

THINK ZINC

The Power of Zinc for Human Health

The Absorption Mechanisms of Zinc

Efficient uptake of zinc in the gastrointestinal tract is key to regulate and maintain zinc levels in the human body. But the process of absorption varies for different zinc sources.

Zinc is an essential trace element which exerts many functions in various biological and physiological processes in the human body. Despite being one of the most abundant trace elements, the human body cannot synthesize zinc itself, so it needs to be consumed via food or supplementation.

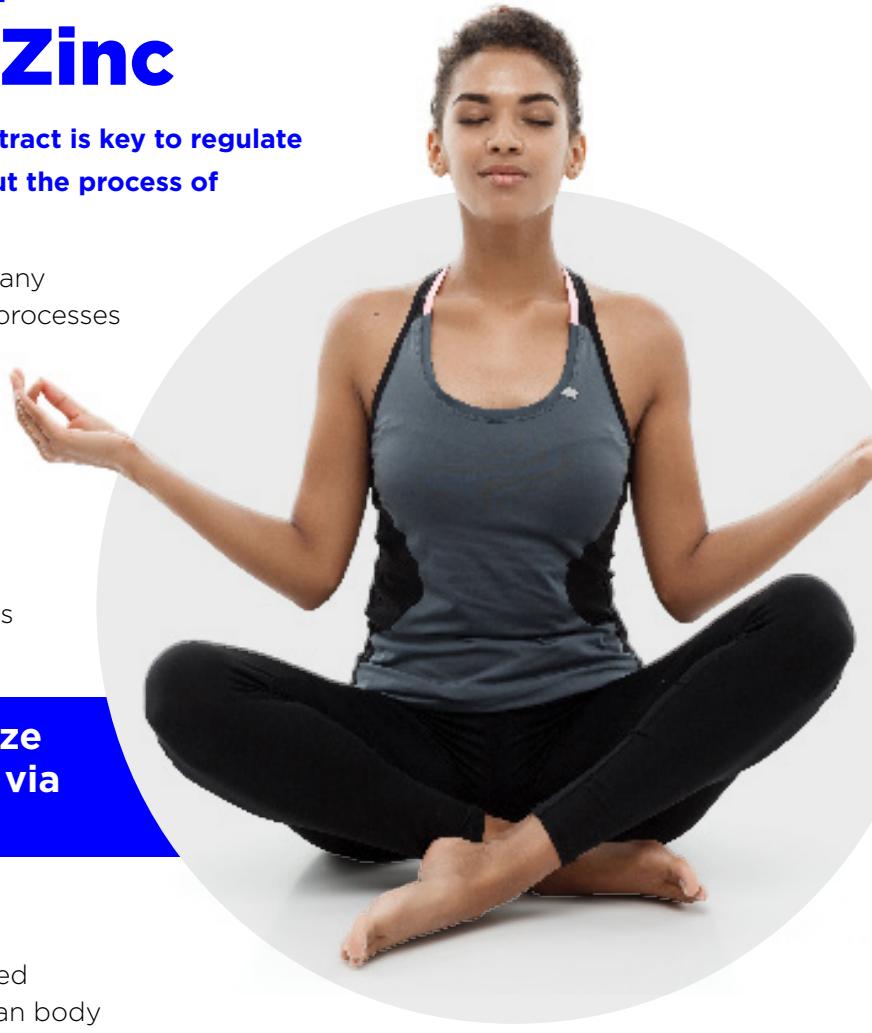
The uptake of zinc mainly takes place in the duodenum and jejunum. Once absorbed by the enterocytes (intestinal cells) and transported to the bloodstream, zinc remains in circulation and is delivered to - and stored in - cells.

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Regulation of Zinc in the Body

The constant state of cellular zinc nutrition (called homeostasis) is naturally controlled by the human body through changes in zinc absorption and excretion in the gastrointestinal tract. Tissue and cellular redistribution of zinc may contribute further to the maintenance of this balance and zinc pools in the body. This allows humans to deal with fluctuations of zinc intake, including abundance and shortages. Studies showed that humans appear to have the capacity to regulate whole body zinc content over a 10-fold change in intake (1).

Transporters, found in the gastrointestinal lining, are central in regulating cellular zinc balance and subcellular zinc distributions. Mammalian zinc transporters belong to two complementary protein families: the Zinc Transporter (ZnT) and Zrt, Irt-like Protein (Zip). ZnT and Zip proteins appear to have opposite roles in cellular zinc homeostasis.



ZnT transporters reduce intracellular cytoplasmic zinc by promoting zinc efflux (moving out) from cells or into intracellular vesicles, while Zip transporters increase intracellular cytoplasmic zinc. Our understanding of zinc transport at the molecular level began with the cloning and the discovery of the first functional evidence showing actual zinc transport activity of ZnT1, the first mammalian zinc transporter (2). To date we know of at least 14 specific transporters that are responsible for either zinc influx (movement into) or efflux in mammalian cells (3).

Different Transportation Routes

Dietary and environmental factors, or chronic diseases can lead to a zinc deficiency. To replenish zinc levels through supplementation, it is important to choose a zinc source that can be easily absorbed by the human body. **Absorption is dependent on how zinc uptake is regulated in the gastrointestinal tract level and which pathways (transporter routes) are used.** Among the transporters are metal ion (di-metal) transporters and amino acid transporters. Inorganic zinc sources are dependent on di-metal transporters, which can be blocked or affected by common antagonists like calcium, phytic acid and other inorganic minerals (4). In other words, there is competition to use these transporters. In addition, when taken up by the enterocytes, the zinc can bind to proteins such as metallothionein that restrict entry of zinc ions into blood circulation. This will result in an inconsistent release of the zinc mineral into the blood circulation.



Some organic zinc supplements use amino acids as ligands (where the zinc is bound to certain amino acids). This allows the zinc to use the amino acid transporters, hence increasing uptake of the mineral into the enterocyte and the passage into the bloodstream. There are different amino acid transporters found in the gastrointestinal tract. For example, amino acids from digested proteins are taken up by at least four sodium-dependent amino acid transporters and sodium independent transporters, supporting the uptake of a variety of different amino acids. **These zinc-amino acid complexes persist in circulation for an extended duration compared to conventional minerals.** However, not all organic sources can claim or can prove they use the amino acid transporter route.

Why Choose Zinc from Zinpro®?

Understanding the differences in zinc supplements and how they are absorbed by the body is crucial for choosing the best supplement to meet individual needs. For over 52 years, Zinpro has been a pioneer in the research and development of performance trace minerals and innovative nutritional solutions. The company's dedication to improving health and wellbeing has led to the development of Zinpro® Zinc LG, a new generation zinc, marked by a unique combination of an organic zinc source with two amino acids: glutamic acid (Glu) and lysine (Lys). **It has been proven to use the amino acid transport route, ensuring superior zinc uptake, which could lead to increased zinc levels in humans.**

Learn more at
zinpro.com/zinc



ZINC LG

Three Main Takeaways



1
Zinc uptake is a complex system and is regulated by the zinc transporter families



2
Inorganic zinc uses the competitive di-metal transporter route, which can lead to faster excretion (loss) of the mineral



3
Zinpro Zinc LG uses the amino acid transporter route, leading to better absorption and longer circulation in the bloodstream