

Zinc

History

- Zinc is an essential trace mineral which is present in a wide variety of foods including grains, nuts, meats, eggs, and dairy. It serves as a cofactor for more than 200 enzymes.
- Deficiency occurs in some developing countries but is likely extremely rare in the U.S.
- Zinc given to severely malnourished school children in India and Bangladesh reduces diarrheal disease.

Most studied use

Upper respiratory infections.

Other common uses

Aphthous ulcers, BPH, enhancing exercise performance, leg ulcers, childhood diarrhea in the developing world.

Summary of the evidence

- Several high quality studies of zinc lozenges for URI's have had conflicting results.
- Most studies have suffered from poor blinding due to the metallic taste of the lozenges.
- Very high doses can cause immune dysfunction, copper deficiency, and anemia.

Pharmacology

- The bioavailability of zinc is approximately 30%. Most is excreted in bile.

Mechanism of action

- Mild zinc deficiency seems to adversely affect T-cell function.
- For the common cold, zinc supplementation is theorized to be beneficial by inhibiting viral replication and boosting immune function.

Clinical studies

- More than 10 RCT's of reasonably good quality have been published testing zinc lozenges for the common cold with a wide mix of results.
- A Cochrane review (Marshall 1999) as well as a more recent meta-analysis (Jackson 2000) concluded that there was insufficient evidence supporting efficacy.

- Since these 2 reviews, 2 other well-done trials reached markedly different conclusions.
- An industry sponsored study in the *Annals of Internal Medicine* (Prasad 2000) recruited 50 patients with natural colds and randomized them to 12.8 mg of zinc acetate or placebo. The zinc group had shorter mean overall duration of cold symptoms (4.5 vs. 8.1 days, $P < .01$). Although blinding was tested and declared to be adequate, an accompanying editorial argues otherwise.
- In perhaps the best study done to date (Turner 2000), 554 patients were randomized into 4 groups testing both forms of zinc (gluconate and acetate) as well as both naturally occurring colds and induced colds, thereby addressing many concerns raised by previous trials. Zinc was not appreciably better than placebo.

Adverse effects

- Zinc lozenges cause a metallic taste that most people find unpleasant.
- Zinc can sometimes cause nausea, vomiting, mouth irritation, and abdominal pain.

Contraindications/cautions

- High doses of 50 mg per day or higher for several weeks can cause copper deficiency, anemia, elevated cholesterol, and impaired immune function.

Important interactions

- Tetracyclines and fluoroquinolones may be ineffective when given with zinc.

Formulation and dosage

- One zinc gluconate or acetate lozenge, providing 9-24 mg elemental zinc, dissolved in the mouth every two hours while awake when cold symptoms are present.

Key Zinc References

1. Turner RB, et al. Effect of treatment with zinc gluconate or zinc acetate on experimental and natural colds. *Clin Infect Dis*. 2000;31(5):1202-8. 2000 Nov 06.
2. Prasad AS, et al. Duration of symptoms and plasma cytokine levels in patients with the common cold treated with zinc acetate. A randomized, double-blind, placebo-controlled trial. *Ann Intern Med*. 2000 Aug 15;133(4):245-52.
3. Macknin ML, et al. Zinc gluconate lozenges for treating the common cold in children: a randomized controlled trial. *JAMA*. 1998 Jun 24;279(24):1962-7.
4. Jackson JL, et al. Zinc and the common cold: a meta-analysis revisited. *J Nutr*. 2000 May;130(5S Suppl):1512S-5S.
5. Marshall I. Zinc for the common cold (Cochrane Review). In: *The Cochrane Library*, 1999. Chichester, UK: John Wiley & Sons, Ltd