The adult human body contains about 2-2.5 g of zinc with about 70% concentrated in the bone .

Also found in ocular tissue, seminal vessels, epididymis, prostate & semin.

Bone contains about 200Mg /g & muscle has about 50Mg/g , ocular tissue & prostate gland have 600-800Mg/g , blood contain 7-8Mg/ml (70-85% occurs in red blood cell& 3% in white cell and plasma & the remainder in plasma ).

Food sources :

Meat, poultry, eggs & seafood. Oysters are the richest sources of zinc.

Cereal & legumes also contain significant amount of zinc.

Absorption :

About 40 % of dietary zinc is absorbed in the small intestine , Zinc is absorbed mainly in the jejunum, and to a lesser extent in the stomach and large intestine. During digestion, dietary zinc is released and forms complexes with different ligands, namely amino acids, phosphates, organic acids, and histidines .

Zinc-ligand complexes are then absorbed through the intestinal mucosa by both an active and passive process. Once absorbed, the portal circulation carries zinc to the liver.

Zinc absorption may be impaired in pancreatic disease or insufficiency. Pancreatic enzymes are necessary for release of dietary zinc, and pancreatic juices may contain zinc-complexing ligands.

The major route of zinc excretion is via the gastrointestinal tract. Up to 10 percent of the circulating zinc is also excreted through urine .

Function:

1- is essential in the composition of over 70 enzyme involved indigestion & major metabolic pathways.

2- its part of carbonic anhydrase which is present in erythrocytes.

4- it involved in bone, heart, kidney & placental metabolism.

5- it required for proper activity of DNA & RNA polymerase & thymidine kinase.

6- co- factor in the synthesis of collagen & to maintain membrane intgrety & function.

Requirement:

Infants-----------3-5mg/day.

Preadolescent---------10mg/day.

Normal adult-------12.5 mg/day.

Male > 10 years------15mg/day.

Female > 10 years-----12mg/day (with addition of 3mg during pregnancy & 7mg during lactation)

Zinc Deficiency

Causes of zinc deficiency :

\*Zinc deficiency can be seen in patients receiving chronic total parenteral nutrition (TPN) solutions, lacking adequate zinc supplementation, or chronic TPN use with underlying diarrhea, inflammatory bowel disease, malabsorption syndrome .

\*Other conditions that predispose to zinc deficiency are diets deficient in zinc, pregnancy, starvation, anorexia, and protein calorie malnutrition, Diabetics , Alcoholic, cirrhotic patients often have low hepatic concentrations of zinc.

\*Zink deficiency reported in infant fed formula diet low in zinc , premature infant are especially at risk of zinc deficiency because of their rapid growth ( the high zinc content of colostrums helps satisfy this need ) .

\*Amore zinc deficiency occur in infant with rare genetic disease ,acrodermatitis enterpathica .

clinical manifestations include :

1-Mild zinc deficiency impairs growth velocity while severe depletion of zinc leads to growth retardation, prolonged zinc deficiency in children can result in hypogonadism & dwarfism .

2- delayed sexual maturation, impotence, hypogonadism, oligospermia, alter reproductive performance manifested by congenital abnormality , poor pregnancy outcome , gonadal dysfunction .

3- alopecia, dysgeusia (impaired taste), immune dysfunction, night blindness, change in hair color, easy pluckability of hair, impaired wound healing.

4- various skin lesions(The dermatologic syndrome occurs primarily in the extremities or around body orifices and is often characterized by erythematous, vesiculobullous, and pustular lesions).

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Toxicity:

Zinc toxicity is a rare (dose up to 200 mg have prodused no ill effect ) , Signs of zinc toxicity include abdominal pain, diarrhea, nausea, and vomiting.