

## **Fat Soluble Vitamins**

### **A**

#### Characteristics:

- Exists in several forms; synthesized from carotenes; stored in the liver; stable in heat, acids and bases; unstable in light.

#### Functions:

- An antioxidant necessary for the synthesis of visual pigments, mucoproteins, and mucopolysaccharides; for normal development of bones and teeth; and for maintenance of epithelial cells.

#### Sources and RDA for Adults

- Liver, fish, whole milk, butter, eggs, leafy green vegetables, yellow and orange vegetables and fruits;  
RDA=4,000-5,000 IU

### **D**

#### Characteristics:

- A group of steroids; resistant to heat, oxidation, acids, and bases; stored in the liver, skin, brain, spleen, and bones.

#### Functions:

- Promotes the absorption of calcium and phosphorus; promotes the development of bones and teeth.

#### Sources and RDA for Adults

- Produced in skin exposed to ultraviolet light; in milk, egg yolk, fish liver oils, fortified foods; RDA= 400 IU

## **E**

### Characteristics:

- A group of compounds resistant to heat and visible light; unstable in the presence of oxygen and ultraviolet light; stored in muscles and adipose (fat) tissue.

### Functions:

- An antioxidant; prevents oxidation of vitamin A and polyunsaturated fatty acids; may help maintain stability of cell membranes.

### Sources and RDA for Adults

- Oils from cereal seeds; salad oils; margarine, shortenings, fruits, nuts, and vegetables; RDA= 30 IU

## **K**

### Characteristics:

- Exists in several forms; resistant to heat, but destroyed by acids, bases, and light; store in the liver.

### Functions:

- Required for the synthesis of prothrombin, which functions in blood clotting.

### Sources and RDA for Adults

- Leafy green vegetables, egg yolk, pork liver, soy oil, tomatoes, cauliflower; RDA= 55-70  $\mu\text{g}$

## **Water-Soluble Vitamins**

### Thiamine Vitamin B1

#### Characteristics:

- Destroyed by heat and oxygen, especially in an alkaline environment.

#### Functions:

- Part of the coenzyme required for oxidation of carbohydrates; coenzyme required for ribose synthesis

#### Sources and RDA for Adults

- Lean meats, liver, eggs, whole-grain cereals, leafy green vegetables, legumes; RDA=1.5 mg

### Riboflavin Vitamin B2

#### Characteristics:

- Stable to heat, acids, and oxidation; destroyed by bases and ultraviolet light.

#### Functions:

- Part of the enzymes and coenzymes required for the oxidation of glucose and fatty acids and for cellular growth.

#### Sources and RDA for Adults

- Meats, dairy products, leafy green vegetables, whole-grain cereals; RDA=1.7 mg

Niacin (nicotinic acid)  
Vitamin B<sub>3</sub>

Characteristics:

- Stable to heat, acids, and bases; converted to niacinamide by cells; synthesized from tryptophan

Functions:

- Part of the coenzymes required for the oxidation of glucose and synthesis of proteins, fats, and nucleic acids.

Sources and RDA for Adults

- Liver, lean meats, peanuts, legumes; RDA=20 mg

Pantothenic acid  
Vitamin B<sub>5</sub>

Characteristics:

- Destroyed by heat, acids, and bases.

Functions:

- Part of coenzyme A required for the oxidation of carbohydrates and fats.

Sources and RDA for Adults

- Meats, whole-grain cereals, legumes, milk, fruits, vegetables; RDA=10 mg

## Vitamin B6

### Characteristics:

- Group of three compounds; stable to heat and acids; destroyed by oxidation, bases, and ultraviolet light.

### Functions:

- Coenzyme required for the synthesis of proteins and certain amino acids, for the conversion of tryptophan to niacin, for production of antibodies, and for nucleic acid synthesis.

### Sources and RDA for Adults

- Liver, meats, bananas, avocado, beans, peanuts, whole-grain cereals, egg yolk; RDA= 2 mg

## Biotin Vitamin B7

### Characteristics:

- Stable to heat, acids, and light; destroyed by oxidation and bases.

### Functions:

- Coenzyme required for the metabolism of amino acids and for fatty acids; and for nucleic acid synthesis.

### Sources and RDA for Adults

- Liver, egg yolk, nuts, legumes, mushrooms; RDA=0.3 mg

Folacin (folic acid)  
Vitamin B<sub>9</sub>

Characteristics:

- Occurs in several forms; destroyed by oxidation in an acidic environment or by heat in an alkaline environment; stored in the liver, where it is converted to folinic acid.

Functions:

- Coenzyme required for the metabolism of amino acids and for fatty acids and for DNA synthesis; promotes production of normal red blood cells.

Sources and RDA for Adults

- Liver, leafy green vegetables, whole-grain cereals, legumes; RDA=0.4 mg

Cyanocobalamin  
Vitamin B<sub>12</sub>

Characteristics:

- Complex, cobalt-containing compound; stable to heat; inactivated by light, strong acids, and strong bases; absorption regulated by intrinsic factor from gastric glands; stored in the liver.

Functions:

- Part of the coenzyme required for the synthesis of nucleic acids and for the metabolism of carbohydrates; plays a role in myelin synthesis; need for normal red blood cell production.

Sources and RDA for Adults

- Liver, meats, milk, cheese, eggs; RDA=3-6 µg

Ascorbic Acid  
Vitamin C

Characteristics:

- Chemically similar to monosaccharides; stable in acids but destroyed by oxidation, heat, light, and bases.

Functions:

- Required for collagen production, conversion of folacin to folinic acid, and metabolism of certain amino acids; promotes absorption of iron and synthesis of hormones from cholesterol.

Sources and RDA for Adults

- Citrus fruits, tomatoes, potatoes, leafy green vegetables; RDA=60 mg

**Major Minerals**

Calcium (Ca)

Distribution:

- Mostly in the inorganic salts of bones and teeth

Functions:

- Structure of bones and teeth; essential for neurotransmitter release, muscle fiber contraction, and blood coagulation; increases permeability of cell membranes; activates certain enzymes

Sources and RDA for Adults

- Milk, milk products, leafy green vegetables; RDA= 800 mg

## Phosphorus (P)

### Distribution:

- Mostly in the inorganic salts of bones and teeth

### Functions:

- Structure of bones and teeth; component of nearly all metabolic reactions; in nucleic acids, many proteins, some enzymes, and some vitamins; in cell membrane, ATP, and phosphates of body fluids

### Sources and RDA for Adults

- Meats, cheese, nuts, whole-grain cereals, milk, legumes; RDA= 800 mg

## Potassium (K)

### Distribution:

- Widely distributed; tends to be concentrated inside cells

### Functions:

- Helps maintain intracellular osmotic pressure and regulate pH; required for impulse conduction in neurons

### Sources and RDA for Adults

- Avocados, dried apricots, meats, nuts, potatoes, bananas; RDA= 2,500 mg



## Sulfur (S)

### Distribution:

- Widely distributed; abundant in skin, hair, and nails.

### Functions:

- Essential part of certain amino acids, thiamine, insulin, biotin, and mucopolysaccharides

### Sources and RDA for Adults

- Meat, milk, eggs, legumes; No RDA established

## Sodium (Na)

### Distribution:

- Widely distributed; mostly in extracellular fluids and bound to inorganic salts of bone

### Functions:

- Helps maintain osmotic pressure of extracellular fluids; regulates water movement; plays a role in impulse conduction in neurons; regulates pH and transport of substances across cell membranes.

### Sources and RDA for Adults

- Table salt, cured ham, sauerkraut, cheese, graham crackers; RDA=2,500 mg

## Chlorine (Cl)

### Distribution:

- Closely associated with sodium (as chloride;) most highly concentrated in cerebrospinal fluid and gastric juice.

### Functions:

- Helps maintain osmotic pressure of extracellular fluids; regulates pH; maintains electrolyte balance; forms hydrochloric acid; aids transport of carbon dioxide by red blood cells.

### Sources and RDA for Adults

- Same as for sodium; No RDA established

## Magnesium (Mg)

### Distribution:

- Abundant in bones

### Functions:

- Required in metabolic reactions in mitochondria that produce ATP; plays a role in the breakdown of ATP to ADP

### Sources and RDA for Adults

- Milk, dairy products, legumes, nuts, leafy green vegetables; RDA= 300-350 mg

