The Trace Minerals

Needed in amounts < 100 mg/day

Iron Fe
Iodine I
Zinc Zn
Chromium Cr
Selenium Se
Fluoride Fl
Cobalt Co
Molybdenum Mo
Manganese Mn
Vanadium V
Silicon Si
Nickel Ni
Tin Sn
Iron

Functions:
1. Hemoglobin
   Myoglobin
2. Oxidation/reduction reactions
3. Making of RBC
4. Detoxifies drugs
5. Part of tissue enzymes

*Poorly absorbed
*Recycled

RDA: 8 mg men
     18 mg women 19-50 yo
     8 mg women over 50 yo

* Most common nutrient deficiency
Iron Deficiency Stages:

1^{st} Depleted iron stores
2^{nd} Decrease in iron being transferred
3^{rd} Hemoglobin and hematocrit decline
Symptoms:
   a. anemia - microcytic, hypochromic
   b. fatigue, pale, cold, headache, restless, short breath.
   c. Pica

Toxicity:
   a. Hemochromatosis - 1%
   b. Hemosiderosis - large storage of hemosiderin in tissues
   c. Iron Poisoning

Iron absorption enhancing factors:
   MFP
   Vitamin C promotes nonheme
   Small doses
   Sugar
   Acids

Iron absorption inhibitors:
   Phytates and fiber
   Oxalates
   Calcium & phosphorus
   Tannic acids
   Polyphenols
   EDTA
Sources of Iron

* heme vs. nonheme

1. Red meat, fish & poultry
2. Enriched grains (25%)
3. Legumes
4. Dark, green leafy vegetables
5. Dried raisins
6. Clams
7. Contamination iron

Supplements:
   Ferrous sulfate (best absorbed)
   Between meals or at bedtime
   Avoid milk
Zinc

Functions:
1. metalloenzyme in over 100 functions
2. normal sex maturation
3. wound healing
4. taste sensitivity
5. digestive enzymes

Deficiency:
1. Dwarfism
2. Growth retardation
3. Arrested sexual maturity
4. Altered taste
5. Slow wound healing

Toxicity: Affects the heart.

**2001 RDA:** 11 mg men; 8 mg women

Upper limit: 40 mg

Sources: Protein foods, oysters, legumes.
Iodine

* 1st nutrient additive, 1924
* Goiter belt - MI, SD, ND, MN

Functions:
1. synthesis of thyroxin (T4)
2. regulates metabolism

Deficiency:
1. Goiter (simple)
2. Goiter (toxic - goitrogen)
3. Cretinism

Toxicity: Enlarged thyroid gland

RDA: 150 mcg for adults

Upper Limit: 1100 mcg

Sources:
Seafood, iodized salt, dairy processing, iodine rich soil.
Chromium

Functions:
1. Participates in cho & lipid metabolism.
   Maintains glucose homeostasis.
2. Enhances insulin's action. Part of the GTF – glucose tolerance factor.

Deficiency: impaired glucose tolerance.

Toxicity: None unless industrial contamination.

Sources: Unrefined foods are best. Whole grains, meats, liver, brewer’s yeast, nuts, cheese.

2001 AI: 35 mcg men; 25 mcg women

Issues: Chromium picolinate.
Selenium

Functions

1. Antioxidant working with enzyme called glutathione peroxidase to prevent free radical formation

2. Converts thyroid hormone to active form.

2000 RDA: 55 mcg/day adults.

Upper Limit: 400 mcg/day

Deficiency: Keshan’s Disease

Toxicity: Yes

Sources: Protein - meats, seafood. Whole grains (reflects soil content)