

Zinc

AT A GLANCE

Introduction

Zinc (Zn) is found in nearly 100 different enzymes and as such is an essential building block for all life. Zinc is the second most common trace mineral in the body after iron and is present in every living cell.

The human body contains approximately three grams of zinc, the highest concentrations of which are located in the prostate gland and the eye.

Particularly in developing countries, zinc deficiency is regarded as an important public health issue by scientists.

Health Functions

A sufficient intake of zinc is important as it supports the body in

- immune function
- protein synthesis
- wound healing
- DNA synthesis
- cell division
- normal growth and development during pregnancy, childhood, and adolescence
- tasting and smelling.

The European Food Safety Authority (EFSA), which provides scientific advice to assist policy makers, has confirmed that clear health benefits have been established for the dietary intake of zinc in contributing to:

- a normal function of the immune system;
- normal DNA synthesis and cell division;
- the protection of cell constituents from oxidative damage;
- the maintenance of normal bone;
- normal cognitive function;
- normal fertility and reproduction;
- normal metabolism of fatty acids;
- normal acid-base metabolism;
- normal metabolism of vitamin A;
- the maintenance of normal vision.

- the maintenance of normal skin;
- the maintenance of normal hair;
- the maintenance of normal nails.

Disease Risk Reduction

Retarded growth

Marked growth retardation in children is a common feature of mild zinc deficiency. It can be seen particularly in developing countries.

Reduced zinc intake by expectant mothers has been linked to decreased attention spans in newborn babies and poorer motor skills at six months.

Better coordination in underweight babies and more energetic movement in very young children have been achieved through zinc supplementation.

Adequate zinc supply is vital for normal development and growth throughout pregnancy, childhood, and adolescence.

Impaired immune system function

Sufficient zinc supply is important for maintaining immune system function. Individuals exhibiting a zinc deficiency are often more prone to various infectious diseases, such as pneumonia, diarrhea, and (in children) malaria.

The duration and severity of acute and persistent childhood diarrhea was shown in a number of studies to be greatly reduced through zinc supplementation in combination with rehydration. Survival rates were also shown to improve.

Children from developing countries who were given zinc supplements showed a considerable decrease in the number of cases of pneumonia, according to various studies.

Some studies have suggested that the occurrence of cases of childhood malaria could be decreased through supplementation with zinc. Other studies however showed no benefit from supplementation*.

That the elderly are more prone to mild zinc deficiencies has been linked to age-related deterioration of immune response. Some studies have shown that levels of immune cells have been seen to increase with zinc supplementation, while others have observed no effect.

Before any recommendations can be made relating to zinc and immune function in elderly people more research must be made available*.

Pregnancy complications

Several pregnancy complications have been linked to poor zinc status among expectant mothers. These include preterm birth, low birth weight, labor and delivery problems, and abnormalities in developing fetuses.

There have been mixed results from trials where expectant mothers have been given zinc supplements.

Some studies noted increased birth weight and reduced incidence of premature birth with supplementation of zinc, others showed no discernible effects*.

The effects of zinc supplementation require further clarification through additional studies.

* see also Principles – The complexity of micronutrient research

Other Applications

Please note:

Any dietary or drug treatment with high-dosed micronutrients needs medical supervision.

Age-related macular degeneration

The amount of zinc present in the retina decreases with age. Zinc is therefore thought to be an important factor in the onset of age-related macular degeneration (AMD). This is where the part of the retina responsible for central vision begins to deteriorate.

Zinc, vitamin C, vitamin E, beta-carotene, and copper were found to slow the development of AMD in a largescale clinical trial. However, there have been studies that have observed no effect with zinc supplementation*.

Currently there is little evidence that zinc has a preventative effect on AMD but more research is needed.

The Common Cold

Evidence is mixed, but many people believe that zinc lozenges or zinc nasal sprays can reduce the duration and severity of colds if used consistently from when they first notice symptoms*.

More high-quality research is required before conclusions can be drawn as to the effectiveness of zinc against certain strains of the common cold.

Diabetes

People who suffer from diabetes may often exhibit a moderate zinc deficiency.

More studies are needed, however, before zinc supplementation can be prescribed for diabetics*.

HIV infection / AIDS

People diagnosed with HIV are more likely to exhibit a deficiency of zinc, which is vital for maintaining normal immune responses. A more advanced stage of the illness and also an increased mortality rate have been associated with low blood levels of zinc in HIV-positive people.

Ascertaining optimal zinc supply levels for people with HIV will require studies*.

* see also Principles – The complexity of micronutrient research

Intake Recommendations

European health authorities recommend zinc intakes for adults of 9.5 mg per day for males and 7 mg/day for females.

In the U.S., the recommended intake for adults has been set at 11 mg/day for men and 8 mg/day for women.

The requirement for dietary zinc may be as much as 50% greater for strict vegetarians whose major food staples are grains and legumes.

A strong relationship exists between zinc and copper. Too much of one can cause a deficiency in the other.

Long-term use of zinc should be accompanied by copper.

Supply Situation

Dietary surveys in Europe and the U.S. estimated that the average zinc intake for adult men most often meets the recommended values.

On the other hand, it has been estimated that 82% of pregnant women worldwide are likely to have inadequate zinc intakes. In addition, infants, children, and breast-feeding women have been found to have an increased risk of zinc deficiency.

Deficiency

It is rare for people in industrialized countries to be seriously deficient in zinc.

Infants, children, and pregnant and breast-feeding women are at increased risk of zinc deficiency.

Low zinc levels are sometimes seen in the elderly, alcoholics, people with anorexia, and people on very restricted diets. People who have malabsorption syndromes, such as Crohn's disease or celiac disease, may also be deficient in zinc.

Symptoms of zinc deficiency include loss of appetite, poor growth, weight loss, lack of taste or smell, poor wound healing, skin problems (such as acne and psoriasis), hair loss, lack of menstrual periods, night blindness, white spots on the fingernails, and depression.

Sources

The best sources of zinc are oysters, red meats, poultry, cheese (e.g., ricotta, Swiss, Gouda), shrimp, crab, and other shellfish.

Other good, though less easily absorbed, sources of zinc include legumes (especially beans, peas, soybeans, and peanuts), whole grains, tofu, brewer's yeast, cooked greens, mushrooms, green beans, pumpkin, and sunflower seeds.

Only 20–40% of the zinc present in food is absorbed by the body. Zinc from animal foods like red meat, fish, and poultry is more readily absorbed by the body than zinc from plant foods.

Zinc is best absorbed when taken with a meal that contains protein.

Safety

Isolated outbreaks of acute zinc toxicity have occurred as a result of the consumption of food or beverages contaminated with zinc released from galvanized containers.

Signs of acute zinc toxicity are abdominal pain, diarrhea, nausea, and vomiting.

The major consequence of long-term consumption of excessive zinc is copper deficiency.

Tolerable upper intake level

European health authorities have defined safe upper intake levels of 25 mg zinc per day for adults, as well as pregnant and breast-feeding women.

In the U.S., the tolerable upper intake level for zinc intake has been set at 40 mg/day for adults.

Drug interactions

Please note:

Because of the potential for interactions, dietary supplements should not be taken with medications without first talking to an experienced healthcare provider.

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