FAT SOLUBLE VITAMINS

Vitamin A
1) Retinol, beta-carotene and various other carotenoids
   a) Helps maintain good vision (necessary for night vision), resistance to infections, and supports growth and repair of body tissues. Also maintains integrity of white and red blood cells, and epithelial lining. Used to treat acne.
   b) Milk, eggs, meat, fish liver oils. Beta-carotene and other carotenoids are found in: Green leafy vegetables - kale, spinach, broccoli, collard greens, parsley, turnip greens, escarole. Yellow vegetables - carrots, sweet potatoes, winter squash, pumpkin. Yellow and orange fruits - mango, cantaloupe, papaya, apricots.
   c) 5,000 IU is probably best (in beta-carotene form); max/day 20,000 IU.
   d) Stop immediately if you experience nausea and vomiting, blurred vision, or bone pain. A harmless orange coloring of the palms and the face may develop with excessive intake of beta-carotene.

Vitamin D
1) Cholecalciferol, ergocalciferol
   a) Regulates absorption of calcium and phosphorus for bone health.
   b) Formed in skin when exposed to sunlight. Also found in dairy products, egg yolks, fish liver oils, tuna, mackerel, herring, sardines, oysters, yeast.
   c) 800-1,200 IU.
   d) Don't give kids more than 1000 IU; excess doses may result in hypercalcemia, which can damage the kidneys and weaken the bones.

Vitamin E
1) Tocopherols, tocotrienols Antioxidant.
   a) Helps maintain cell membranes, red blood cell integrity, protects vitamin A and fatty acids from oxidation. Used to treat anemia and may help manage claudication (cramping pain caused by low blood supply to affected muscles).
   b) Found primarily in vegetable oils, but also butter, avocados, eggs, nuts, whole grain cereals, wheat germ.
2) Fat malabsorption can lead to vitamin E deficiency.
3) 1,200 IU; such high amounts may interfere with vitamin K activity and increase the risk of uncontrolled bleeding.
4) Important to know what type of tocopherol you're getting in a supplement.

Vitamin K
1) Helps make factors that promote blood clotting. Used in hemorrhagic disorders.
2) Gut produces some. Diet generally supplies remaining need. Some stored in liver.
3) Green, leafy vegetables are the best source, followed by liver and other animal foods.
4) Fat malabsorption can lead to vitamin K deficiency.
5) 80 mcg; phylloquinone is essentially non-toxic; otherwise, take care with use, especially in children

WATER SOLUBLE VITAMINS

Thiamine
1) Vitamin B1
   a) Men: 0.8 - 1.3 mg
c) Deficiency:
i) Anxiety; hysteria; depression; muscle cramps; loss of appetite; in extreme cases beriberi (mostly in alcoholics).

d) Overdose:
i) Unknown, although excess of one B vitamin may cause deficiency of others.

Riboflavin

1) Vitamin B2
   a) Men: 1.3 - 1.6 mg
   b) Women: 1.1 mg
   c) Liver, Milk, Spinach, enriched Noodles, Mushrooms. Needed for metabolism of all foods and the release of energy to cells. Essential to the functioning of Vitamin B6 and Niacin.

d) Deficiency:
i) Cracks and sores around the mouth and nose; visual problems.

e) Overdose: See Vitamin B1.

Niacin

1) Vitamin B3
   a) Men: 16-23 mg
   b) Women: 14-16 mg
   c) Niacin is converted to niacinamide in the body. Mushrooms, Bran, Tuna, Chicken, Beef, Peanuts, enriched Grains. Needed in many enzymes that convert food to energy. Helps maintain a healthy digestive tract and nervous system. In very large doses, lower cholesterol (large doses should only be taken under the advice of a physician).

d) Deficiency:
i) In extreme cases, pellagra, a disease characterized by dermatitis, diarrhea and mouth sores.

e) Overdose:
i) Hot flashes; ulcers; liver disorders; high blood sugar and uric acid; cardiac arrhythmias.

Pantothenic Acid

1) Vitamin B5
   a) Men: 2.5 mg
   b) Women: 2.5 mg
   c) Abundant in animal tissues, whole grain cereals and legumes. Converts food to molecular forms. Needed to manufacture adrenal hormones and chemicals that regulate nerve function.

d) Deficiency:
i) Unclear in humans.

e) Overdose:
i) See Vitamin B1.

Pyridoxine

1) Vitamin B6
   a) Men: 1.8 mg
   b) Women: 1.5 mg

d) Deficiency:
i) Anemia, irritability, patches of itchy, scaling skin; convulsions.

e) Overdose:
i) Nerve damage.
Cyanocobalamin

1) Vitamin B12
   a) Men: 2 mcg
   b) Women: 2 mcg
   c) Found almost exclusively in animal products. Builds genetic material. Helps form red blood cells.
   d) Deficiency:
      i) Pernicious anemia; nerve damage. (Note: Deficiency rare except in strict vegetarians, the elderly or people with malabsorption disorders.)
   e) Overdose:
      i) See Vitamin B1.

Biotin

1) Vitamin H
   a) 60 mcg
   c) Deficiency:
      i) Seborrhic dermatitis in infants. Rare in adults, but can be induced by consuming large amounts of egg whites - anorexia, nausea, vomiting, dry scaly skin.
   d) Overdose:
      i) See Vitamin B1

Folic Acid (Folacin)

   a) Men: 180-220 mg
   b) Women: 160-190 mg
   c) Green, leafy vegetables, Orange Juice, organ Meats, Sprouts. Essential for the manufacture of genetic material as well as protein metabolism and red blood cell formation.
   d) Deficiency:
      i) Impaired cell division; anemia; diarrhea; gastrointestinal upsets.
   e) Overdose:
      i) Convulsions in epileptics. May mask pernicious anemia (see Vitamin B12 deficiency).
   f) Adequate amounts of this nutrient in the first stage of pregnancy may reduce the risks of neural tube birth defects.

Vitamin C

2) Ascorbic Acid
   a) Men: 40 mg
   b) Women: 30 mg
   d) Deficiency:
      i) Muscle weakness, bleeding gums; easy bruising. In extreme cases, scurvy.
   e) Overdose: Unknown.
   f) The antioxidant properties of this nutrient may be a factor in reducing the risk of certain forms of cancer. May reduce the effects of the common cold.
**Minerals**

**Calcium**
1) Men: 800 - 1000 mg
2) Women: 700-800 mg
3) Milk, Yogurt, Cheese, Sardines, Broccoli, Turnip Greens. Helps build strong bones and teeth. Promotes muscle and nerve function. Helps blood to clot. Helps activate enzymes needed to convert food to energy.
4) Deficiency:
   a) Rickets in children; osteomalacia (soft bones) and osteoporosis in adults.
5) Overdose:
   a) Constipation, Kidney Stones, calcium deposits in body tissues. Hinders absorption of iron and other minerals.

**Phosphorus**
1) Men: 1000 mg
2) Women: 850 mg (3-6 g)
4) Deficiency: (Rare)
   a) Weakness; bone pain; Anorexia.
5) Overdose:
   a) Hinders body's absorption of calcium.

**Magnesium**
1) Men: 230 - 250 mg
2) Women: 200 - 210 mg
3) Spinach, Beef Greens, Broccoli, Tofu, Popcorn, Cashews, Wheat Bran Activates enzymes needed to release energy in body. Needed by cells for genetic material and bone growth.
4) Deficiency:
   a) Nausea, irritability, muscle weakness; twitching; cramps, cardiac arrhythmias.
5) Overdose:
   a) Nausea, vomiting, low blood pressure, nervous system disorders.

**Warning: Overdose can be fatal to people with kidney disease.**

**Potassium**
1) Men: 40-80 mmol
2) Women: 40-80 mmol (3-6 g)
4) Deficiency:
   a) Nausea, anorexia, muscle weakness, irritability. (Occurs most often in persons with prolonged diarrhea.)
5) Overdose:
   a) Rare.
Iron (Elemental)

1) Men: 8-10 mg
2) Women: 8-13 mg
3) Liver, lean Meats, Kidney beans, enriched Bread, Raisins.
4) Essential for making hemoglobin, the red substance in blood that carries oxygen to body cells. Note: Oxalic acid in spinach hinders iron absorption.
5) Deficiency:
   a) Skin pallor; weakness; fatigue; headaches; shortness of breath (all signs of iron-deficiency anemia)
6) Overdose:
   a) Toxic buildup in liver and in rare instances the heart.

Zinc

1) Men: 12 mg
2) Women: 9 mg
3) Oysters, Shrimp, Crab, Beef, Turkey, whole Grains, Peanuts, Beans. Necessary element, in more than 100 enzymes, that is essential to digestion and metabolism.
4) Deficiency:
   a) Slow healing of wounds; loss of taste; retarded growth and delayed sexual development in children.
5) Overdose:
   a) Nausea, vomiting; diarrhea; abdominal pain; gastric bleeding.

Selenium

1) 0.05-0.2 mg
2) Adequate amounts are found in Seafood, Kidney, Liver and other meats. Grains and other Seed contain varying amounts depending on the soil content. Antioxidant. Interacts with Vitamin E to prevent breakdown of fats and body chemicals.
3) Deficiency: Unknown in humans.
4) Overdose: Finger nail changes, hair loss.

Copper

1) 2-3 mg
2) The richest sources of copper in the diet are Liver and other organ Meats, Seafoods, Nuts and Seeds. Component of several enzymes, including on needed to make skin, hair and other pigments. Stimulates iron absorption. Needed to make red blood cells, connective tissue and nerve fibres.
3) Deficiency:
   a) Rare in adults. Infants may develop a type of anemia marked by abnormal development of bones, nerve tissue and lungs.
4) Overdose:
   a) Liver disease; vomiting; diarrhea.

Manganese

1) 2-5 mg
2) Tea, whole Grains and Cereal products are the richest dietary sources. Adequate amounts are found in Fruits and Vegetables. Needed for normal tendon and bone structure. Component of some enzymes important in metabolism.
3) Deficiency:
   a) Unknown in humans.
4) Overdose:
   a) Generally results from inhalation of manganese containing dust or fumes, not dietary ingestion.
Molybdenum

1) 0.15-0.3 mg
2) The concentration in food varies depending on the environment in which the food was grown. Milk, Beans, Breads and Cereals contribute the highest amounts. Component of enzymes needed in metabolism. Helps regulate iron storage.
3) Deficiency:
   a) Unknown in humans.
4) Overdose:
   a) Gout-like joint pain.