Chromium deficiency in HIV

The nutrient chromium can be found in the following foods:

- liver
- whole grains
- beans
- broccoli
- mushrooms
- spices such as cinnamon

Chromium is absorbed from the intestines and stored in the following locations:

- bone
- liver
- spleen
- muscle
- fatty tissue

Chromium can be stored in fat and muscle for about two weeks. The liver and spleen can store this nutrient for up to a year. The body appears to release most of its store of chromium in the urine.

According to the results of animal experiments, chromium appears to enhance the activity of the hormone insulin. This hormone is used to regulate blood sugar. When blood sugar levels are high, insulin, which is made by the pancreas gland, helps cells absorb sugar from the blood.

But other parts of the body also help to play a role in the regulation of blood sugar. For instance, the liver can help lower blood sugar by converting sugar into fat. Some of this fat can be stored in the liver, and some can be released into the blood in the form of triglycerides. So, while insulin is directly important for controlling sugar levels, it can indirectly affect fat levels.

Several research teams have noted that HIV positive people can develop changes in the effects of insulin and sugar levels. These studies suggest that there is a tendency for the following in HIV positive people:

- higher-than-normal levels of blood sugar
- higher-than-normal levels of insulin in the blood

In some HIV positive people, the effect of insulin seems to weaken over time—this is called insulin resistance. The pancreas gland makes insulin, and high blood sugar triggers an increased output of insulin as the body tries to regulate blood sugar. Eventually the gland becomes exhausted, leading to type 2 diabetes.

HIV and diabetes

Researchers at Toronto General Hospital have noted that there are similarities between the following three groups of people:

- HIV negative people with type 2 diabetes
- HIV negative people with chromium deficiency
- HIV positive people with altered sugar and fat metabolism

In experiments with these three groups of people, several research teams have found that supplementation with
small amounts of chromium improved insulin sensitivity and other assessments of metabolism. So the Toronto researchers undertook to study chromium levels in HIV positive people to find out if there were any deficiencies and possible connection to blood sugar abnormalities.

**Study details**

The Toronto team recruited 104 participants from the following categories for this pilot study:

- 75 HIV positive people taking highly active antiretroviral therapy (HAART)
- 16 HIV positive people not taking HAART
- 13 HIV negative people (used for comparison)

Participants were mostly male and around 40 years old. Blood and urine samples were collected, as well as hair and nail clippings for chromium content.

Dieticians interviewed participants about their food intake to find out food sources of chromium.

The researchers assessed participants’ body composition—proportion of muscle, fat, water and bone—by using BIA (bioelectrical impedance analysis).

**Results**

The study team found that HIV positive and HIV negative participants were receiving a similar amount of chromium from their food. However, levels of chromium in hair, nails and blood were lower in HIV positive people than in those without HIV.

The amount of chromium released into the urine was similar in HIV positive and HIV negative groups.

HIV positive participants who took HAART released significantly higher levels of chromium into their urine than HIV positive people not on HAART. Also, researchers found that the greater the amount of chromium detected in urine samples, the more likely the person had the HIV lipodystrophy syndrome.

**What’s next?**

An important point about this study is its design. It was a cross-sectional study. These studies are like a snapshot of data at a particular time. They can only find associations, not prove cause and effect. Cross-sectional studies are useful for finding associations that might later be explored in studies with a different design.

These findings from the Toronto team suggest that there may be disturbances in chromium metabolism in some HIV positive people, particularly those on HAART. It also suggests the possibility that chromium may have a role to play in body shape changes seen in HIV/AIDS.

**REFERENCES:**


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