



HME103-Principles of Nutrition

Components in foods and their relationship with health: Vitamin II

Lesson Code: HME103-Principles of Nutrition

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VITAMIN A (RETINOL)

It is the first recognized vitamin.

Molecules carrying vitamin A activity in animal tissues are called **retinoids**.

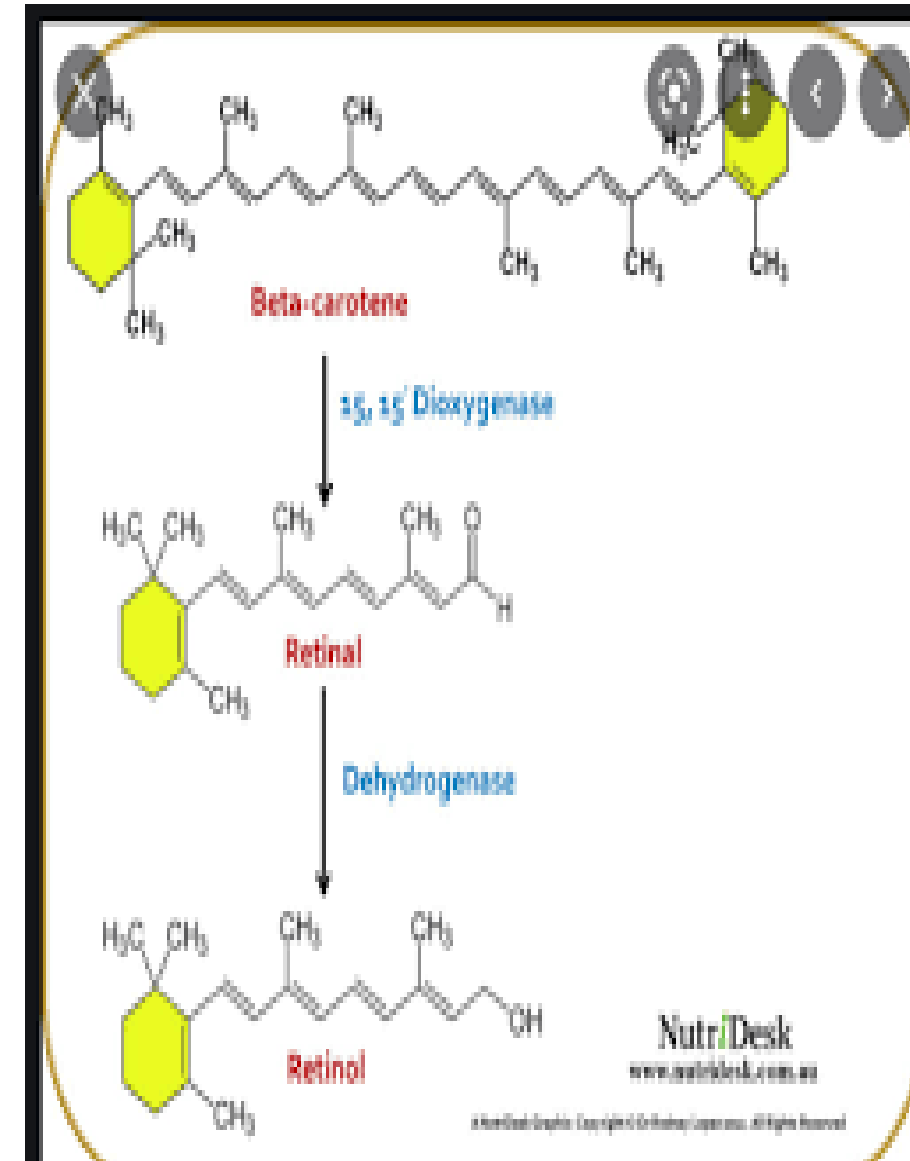
- The precursor molecules of vitamin A in plant foods are **carotenoids**.

- Vitamin A is responsible for regulating some functions in our body. These:

- Vitamin A plays an important role in vision. It allows us to perceive light, especially in low-light environments.

- There are specialized cells at the back of the eye that contain vitamin A. When these cells come into contact with light, they undergo chemical changes and send signals to the brain indicating the presence of light. Vitamin A is found in the structure of **rhodopsin**, which is important in vision function.

- *Rhodo, retinol; Opsin is a protein.



Most of the vitamin A in the body is responsible for the formation of epithelial cells covering body tissues. Vitamin A is especially responsible for the formation of mucopolysaccharides found in the structure of epithelial tissues.

Vitamin A is vital for bone development, especially in children and adolescents. Bone development occurs at the ends of the bones, where bones begin to take shape and allows the bones to lengthen.



DEFICIENCY:

Many problems occur as a result of vitamin A deficiency. However, symptoms resulting from its deficiency may take months or years to appear. Vitamin A level in the blood is important in detecting deficiency.

SOURCES:

Foods such as;

Liver,
green leafy vegetables,
egg,
carrot,
apricot,
milk, and
tomatoes are rich in vitamin A.



TOXICITY AND SUPPORT: As a fat-soluble vitamin, serious poisoning may occur if vitamin A is taken more than necessary.

When it comes to beta carotene and other carotenes, there is no poisoning. However, pigmentation occurs on the skin. Orange colors appear especially on the soles of the feet and palms. This pigmentation usually occurs when drinking large amounts of carrot juice or taking beta-carotene supplements.



VITAMIN D (cholecalciferol)

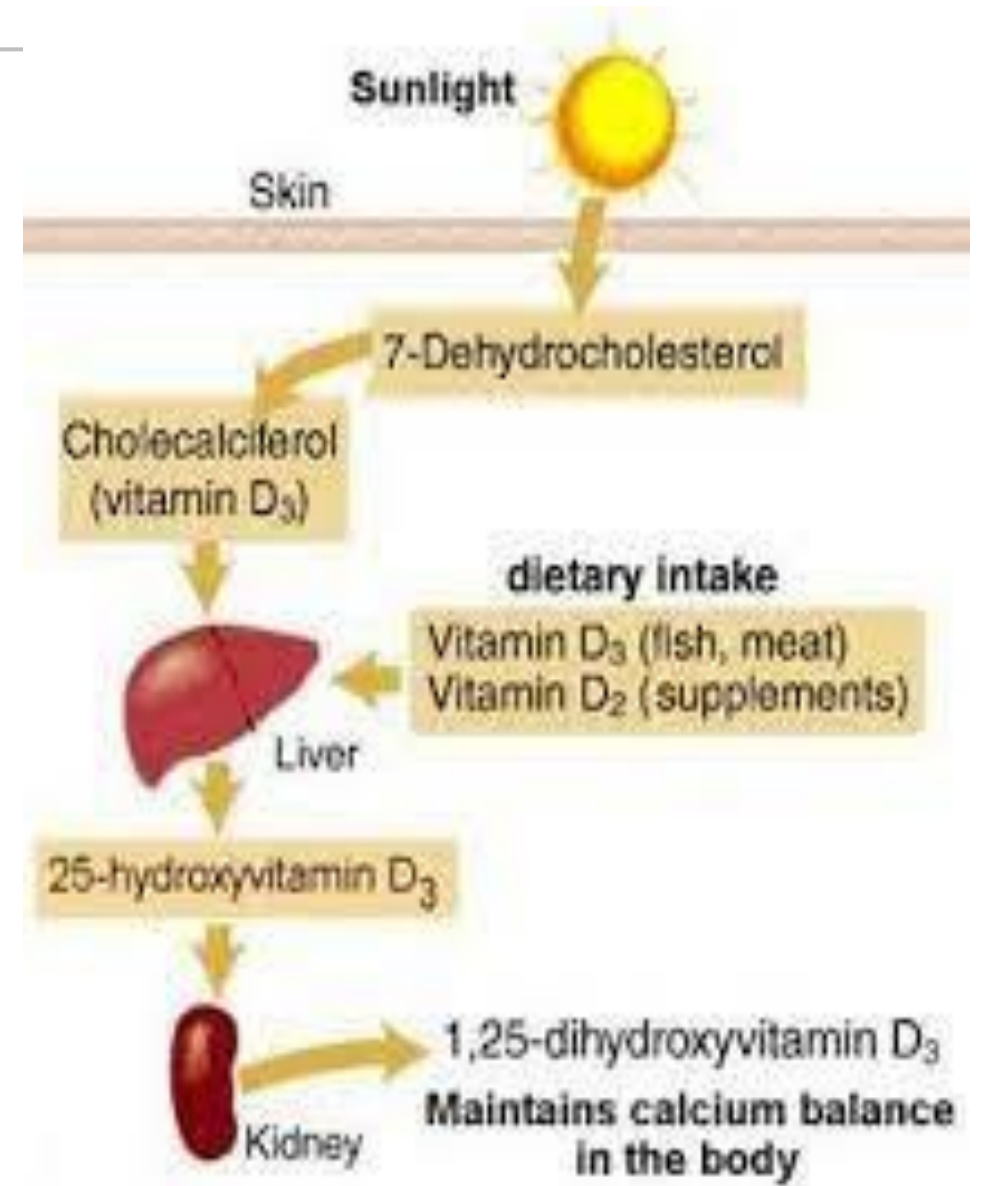
Vitamin D is especially important in calcium metabolism. It regulates calcium absorption in the intestine through calcium-binding protein. It manages mineralization such as calcium-phosphorus salt called hydroxyapatite in bones.

It regulates the calcium level in the blood by managing the amount of calcium that the kidneys excrete or return to the body.

Vitamin D is available in different forms. The most important of these are vitamins D-2 and D-3.

The provitamin (precursor) of vitamin D-2 is ergosterol, and that of vitamin D-3 is 7-dehydrocholesterol.

With sunlight, ergosterol is converted to vitamin D in plant tissues, and 7-dehydrocholesterol is converted to vitamin D in animal tissues.



Vitamin D has a hormone-like effect. Our body can produce this vitamin if we receive sufficient amounts of sunlight. Approximately 30 minutes a day of sunlight on the hands and face is sufficient for those with fair skin and 2 hours for those with darker skin.

Factors affecting cholecalciferol synthesis:

- Contact time with sunlight
- Incident angle of sunlight
- The amount of melanin in the skin
- Person's age

Symptoms of **rachitism** caused by its deficiency are:

- Soft bones that bend inward or outward (long bones in the legs are most affected).
- Cartilage grows more than necessary and tries to compensate for the lack of mineral substances in the bones.
- Since not enough calcium is taken in the formation of the skull, it is replaced by cartilage tissue. For this reason, disproportionate head development occurs in children.



VITAMIN D REQUIREMENT

- The requirement is met by staying in the sun for 30 minutes to 2 hours, depending on skin color.
- Adequate intake (AI)

Age:

0-50

5 μg

51-70

10 μg

> 70

15 μg

It is a vitamin that is highly resistant to various conditions in food processing and storage.

REQUIREMENT: The need for vitamin D increases with age. Because the body's ability to produce this vitamin decreases with age.

SOURCES:

Oily fish such as salmon and tuna
Liver and eggs



VITAMIN E (TOCOPHEROL)

Vitamin E, especially thanks to the double bonds in its structure, has antioxidant effects like vitamin C and beta-carotene and prevents fatty acids from oxidizing.

Although there are many tocopherols that show varying levels of vitamin E activity, α -tocopherol is the most common and also the most abundant in foods.

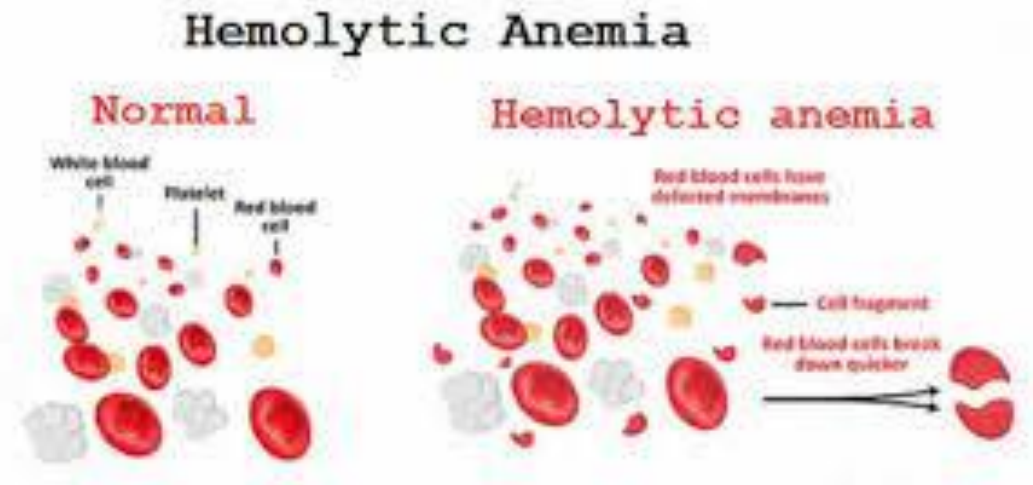


DEFICIENCY:

Vitamin E deficiency is actually rare. Since the residence time of this vitamin in the body is quite long, it may take approximately five to seven years for its deficiency to appear.

A type of anemia called hemolytic anemia occurs in vitamin E deficiency. As seen in the figure, red blood cells break down because their cell membranes weaken.

Long-term vitamin E deficiency is thought to cause age-related diseases such as cancer, heart disease and Alzheimer's disease. For example, due to weakened cell membranes, carcinogens can penetrate DNA more quickly and cause cancer.



REQUIREMENT:

The requirement for vitamin E depends on the intake of polyunsaturated fats. If a person consumes too much of these oils, the need for vitamin E increases.

The daily requirement of this vitamin is determined as 15 milligrams for men and women; However, this can increase up to 19 milligrams during lactation periods.

SOURCES:

- It is found in sufficient amounts in daily foods.
vegetable oils
Nuts
brown grains
wheat embryo
Avocado



VITAMIN K



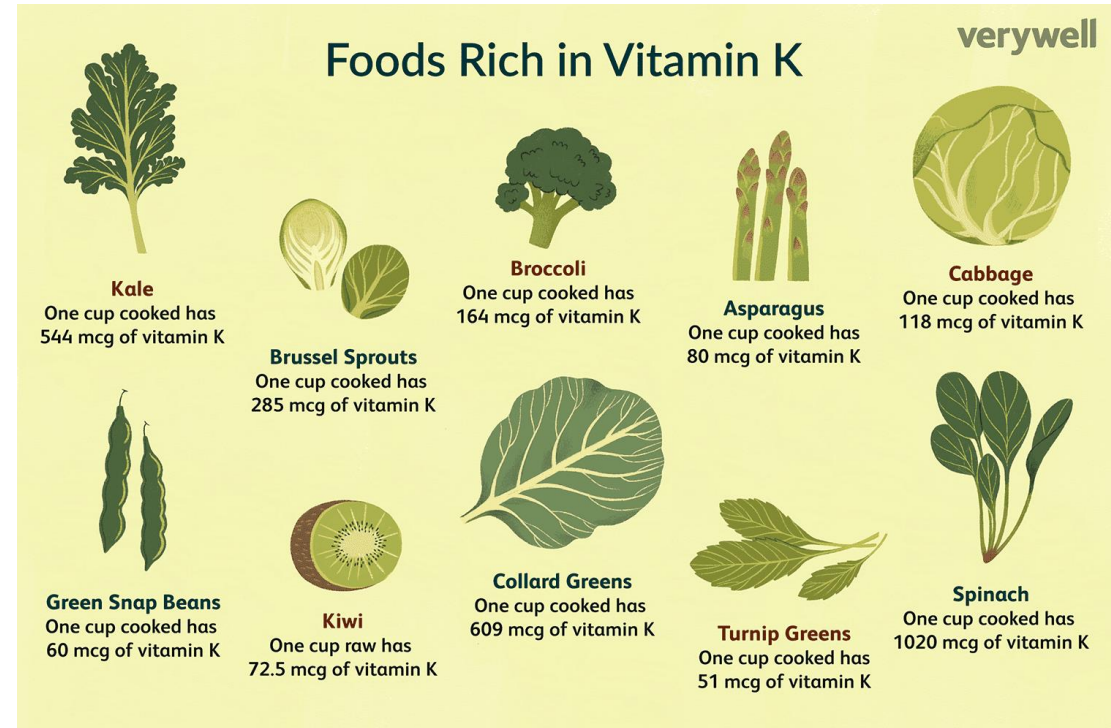
It has been found to be a blood clotting factor. 'coagulation vitamin'

DEFICIENCY:

The need for vitamin K is met through food and by microbial synthesis of bacteria present in the intestines. Since most of it is met by microbial synthesis, its daily intake through food is low.

Deficiency is seen in people who use antibiotics for a long time. While antibiotics kill harmful bacteria and fight infection, they also destroy the beneficial bacteria in our intestines that synthesize vitamin K.

The most important sources are dark green vegetables such as spinach, other vegetables such as cabbage, cauliflower, peas and some grains.



VITAMIN K DAILY INTAKE AMOUNT

Requirement:

Male

120 μg

Female

90 μg

1/2 of this amount is provided by green fibrous vegetables, 1/4 by bacteria in the intestines and 1/4 by vegetable oils and breakfast cereals.