Background

Chromium is a mineral that humans require in trace amounts, although how it works in the body and the amounts needed for optimal health are not well defined. It is found primarily in two forms: trivalent (chromium 3+), which is biologically active and found in food, and hexavalent (chromium 6+), a toxic form that results from industrial pollution.1

Chromium is known to enhance the action of insulin, a hormone critical to the metabolism and storage of carbohydrate, fat, and protein in the body.1 Among the most active areas of chromium research are its use in supplement form to treat diabetes, reduce levels of blood lipids (fatty acids, cholesterol, etc.), promote weight loss, and improve body composition. It has been suggested that chromium has a role in the regulation of food intake.2 Chromium has also been used in mild forms of depression or atypical depression, but the evidence is insufficient to establish efficacy. More research is needed to determine the full range of chromium’s roles in the body.

Chromium is sold as a single-ingredient supplement as well as in combination formulas, particularly those marketed for weight loss and performance enhancement. Supplement doses typically range from 50 to 200 mcg, but doses as high as 1000 mcg/day have been used safely.1

Chromium supplements come in several forms, the most common of which are chromium picolinate, chromium nicotinate, chromium polynicotinate, and chromium chloride. However, gastrointestinal absorption of chromium is typically very low, approximately 0.4% to 2.5% of the ingested dose.3 Supplementing with the picolinate or nicotinate form increases absorption, retention, and accumulation of chromium compared to inorganic forms such as chromium chloride.

Dose Range and Upper Limit

Food and Nutrition Board DRI:

- **RDA/AI**:
  - Men 19-50 – AI = 35 mcg/day
  - Women 19-50 – AI = 25 mcg/day

- **Upper Limit**: Not established.

Doses Used In Randomized Clinical Trials: Controlled trials looking at the efficacy of chromium on lean mass and strength gains used doses from 200 to 1000 mcg/day.5

Toxicology Data: The Food and Nutrition Board of the National Academy of Sciences has not established a tolerable upper limit (UL) owing to the low toxicity of trivalent chromium. Chromium picolinate has GRAS (Generally Recognized as Safe) status in the U.S.

Evaluation of Potential Benefits

While small beneficial effects have been noted in some trials, the majority of evidence does not support the purported benefits of chromium picolinate supplementation for use in weight loss or for the enhancement of body composition (e.g., reduction of body fat).

Potential Detrimental Effects on…

Military Performance: Negative effects on iron status have been noted in controlled trials in healthy subjects consuming chromium picolinate (200 mcg/day). However, the data are mixed, and a recent comparative study concluded that the effect “appears to be modest.”6
In a series of case studies in subjects with refractory mood disorders consuming chromium (400-600 mcg/day), mild effects such as tremors and a “caffeine-like effect” were noted, and most subjects experienced vivid dreams.\(^7\)

Among subjects with atypical depression and a history of carbohydrate craving given 600 mcg/day of chromium picolinate, a small group experienced disturbance in attention, nightmares, blurred vision, dry mouth, constipation, and increased thirst.\(^8\)

**Military Survivability:** Chromium-induced kidney damage (interstitial nephritis and acute tubular necrosis) has been reported but is rare, and it is unclear if chromium was the causative agent.\(^3\)

**Other Health Risks**

No data found.

**Interactions with Medications or Other Bioactive Substances**

There is some evidence that non-steroidal anti-inflammatory medications (NSAIDs) might increase chromium levels by enhancing chromium absorption and retention.\(^3\) Drugs that are prostaglandin inhibitors (aspirin, ibuprofen, indomethacin, etc.) also may increase chromium absorption and retention.\(^3\) Theoretically, taking insulin and chromium together could increase the risk of hypoglycemia.\(^3\)

Ascorbic acid (vitamin C) has been shown to significantly increase chromium absorption, and zinc possibly could decrease both chromium and vitamin C absorption.\(^3\)

Absorption may be reduced by a diet high in phytates (phosphorus-rich foods such as bran and seeds) and by the use of antacids or medications that inhibit acid secretion (e.g., H2-blockers and proton pump inhibitors).\(^3\)

For details of these and other potential interactions, visit the Natural Medicines Comprehensive Database.\(^3\)

**Withdrawal Effects**

No data found.

**Concern and Benefit Estimate (see Dietary Supplement Risk Matrix)**

*Benefit potential:* Low

*Risk (safety concern):* Low

*Classification score:* 6

The majority of evidence does not support the purported benefits of chromium supplementation for use in weight loss or for the enhancement of body composition. Decrements in military performance may occur with doses above 200 mcg/day.

**References**