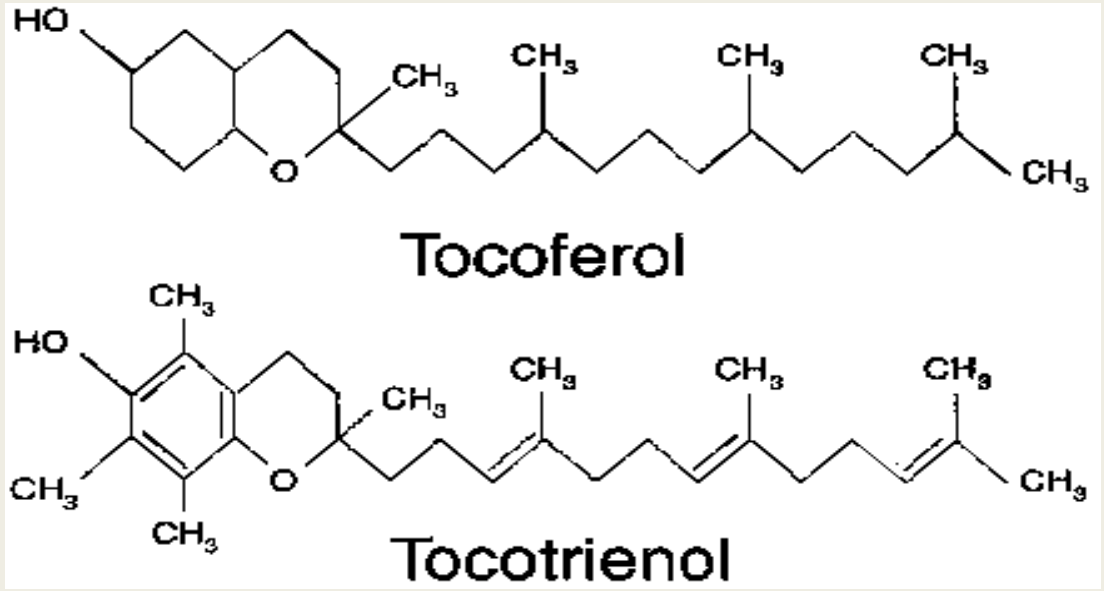
VITAMIN E

Vitamin E

- A fat-soluble vitamin which plays a role in the cell antioxidant defense system
- 8 isomers;
  - *α-, β-, γ-, δ- tocopherol*
  - *α-, β-, γ-, δ- tocotrienol*



Vitamin E

- Among these isomers only α-tocopherol is involved in human plasma and released to the circulation by liver cells.
- Present in phospholipid layer of the cell
- Daily need is generally supplied by diet.
- Main role of vitamin E is to protect the cell components such as polyunsaturated fatty acids, protein, DNA from oxidative damage.

Vitamin E

- Essential for the production of coenzyme Q_{10} and DNA synthesis
- Extends the life span of red blood cells
- Reduces clotting tendency
- Increases blood flow in the legs
- Shows anti-inflammatory effect by inhibiting the inflammatory activities of prostaglandins.

Main sources

- Unrefined vegetable oils (wheat germ oil, olive oil, sunflower oil etc.)
- Green leafy vegetables
- Cereals
- Nuts

- Medicinal preparations and dietary supplements generally include vitamin E in the form of α-tocopheryl acetate.

Vitamin E Deficiency

- *Abnormalities in dietary fat absorption or metabolism,*
- *Mutations in the tocopherol transfer protein causing impaired fat metabolism,*
- *Disrupted fat malabsorption as the small intestine requires fat to absorb vitamin E,*
- *Low birth-weight,*
- *Some genetic disorder causing irregularities in lipoprotein production,*
- *Cystic fibrosis, chronic cholestatic hepatobiliary disease, short-bowel syndrome, Crohn's disease, exocrine pancreatic insufficiency, and liver disease*

…can lead to vitamin E deficiency.

* Kemnic, T.R., Coleman, M. Treasure Island (FL): StatPearls Publishing; 2019

Vitamin E Deficiency

- Cellular structure is destroyed.
- Cardiac myopathy, neuropathy, liver necrosis, disorders in the muscles and neurological system
- The initial symptoms;
  - *infiltration of enzymes such as creatine kinase and pyruvate kinase into the plasma,*
  - *infiltration of lipid peroxidation products into the plasma,*
  - *increased erythrocyte hemolysis.*

Use of Vitamin E

- It is reported that intake at the daily dose of 400-800 IU reduced the risk of the development some cancer types such as lung, esophagus and colon cancer.
- It is recommended at a dose of 800-1200 IU to control blood-glucose level in patients with diabetes.
- Its use against Alzheimer disease and dementia due to antioxidant activity and its effect to increase blood circulation in the brain is reported.
- Reduces the risk of cataract and macular degeneration by 55-60% at the dose of 400 IU

Use of Vitamin E

- Symptoms of premenstrual syndrome and fibrocystic breast pain are treated with the dose of 400-1200 IU.
- It is recommended against leg pain due to poor blood circulation at the dose of 600-1200 IU.
- Uses of vitamin E as neuroprotective, anti-HIV, anti-atherogenic are reported due to its antioxidant activity.
- Anticoagulant activity due to inhibition of platelet aggregation and thrombin production.

Interactions & Cautions

- Oral anticoagulants
- Anticonvulsants

- Vitamin E supplementation should be discontinued 1 month before surgical operations.

Toxicity

- Vitamin E toxicity is rarely seen.
- Vitamin E supplement contain 100-200 mg vitamin E.
- Prooxidant activity as a toxic effect is encountered at the dose of 1000 mg/day.