

## Fat-soluble vitamins

Fat-soluble vitamins are stored in the body's cells and are not excreted as easily as water-soluble vitamins. They do not need to be consumed as often as water-soluble vitamins, although adequate amounts are needed. If you take too much of a fat-soluble vitamin, it could become toxic.

### 1. vitamin A (Retinol, Retinals , beta-carotene)

#### a. Food Sources

Vitamin A from animal sources (retinol): fortified milk, cheese, cream, butter, fortified margarine, eggs, liver

Beta-carotene (from plant sources): Leafy, dark green vegetables; dark orange fruits (apricots) and vegetables (carrots, winter squash, sweet potatoes)

#### b. Daily Requirements

900 µg/700 µg (male / female)

#### c. Function

Needed for vision, healthy skin and mucous membranes, bone and tooth growth, immune system health

#### d. Deficiency disease(s)

Night blindness.

## 2. vitamin D (Cholecalciferol (D3), Ergocalciferol (D2))

### a. Food Sources

Eggs, liver, certain fish species such as sardines, certain mushroom species.

### b. Daily Requirements

15 µg/15 µg (male / female)

### c. Function

Needed for proper absorption of calcium; stored in bones

### d. Deficiency disease(s)

Rickets and osteomalacia

## 3. vitamin E (Tocopherols, Tocotrienols)

### a. Food Sources

Many fruits and vegetables, nuts and seeds, and seed oils.

### b. Daily Requirements

15 mg/15 mg (male / female).

### c. Function

Antioxidant; protects cell walls.

### d. Deficiency disease(s)

Deficiency is very rare; mild hemolytic anemia in newborn infants.

## 4. vitamin K (Phylloquinone, Menaquinones)

### a. Food Sources

Leafy green vegetables such as spinach; egg yolks; liver

### b. Daily Requirements

110 µg/120 µg (male / female)

### c. Function

Needed for proper blood clotting

**d. Deficiency disease(s)**

Bleeding diathesis

<b>Characteristics of Fat-Soluble Vitamins</b>	<b>Characteristics of Water-Soluble Vitamins</b>
Protect cell membranes from free radical damage; act within the cell's nucleus to influence gene expression	Act in the cytosol of cells or in extracellular fluids such as blood
Absorbed into lymph with fats from foods	Absorbed directly into blood
Large storage capacity in fatty tissues	Little to no storage capacity
Do not need to be consumed daily to prevent deficiency (may take months to develop)	Need to be consumed regularly to prevent deficiency
Toxicity is more likely	Toxicity is rare