

## Trace minerals

- Trace minerals are iron , iodine , zinc , selenium , copper , fluoride , chromium , molybdenum and manganese .
- These nutrients are classified as trace minerals because they are present in the body in amounts less than 5 gm. and the daily requirement is less than 100 mg

### Iron •

#### Functions •

- Iron is essential for oxygen transport throughout the body . Approximately two-thirds of the body's iron is part of the protein hemoglobin found in red blood cells. Hemoglobin carries oxygen from the lungs to the rest of the body .

#### Food Sources •

Organ meats (liver and heart ) , legumes , green leafy vegetables. •

Deficiency symptoms : Fatigue , rapid heart rate , development delays in children , pica , koilonychias , glossitis , anemia. •

Toxicity symptoms : Hemochromatosis , organ damage •

## Factors affecting iron balance

1. Decreased intake .
  - a. Poor quality food
  - b. Inappropriate use of cow's milk in children under age 3 years .
2. Decreased iron absorption
  - A .Reduced iron bioavailability – phytates , polyphenols ( tea , coffee ) , high calcium intake , soy protein .
  - b. Alkaline gastric , medications ( anti acids and ulcer medication ) .
  - c. Hookworm .
  - d. Malabsorptive disease .
  
- 3-Increased losses
  - a. Surgery .
  - b. Menstruation .
  - c. Gastrointestinal or genitourinary losses of blood.

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4. Increased needs :

- a. growth
- b. pregnancy

Recommended intake

1. The RDA for age 19 years and older is 8 mg of iron per day
2. Females of childbearing age are advised to consume 15 mg /day of iron age 14 to 18 years and then 18 mg /day until age 50 year
3. During pregnancy increased to 27-30 mg/day
4. Infants born to mothers with iron deficiency anemia are at risk for low birth weight and preterm delivery
5. Healthy, full term babies should have sufficient fetal iron stores to last until age 4 to 6 months.

## Zinc.

### Function

Enzyme cofactor ( over 100 different enzyme in the body )

Food Sources : Oysters , red meat , whole grains

Deficiency symptoms : Reduced appetite and taste acuity , stunted growth , hypogonadism in boys , diarrhea , poor wound healing .

### Toxicity symptoms

1. Impaired copper absorption status .
2. reduced immune response.
3. decreased HDL cholesterol .

**Recommended intake** : The RDA of zinc for

- Adult females is 8 mg /day.
- Adult males is 11 mg/day .

# Selenium

## Function

1. Antioxidant .
2. plays role in cancer prevention .
3. maintenance of thyroid and immune function .

## Food source

nuts , beef , seafood , poultry , some plants .

**Deficiency Symptoms** : Rare , Hypothyroidism

**Toxicity Symptoms** : Hair loss , garlicky breath , fatigue , intestinal complaints.

**Recommended intake** :- 55 mcg for adults.

## Copper.

### Function:

1. coenzyme , copper is needed for the binding of iron to the transport protein transferrin .
2. It is important in collagen and connective tissue synthesis and wound healing .

. Food Sources : Organ meats such as liver , seafood , nuts , grain products

Deficiency symptoms : Anemia , bone demineralization

toxicity symptoms : Vomiting , diarrhea , cirrhosis , liver failure

Recommended intake : The RDA for copper is 900 mcg per day for adolescents and all adults.

# Fluoride.

## Function.

1. Mineralization of bones and teeth .
2. Fluoride provided to children up to age 8 years to 12 years improves the mineralization of teeth .

## Food sources

1. Drinking water .
2. dental products such as rinses , gels and foams also supply fluoride .

Deficiency symptoms : Increased risk of dental caries

Toxicity symptoms : Fluorosis

Recommended intake : The RI for fluoride 2 mg per day for adult females and 3 mg for adult males per day.

## Chromium.

### Function.

1. acts as a cofactor in the action of insulin in the body .
2. maintaining blood glucose homeostasis .

. Food sources : Meats poultry and fish

Deficiency symptoms : Chromium deficiency is reported to cause glucose intolerance its rare

Toxicity symptoms : None reported

Recommended intake

In adult males up to age 50 years , 35 mcg per day is recommended

**Whereas females of the same age are 25 mcg daily.**



# Iodin

## Functions.

Iodine is component of thyroid hormones which are responsible for regulation of temperature, metabolic rate , and enzyme action in the body .

**Food Sources :** Sea food , iodized salt

**Deficiency symptoms :** Thyroid disease , goiter , congenital hypothyroidism .

**Toxicity symptoms :** Thyroid disease

**The recommended intake** for iodine is 150 mcg per day for adults

**Prolonged iodine deficiency** causes enlarged thyroid gland is called goiter .

# **Manganese.**

## **Function.**

1. Bone formation .
2. Metabolism of carbohydrate , protein and fat.

Food Sources : Legumes , grains , nuts

Deficiency symptoms: slowed growth or impaired growth and glucose tolerance .

Toxicity symptoms: Neurological symptoms ( limited human data ).

The recommended intake of manganese is 2.1 mg per day for adults .