Chromium – The mineral that makes insulin work better

The name of the game for both weight and diabetes control is to keep insulin levels naturally low. But, as you've seen, we often become increasingly insulin insensitive or resistant. That's where the essential mineral chromium makes all the difference. For insulin to work properly is has to dock into the insulin receptor. Chromium increases insulin binding, increases the number of insulin receptors and also increases insulin effectiveness; all of which lead to improved glucose transport into muscle, fat and liver tissue, and therefore better glucose control. The further you are along the road to diabetes the more you need to make sure you are really hearing the insulin message.

Although chromium is naturally present in foods such as beer, whole grains, cheese, liver, and meat, the typical intake in a western diet is much lower than the recommended daily requirement of 50-200µg/day (micrograms per day). The average intake is thought to be in the region of 28-35µg. In addition to the problem of low consumption due to eating refined and processed foods (white flour has 98% of its chromium removed), it has been shown that typical western diets high in refined food such as white bread, cakes, sweets and biscuits increase chromium losses because it is used up in processing sugar. So, every time you binge on something sweet you are losing your body's stores of chromium. While eating unrefined food, which is a cornerstone of my low GL diet, should give you at least 30mcg and taking an optimum multivitamin and mineral, which should provide at least another 30mcg, totaling 60mcg, that's not enough to undo the damage. Good enough for maintenance but not for repair. What you need, if you have diabetes, is 600mcg a day – ten times this amount.

The Evidence for Chromium Reversing Diabetes

Not only is low chromium status associated with an increased prevalence of Type 2 diabetes, there's lots of good quality research showing that chromium helps to restore blood-sugar balance in diabetics, better and faster than the most commonly prescribed anti-diabetes drug metformin.

A 2007 review of over 40 randomized controlled trials found that giving Type 2 diabetics chromium improves their fasting blood sugar levels and also decreases glycosylated haemoglobin levels (another measure of poor sugar control). In the words of the reviewers *"Among participants with type 2 diabetes, chromium supplementation improved glycosylated haemoglobin levels and fasting glucose. Chromium supplementation significantly improved glycemia among patients with diabetes."*[i]

This study, published in the highly respectable journal Diabetes Care, found that the best effects were seen with chromium picolinate (which is much better absorbed than cheaper forms of inorganic chromium, such as chromium chloride) in doses of 400-1000mcg per day. Despite being more than eight times the current recommended daily allowance, there are no known side effects at levels of up to 100 times greater than this.

A landmark study in 1997, looked at 120 Chinese patients with type 2 diabetes, 60 of whom were given 200µg chromium per day and 60 of whom were given 1000µg per day. After just 2 months, significant improvements were seen in glucose control, in both groups. After 4 months, there was almost a 30% reduction in glucose levels in the higher dosage group.[ii]

Figure 17 The effect of chromium on blood sugar and insulin resistance

A larger study in 1999 followed over 800 diabetics who were taking insulin or anti-hyperglycaemic drugs.[iii] The patients were given 500 µg chromium per day for 9 months, and after just 1 month, fasting and post-meal glucose levels had significantly fallen. At the end of the 9 months, 90% of patients reported a decrease in fatigue, thirst and the need for frequent urination.

More recently a double-blind placebo-controlled study randomly assigned 42 overweight adult women with carbohydrate cravings to receive chromium or placebo for 8 weeks. Chromium, as compared to placebo, reduced food intake, hunger levels, and fat cravings and decreased body weight.[iv] That's just about everything you could ever hope for. Also, in many studies benefits are seen within a month so you don't have to wait long.[v] In my experience, if you also take cinnamon extract (more on this on p.xx) and follow a low GL diet you'll experience a considerable improvement on blood sugar control in a matter of days, not weeks.

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How much chromium do you need?

The majority of studies showing improvements in glucose control have used quantities of over 400µg/day, although in two studies improvements in insulin sensitivity have still been reported in those taking just 200µg/day.[vi] Most available chromium supplements in health food stores provide 200µg, but in relation to diabetes or pre-diabetes, a daily intake of 400 to 600µg may be more appropriate.

There is some debate about the best form of chromium. Is it chromium picolinate, or chromium polynicotinate (chromium polynicotinate contains vitamin B3 which works in synergy with chromium) Both appear to be effective and better than another cheaper form, chromium chloride.

I generally recommend taking 400µg of chromium with breakfast and 200µg with lunch if you have diabetes for the first three months. If this doesn't considerably stabilize your blood sugar level then you can increase up to 1,000mcg a day. But, once your blood sugar level is consistently below 6 this might be more than you need. Certainly, if you are experiencing blood sugar lows, it is probably time to experiment with taking either 400mcg or 200mcg of chromium a day to see if this is enough to keep your blood sugar level on an even keel.

Chromium as an alternative to diabetic drugs

Conventional anti-diabetics drugs such as metformin and sulfonylurea, as well as glitazones, frequently cause side-effects such as nausea, cramps and vomiting. They can also lead to weight gain and elevated blood pressure, leading to a need for weight loss drugs in addition to anti-hyperglycaemic medication.

Of greater concern is the evidence of glitazones increasing heart disease risk and metformin promoting vitamin B12 deficiency. This in turn elevates homocysteine levels, a major risk factor for stroke and cardiovascular disease.

Therefore, a natural substance such as chromium which has no known side effects below 10,000µg a day, according to the UK's Committee on Toxicity[vii] – that's twenty times the therapeutic level - is much more desirable as a way of helping to stabilize blood sugar, thus reducing the symptoms of diabetes.

In fact chromium has been shown to dramatically decrease the need for medication in many diabetics and in some cases eliminate the need for drugs completely.[viii]

Cinnamon and chromium – a winning combination

Cinnamon, together with chromium, helps normalise blood sugar and reduce insulin resistance, as I explain on page xx. The active ingredient in cinnamon, MCHP mimics the action of the hormone insulin, which removes excess sugar from the bloodstream. Having a teaspoon of cinnamon a day and/or supplementing a cinnamon extract high in MCHP, together with chromium, makes a lot of sense. One such extract is called Cinnulin®. Supplementing 150mg of Cinnulin is equivalent to 3 grams of cinnamon. Cinnulin is also a good choice because it is very low in coumarin, a potentially harmful compound found in some species of cinnamon, if ingested in very large quantities. Cinnulin is guaranteed to contain less than 0.7% coumarin, as well as having a high concentration of MHCP, the active ingredient. This means that if you supplemented 300mg of Cinnulin the intake of coumarin would be well below the tolerable daily intake and not remotely pose any potential health risk, while giving all the potential benefits of cinnamon.

Supplementing cinnamon and chromium, together with a low Glycaemic Load (GL) diet makes a lot of sense for those struggling with weight, sugar cravings or diabetes. While we need more human trials looking at the effects of cinnamon on type 2 diabetes management, based on the available evidence I recommend that type 2 diabetics include 3 grams of cinnamon daily (one teaspoon) and 150mg of a cinnamon extract high in MCHP. However, do bear in mind that your need for medication may decrease so it is important to monitor your blood sugar levels and inform your primary care practitioner accordingly.

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[i] E. Balk et al. 'Effect of Chromium Supplementation on Glucose Metabolism and Lipids: A Systematic Review of Randomized Controlled Trials', *Diabetes Care*, 2007, 30(8): 2154-63

[ii] R. A. Anderson et al., 'Elevated intakes of supplemental chromium improve glucose and insulin variables in individuals with type 2 diabetes', *Diabetes* 1997, 46: 1786–1791

[iii] N. Cheng et al., 'Follow-up survey of people in China with type 2 diabetes mellitus consuming supplemental chromium', *Journal of Trace Elements in Experimental Medicine*, 1999 May;12:55–60

[iv] H. Rabinovitz et al., 'Effect of chromium supplementation on blood glucose and lipid levels in type 2 diabetes mellitus elderly patients', *International Journal for Vitamin and Nutrition Research*, 2004 May, 74: 178–182

[v] S. Anton et al., 'Effects of chromium picolinate on food intake and satiety' *Diabetes Technology & Therapeutics*, 2008 Oct, 10(5): 405-12

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[vii] Food Standards Agency, 'Agency revises chromium picolinate advice', (Monday 13 December 2004) http://www.food.gov.uk/news/newsarchive/2004/dec/chromiumupdate

[viii] See ref 5 above - Anton S et al. Effects of chromium picolinate on food intake and satiety. Diabetes Technol Ther, 2008 Oct, Vol 10(5): pp. 405-12