromium picolinate is thought to be best absorbed, but even in this form, more than 98% is excreted unabsorbed in feces.

Mechanism of action

- Insulin sensitivity is at least partially mediated by a peptide complex termed "glucose tolerance factor" of which chromium appears to play a role.
- Chromium may potentiate the activity of insulin by enhancing intracellular tyrosine kinase activity.

Clinical studies

- Studies of chromium are difficult to interpret because a wide variety of dosages and many different salt forms have been tested.
- One recent systematic review located three double blind placebo controlled trials (Yeh 2002). In two, chromium was found to be effective in lowering blood sugars and one it was found to be ineffective (Lee 1994).
- Another recent meta-analysis found inconclusive results (Althuis 2002).

Adverse effects

- Chromium is well-tolerated in usual doses.

Contraindications/cautions

- All chromium used in humans is the trivalent (+3 oxidative state) form of the metal. Hexavalent chromium (+6 oxidative state) is a serious toxin used in industrial settings and has been found in at least one commercial chromium product (although in a very small amount).

Important interactions

- No significant interactions known.

Formulation and dosage

- Trials have tested 200 - 1,000 mcg in divided doses.
- Chromium picolinate may have the best bioavailability.

Key Chromium References

1. Yeh GY, et al. Systematic review of herbs and dietary supplements for glycemic control in diabetes. Diabetes Care. 2003 Apr;26(4):1277-94.
2. Althuis MD, et al. Glucose and insulin responses to dietary chromium supplements: a meta-analysis. Am J Clin Nutr. 2002 Jul;76(1):148-55.
3. Lee NA, et al. Beneficial effect of chromium supplementation on serum triglyceride levels in NIDDM. Diabetes Care 17:1449–1452, 1994.
4. Anderson RA, et al. Elevated intakes of supplemental chromium improve glucose and insulin variables in individuals with type 2 diabetes. Diabetes 46:1786–1791, 1997.
5. Bahijiri SM, Mira SA, Mufti AM, Ajabnoor MA: The effects of inorganic chromium and brewer's yeast supplementation on glucose tolerance, serum lipids and drug dosage in individuals with type 2 diabetes. Saudi Med J 21:831–837, 2000