

Media Watch – Inconclusive study on chromium causes consumer alarm

Dear Member,

As you may be aware, there have been some alarmist media stories published this morning in relation to chromium supplements being linked to cancer. These articles stem from a study – ‘Carcinogenic chromium (VI) Compounds Formed by Intracellular Oxidation of Chromium (III) Dietary Supplements by Adipocytes’ – published online on 22 December 2015 in the chemistry journal *Angewandte Chemie*.

The authors, led by Dr Lindsay Wu from the University of NSW’s School of Medical Sciences and Professor Peter Lay from the University of Sydney’s School of Chemistry, state that the study results show strong support for the hypothesis that the antidiabetic activity of chromium (III) complexes is based on the formation of carcinogenic chromium (VI) intermediaries. The authors go on to say that this raises concern with the possible carcinogenicity of chromium compounds and the risks of long term chromium nutritional supplementation, and that there is a need for epidemiological studies to ascertain whether chromium supplements alter cancer risk.

Source article can be located here: <http://onlinelibrary.wiley.com/doi/10.1002/anie.201509065/abstract>

The media stories have taken a highly disproportionate and sensationalist approach to the study findings, *The Australian* in particular mentioning the 2000 movie *Erin Brockovich* and stating that “findings could leave Western countries on the verge of a new cancer epidemic.”

Media stories:

Sydney Morning Herald: [Popular chromium supplements linked to carcinogens](#)

The Australian: [Popular chromium pills 'cause cancer'](#)

Some points to note:

Study methodology

- This study was conducted on mice fat cells (in vitro) only and not the effects that take place in a living organism (in vivo). Hence no meaningful extrapolation into clinical practice can be made without further epidemiological studies.
- The potential genotoxicity of chromium III has been assessed in several in vitro studies. The results are conflicting, with some studies indicating that high concentrations of chromium (III) in the cell could lead to DNA damage¹.

¹ Eastmond, David A.; MacGregor, JT; Slesinski, RS (2008). "Trivalent Chromium: Assessing the Genotoxic Risk of an Essential Trace Element and Widely Used Human and Animal Nutritional Supplement". *Critical Reviews in Toxicology* 38 (3): 173–190.

- However, chromium III compounds do not have genotoxicity activity in vivo. Scientific opinion on the long term safety of chromium establishes that no credible data or reports have shown adverse effects in humans from its consumption, and animal data also suggests that orally administered chromium is safe².
- There are a number of biological processes that take place in human digestion and nutrient transport around the body that these researchers have bypassed in their methodology.

Safety considerations

- The safety of chromium III is supported by evaluations from international authorities including the European Food Standards Authority (EFSA) and World Health Organisation (WHO).
- The safety of intake levels of up to 250 µg/day for supplemental intake is supported by thorough evaluations from the EFSA and the WHO.
- Human clinical trials have provided strong support for the safety of chromium supplements in chromium picolinate form at levels of up to 1,000 µg per day³.
- In 2014 the Council for responsible Nutrition (CRN) concluded that the available clinical trial data was sufficient to indicate safety for chromium supplementation at levels of up to 1,000 µg per day for adults⁴

Australian therapeutic considerations

- Chromium is widely used in listed complementary medicines for a range of therapeutic benefits such as assisting with the symptoms around metabolic disorders, such as insulin resistance and type 2 diabetes⁵.
- The Therapeutic Goods Administration (TGA) restricts chromium supplementation in listed medicines in the form of chromium nicotinate, chromium picolinate and yeast - high chromium to the maximum recommended daily dose of no more than 50µg of chromium for all dosage forms.

The CMA has published a media release, which can be found [here](#).

² Dourson 1994; Nielsen 1994; Hathcock 1996; IOM 2001; Expert Group on Vitamins and Minerals [EVM] 2003; European Food Safety Authority [EFSA] 2010).

³ Institute of Medicine (IOM). 2001. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Washington, DC: National Academy Press.

⁴ Vitamin and Mineral Safety 3rd Edition (2014) Council for Responsible Nutrition (CRN) www.crnusa.org

⁵ Wu, L, Levina, A, Harris, H, Cai, Z, Lai, B, Vogt, S, James, D, Lay, P. (2015) 'Carcinogenic chromium (VI) Compounds Formed by Intracellular Oxidation of Chromium (III) Dietary Supplements by Adipocytes' *Angew. Chem. Int. Ed.*, 54, pp. 1- 5