Trace minerals
Copper

- Important component of many metabolic reactions
- Found in a variety of foods - seafood like oyster, lobster and crab.
- Plant sources include kale and avocado.
- It’s also available in nuts, seeds and mushrooms
- Recommended dietary allowance is 2 mg/day
- Deficiency causes anaemia, leukopenia, osteoporosis
- Toxicity not very common but very high amount leads to liver damage
High Copper Food
Iodine

• The main role of the trace mineral iodine is promoting healthy thyroid function.

• It helps the body synthesize thyroid hormones that regulate growth and metabolism.

• Too much or too little iodine can lead to the conditions known as hyperthyroidism and hypothyroidism.
Food Sources:

• **Seafood** as well as **seaweed** is the best source of iodine.

• It is also found in **potatoes**, **eggs** and **milk**.

Deficiency:

• Goitre in adults

• Cretinism in new born

**RDA**: 150µg/day
FOODS RICH IN IODINE

- seaweeds
- sea salt
- strawberries
- cranberries
- spinach
- rawforbeauty.com
- coconut oil
- Himalayan crystal salt
- broccoli
- fennel
Problems due to excess intake of iodine

Hyperthyroidism

• Excessive iodine, the iodine interferes with the manufacture of thyroid hormones resulting in low thyroid hormone levels, or hypothyroidism.

• Symptoms of hypothyroidism include fatigue, weight gain, dry skin and intolerance to changes in temperature.

• Too much iodine also causes other thyroid diseases including Hashimoto’s disease, Graves’ disease and thyroid cancer.
Problems due to deficiency of iodine

• **Iodine deficiency** is a lack of the trace element iodine.

• It may result in **goiter** (so-called endemic goiter), as well as **cretinism** in children which results in developmental delays and other health problems.

• Thus, **iodine deficiency can lead to** enlargement of thyroid gland, hypothyroidism and mental retardation in infants and children whose mothers were **iodine deficient** during pregnancy.
Goiter
Cretinism
Selenium

- Plays an important role in the protection of body tissues against oxidative stress and also growth & development

**Food Sources:**

- Found in most cereals, meats, fish and dairy, legumes and Brazil nuts, as well as fruits and vegetables

- RDA: 40 μg/day
Problems due to deficiency of selenium

- Selenium deficiency is very rare
- Selenium deficiency can cause Keshan disease (a type of heart disease) and male infertility.
- It might also cause Kashin-Beck disease, a type of arthritis that produces pain, swelling, and loss of motion in the joints.
Manganese

• Manganese supports enzyme functions as co-enzymes

• Found in grains, nuts, legumes, green leafy vegetables

• Excess intake causes poor growth, joint inflammation etc

• Low levels of manganese in the body can result in impaired glucose tolerance, altered carbohydrate and fat metabolism, skeletal abnormalities, bone demineralization and malformation,

• RDA – very low
Foods High in Manganese

1. Green Vegetables
2. Fruits
3. Whole Grains
4. Legumes
5. Nuts
6. Spices
7. Fish and Shellfish
8. Tea and Coffee
9. Sweets
10. Pumpkin Seeds
Chromium

- Improves insulin action
- Found in broccoli, Brewer’s yeast, molasses, barley oats and meat
- Deficiency causes glucose intolerance
- Too much chromium from supplements can also damage the liver, kidneys, and nerves, and it may cause irregular heart rhythm.
Foods High in Chromium

- Red wine
- Broccoli
- Grape juice
- Potatoes
- Whole-wheat bread
Fluoride

• Provides strength to bones and teeth, improves resistance to tooth enamel

• Found in water, seaweed, tea, seafood

• Deficiency may cause dental caries

• Excess may cause dental and skeletal fluorosis

• RDA: about 1 PPM
Dental fluorosis
Skeletal fluorosis
Molybdenum

- Cofactor for several enzymes
- Found in milk, cheese, beans, legumes, dark green leafy vegetables, cereals and nuts
- Effects of deficiency and excess very rare
- RDA – very low
Molybdenum

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