

## NUTRIENT

### 1. What is the nutrient?

Zinc

### 2. What is the RDA/DRI for the nutrient?

Infants:

- 0-6mo:2mg/d
- 7-12mo:3mg/d

Children

- 1-3 years:3mg/d
- 4-8 years:5mg/d

Males

- 9-13 years:8mg/day
- 14-50 years:11 mg/d
- >70 years:11mg/d

Females

- 9-13 years: 8mg/d
- 14-18 years: 9mg/d
- 19-70 years:8mg/d
- >71years:8mg/d

("Dietary reference intakes," )

### 3. How is the nutrient metabolized?

Absorbed zinc enters the liver where it is incorporated into zinc metalloenzymes and exported to peripheral tissue in plasma, bound to albumin. Of the total plasma zinc concentration of 12-25  $\mu\text{mol/l}$ , over 90% is associated with albumin, <10% with alpha-2 macroglobulin, and a small amount, <1%, complexed to amino acids and other low molecular weight species. Zinc homeostasis is achieved by regulation of enterohepatic re-circulation. An amount of zinc equivalent to the total absorbed zinc is re-excreted into the gut in intestinal fluids. In normal health zinc output by the gut is equal to the total dietary intake. Urinary excretion of zinc is low (around 10  $\mu\text{mol/day}$ ), and does not vary markedly with dietary supply. It is increased in catabolic states, by certain drugs and/or chelating agents. ("Zinc,")

### 4. What are food sources of the nutrient?

"A wide variety of foods contain zinc . Oysters contain more zinc per serving than any other food, but red meat and poultry provide the majority of zinc in the American diet. Other good food sources include beans, nuts, certain types of seafood (such as crab and lobster), whole grains, fortified breakfast cereals, and dairy products." (" zinc ,")

### 5. What disease states alter the nutrients metabolism?

"Some diseases increase the risk of zinc deficiency. Sickle-cell anemia, diabetes, and kidney disease can all affect zinc metabolism. People with **Crohn's disease** , sprue, chronic **diarrhea** , or babies with acrodermatitis enteropathica also have an increased need for zinc. Consult a health care provider for appropriate supplementation instructions. (Turner, 2005)

**6. What are the tests or procedures to assess the nutrient level in the body?**

Zinc can be measured in blood, feces, urine and hair. Different tests may be able to show the type of exposure to zinc. High levels of zinc in the blood or feces might show a recent high exposure. Zinc levels measured in hair would show long-term exposure. However, these tests are not routinely used. ("Zinc," )

**7. What is the drug –nutrient interactions?**

“Large amounts of zinc can interfere with copper and iron absorption. Similarly, large amounts of iron can interfere with zinc absorption. (Hermann)” “

“Zinc may interact with some medicines such as birth control pills and some antibiotics. Zinc can also interact with other supplements, such as calcium, magnesium, copper, and iron. If you take daily medicine or supplements, ask your doctor about taking zinc.” ("Zinc," 2009)

“Zinc supplements have the potential to interact with several types of medications. A few examples are provided below. Individuals taking these medications on a regular basis should discuss their zinc intakes with their healthcare providers.

*Antibiotics*

Both quinolone antibiotics (such as Cipro<sup>®</sup>) and tetracycline antibiotics (such as Achromycin<sup>®</sup> and Sumycin<sup>®</sup>) interact with zinc in the gastrointestinal tract, inhibiting the absorption of both zinc and the antibiotic. Taking the antibiotic at least 2 hours before or 4–6 hours after taking a zinc supplement minimizes this interaction.

*Penicillamine*

Zinc can reduce the absorption and action of penicillamine, a drug used to treat rheumatoid arthritis. To minimize this interaction, individuals should take zinc supplements at least 2 hours before or after taking penicillamine.

*Diuretics*

Thiazide diuretics such as chlorthalidone (Hygroton<sup>®</sup>) and hydrochlorothiazide (Esidrix<sup>®</sup> and HydroDIURIL<sup>®</sup>) increase urinary zinc excretion by as much as 60%. Prolonged use of thiazide diuretics could deplete zinc tissue levels, so clinicians should monitor zinc status in patients taking these medications.” (" zinc ," )

**8. How is the nutrient measured?**

“There are tests available to measure zinc in your blood, urine, hair, saliva, and feces. These tests are not usually done in the doctor's office because they require special equipment. High levels of zinc in the feces can mean high recent zinc exposure. High levels of zinc in the blood can mean high zinc consumption and/or high exposure. Tests to measure zinc in hair may provide information on long-term zinc exposure; however, the relationship between levels in your hair and the amount of zinc you were exposed to is not clear.” ("Toxfaqs™ for zinc," 2005)

**9. What is the Upper Tolerable Limits?**

0-6 months-4mg/d

7-12 months-5mg/d

1-3 years-7mg/d

4-8 years-12mg/d

9-13 years-23mg/d

14-18 years-34mg/d

19 years and up-40mg/d

("Zinc," 2009)

**10. What are the physical signs of deficiency?**

"The first signs of zinc deficiency are impairment of taste, a poor immune response and skin problems. Other symptoms of zinc deficiency can include hair loss, diarrhoea, fatigue, delayed wound healing, and decreased growth rate and mental development in infants. ("Zinc," )

**11. What are physical signs of toxicity?**

Zinc toxicity can occur in both acute and chronic forms. Acute adverse effects of high zinc intake include nausea, vomiting, loss of appetite, abdominal cramps, diarrhea, and headaches. (" zinc ," )

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