Vitamin E Tocopherols

Tocopherols are yellowish fats; insoluble in water, soluble in oil; they are sensitive to oxidation; withstand oxygen-free heat up to 200 ° C; They are destroyed by UV light.

α-tocopherol is the most widely distributed in nature as a vitamin and having the greatest biological activity

Significant amounts are found in all green tissues, but mostly in seeds

Ester form prevents the oxidation of vitamin E and extends shelf life. These esters are easily hydrolyzed in the intestine and absorbed in free form, except for individuals with absorption disorder syndrome

α-tocopheryl phosphate, a phosphorylated form of α-tocopherol, is found naturally in food and animal tissues, as well as in human tissues, as a messenger for the regulation of gene expression by transport molecule, transport form and signal transduction

The main vitamin E analogue in

olive oil and sunflower oil is α-tocopherol
Corn oils are mainly y-tocopheryl and
soybean oils are relatively high contain δ-tocopherol

Tokotrienols are the major components of vitamin E in palm oil, with significant amounts of oat and rice bran

VITAMIN E ABSORPTION

All forms of vitamin E are absorbed by the intestinal cells after dieting and released into the circulation in chylomicrons. Vitamins reach the liver through chylomicron residues.

The α-tocopherol transfer protein, which is a specific protein in the liver, selectively targets α-tocopherol and it carries into very low density lipoproteins

α-tocopherol is probably synthesized in mevalonic acid in plants; cereal seed germinating is rich in tocopherol

Tocopherols are taken with nutrients from lipids as fat-soluble vitamins. α-tocopherol is easily absorbed from the small intestine; possibly in chylomicrons, and into the peripheral tissues of the liver. Mitochondrial phospholipids, endoplasmic reticulum and plasma membrane have specific affinity for α-tocopherol; vitamin E is stored here as a concentrate

Vitamin E has at least two metabolic roles; To act as the most powerful oil-soluble antioxidant in nature and play a specific but not fully understood role in the metabolism of selenium

Selenium is essential for the normal pancreatic function and the digestion and absorption of lipids, including vitamin E; glutathione as a component of peroxidase helps to destroy peroxides and thus reduces peroxidation of polyunsaturated fatty acids of lipid membranes; helps keep vitamin E in plasma lipoproteins…

ANTIOXIDANT EFFECTS OF VITAMIN E

Vitamin E protects vitamin A, carotenes, unsaturated fatty acids and thiol groups against oxidation. Vitamin E is the first line of defense against the peroxidation of polyunsaturated fatty acids found in cellular and subcellular membrane phospholipids.

Tocopherols exhibit an antioxidant behavior by breaking free radical chain reactions as a result of their ability to transfer a phenolic hydrogen to a free peroxide radical in a peroxidized polyaridated fatty acid.

ANTIOXIDANT EFFECTS OF VITAMIN E

Vitamin E, is a major oil-soluble antioxidant, It also reduces tissue pathology due to iron accumulation as an important component of protection against synthesis and accumulation

Vitamin E reacts with peroxyl radicals produced from membrane phospholipids or polyunsaturated fatty acids present in lipoproteins to give a stable lipid hydroperoxide. Vitamin E effectively reduces harmful lipid free radicals through this biochemical reaction, thus protecting the tissues from free radical attack

The most important role of vitamin E is that the membranes of the cells and intracellular organelles are a chain-breaking antioxidant and free radical scavenger in the lipid phase

This antioxidant activity of vitamin E in preventing lipid peroxidation, increases immune response

Tokotrienols

Tokotrienols have a higher antioxidant activity than the tocopherols in the membranes. In addition, they have anticancer and cholesterol-lowering properties

Oxidative stress and vitamin E

Oxidative stress consists of either excessive production of free radicals or insufficient supply of antioxidants or a combination of both. When free radicals crosses the body's antioxidant defense capacity, oxidative stress occurs. Oxidative stress can affect health both directly and indirectly when reactive oxygen metabolites are not effectively and reliably eliminated. Oxidative stress contributes to suppress immune suppression

Oxidative stress is responsible for the onset and development of various diseases and aging

Oxidative stress and vitamin E

Overproduction of reactive oxygen species is thought to be a factor causing apoptosis. Inhibition of production of reactive oxygen species by vitamin E may delay this process. Whether the cell is cancerous or the identity of the oxidative stress maker may alter the cellular response of α-tocopherol in some cases, resulting in apoptosis

If oxidative stress increases, an antioxidant such as α-tocopherol should reduce the activity of the protease, protein kinase C and cytosolic phospholipase A2 enzymes associated with the cell membrane

Other antioxidants and their relationship with vitamin E

Normally the body is protected by a wide range of antioxidant systems that work together…

Antioxidants protect lipits on cells and cell membranes from peroxidation damage and regulate the biosynthesis of important cell regulators, prostaglandins, thromboxanes and leukotrienes

Peroxidative chain reactions induced by reactive species escaping enzymatic degradation are eliminated by chain-breaking antioxidants such as water-soluble ascorbate, glutathione and urate as well as oil-soluble vitamin E, ubiquinone and β-carotene

Other antioxidants and their relationship with vitamin E

Vitamin E and glutathione peroxidase are antioxidants that protect phagocytic cells and surrounding tissues from oxidative attack by free radicals produced by respiration of neutrophils and macrophages during phagocytosis

Antioxidant vitamins such as vitamins E and C act to eliminate single oxygen and prevent the formation of free radicals

Vitamin E supplements to diet may reduce the measurement of lipid peroxidation in individuals with oxidative stress.

Vitamin E and other antioxidants increase the proliferation, orientation and bacterial killing of polymorphonuclear leukocytes. Vitamin E as an antioxidant protects polymorphonuclear leukocytes from peroxidative damage, but overdose may reduce the ability of polymorphonuclear leukocytes to kill harmful cells, such as intracellular bacteria or cancer cells, due to reduced peroxidative damage to bacteria phagocytosed by hydrogen peroxide

Focus has been given to dietary supplements as potential anticancer drugs. Thus, agents present in the diet are, generally, nontoxic, so that they may be selective antineoplastic agents, depending on their activities. Of dietary components, vitamin E (VE) has been studied because it is capable of scavenging reactive oxygen species (ROS) that have been implicated in tumorigenesis.

Great interest has been given to the potential use of VE as anticancer drugs. This is rather logical, since VE and other redox-active micronutrients are ingested regularly and their dose can be increased by food fortification. They may be beneficial since they do not exert deleterious effects.

In Literature

α-Tocopherol, selenium, and β-carotene, showed a 13% reduced incidence of cancer and 50% reduced mortality from stomach cancer

Alpha-Tocopherol, Beta-Carotene Cancer Prevention (ATBC) trial, smokers who took α-TOH supplements had a 32% lower incidence of prostate cancer and 41% lower mortality from prostate cancer than the unsupplemented subjects.

Higher serum α-TOH was associated with lower lung cancer risk, in particular among those with less cigarette smoke exposure.

VE analogs

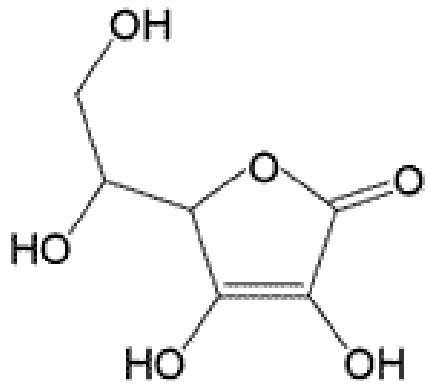
VE analogs induce apoptosis selectively in malignant cells and inhibit tumor growth in experimental models;
(2) they overcome resistance to established anticancer drugs due to bypassing mutations in or deletions of critical genes;
(3) they synergize with anticancer agents and/or sensitize resistant cells toward them;
(4) they cause apoptosis in proliferating endothelial cells, suggesting their antiangiogenic activity;
(5) they are metabolized into the redox-active VE with secondary beneficial bioactivity.

Foods With Vitamin E

Wheat Germ Oil
Sunflower Seeds
Almonds
Hazelnuts
Spinach
Avocado
Butternut Squash
Pine Nuts
Mustard Greens
Turnip Greens
Swiss Chard

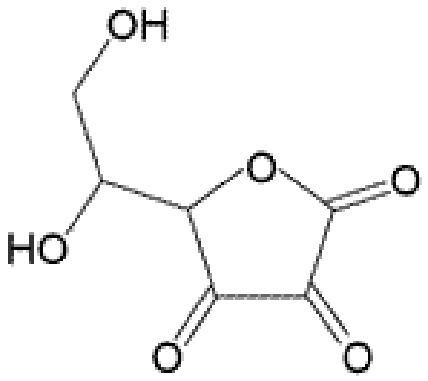
Palm Oil
Peanuts
Olive Oil
Broccoli
Parsley
Papaya
Olives
Mango
Kale
Sweet Patato
Tomatoes

Vitamin C



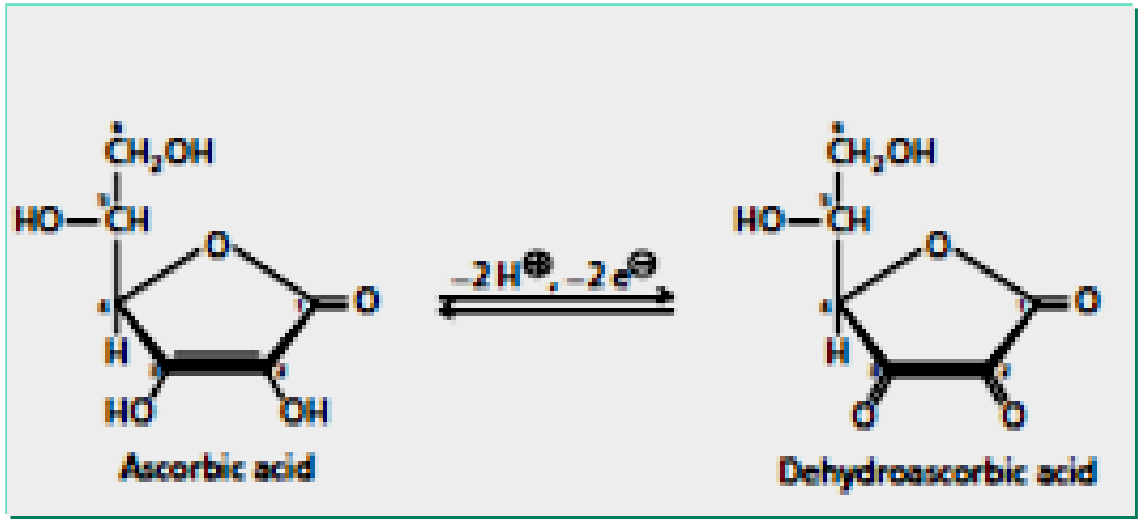
ascorbate

L-Askorbat



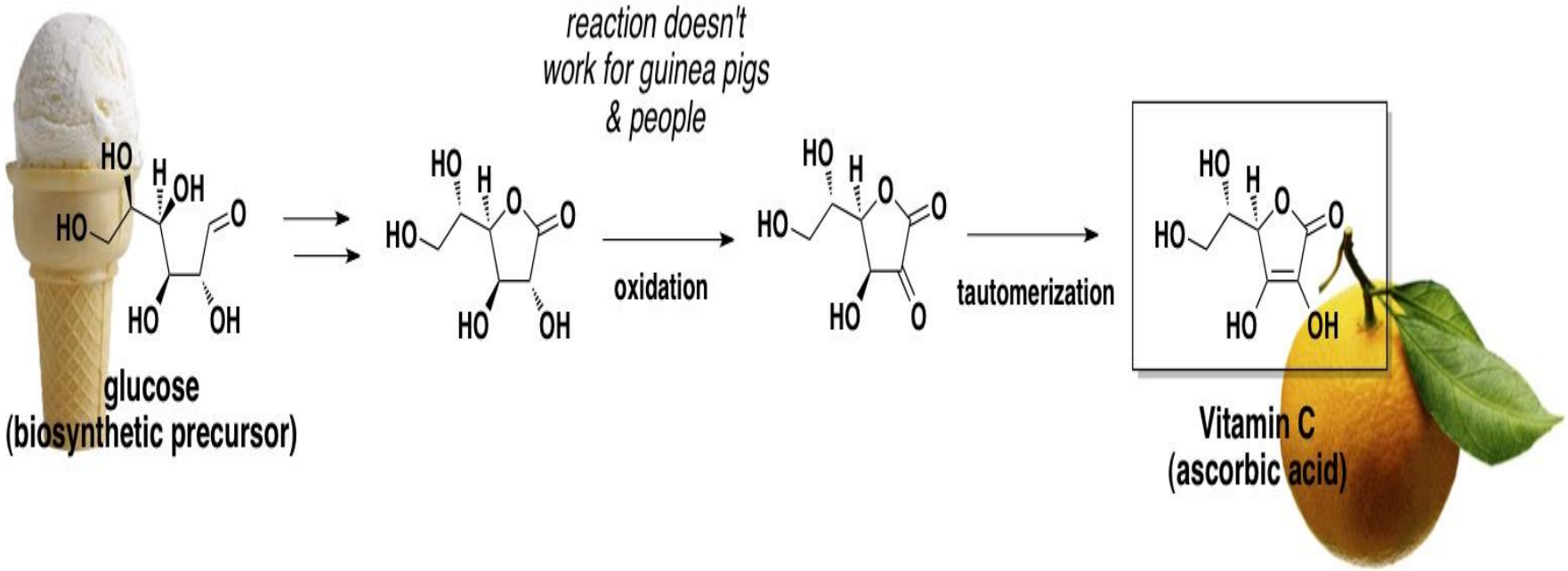
dehydroascorbate

L-Dehidroaskorbat



L-Dehydroascorbate is considered equivalent to the fact that it converts easily into ascorbic acid in the body

Starting molecule



Ascorbic acid is essential in humans and other primates and in guinea pigs; All other animals and plants examined are synthesized from D-glucose by glucuronic acid.

Ascorbic acid in the liver in mammals; In birds, frogs and reptiles, they are synthesized in the kidneys. Microorganisms do not require and synthesize ascorbic acid.

Broccoli and potatoes also contain high levels of vitamin C

Because vitamin C disrupts contact with air, it is important to consume fresh dishes fairly quickly….

Askorbic asid (Vit C)

Functions: Collagen synthesis, antioxidant, amino acid metabolism.

Deficiency Diseases: Scurvy.

Symptoms: Anemia, bleeding gums, weakness, muscle pain, slow healing.

Toxicity: Headache, rashes

Average RDA: 160 mg/day

Sources: Citrus fruits, vegetables and fruits.

The main function of vitamin C is the production of collagen
is the basic structure protein in the human body.
construction.

Vitamin C binds to the amino acid of proline
and causes hydroxyproline formation.

As a result, collagen becomes more resistant

Collagen in our body is a very important
structure to hold together such as connective
tissue, cartilage tissue, tendon

therefore vitamin C is very important in wound
healing and healthy gum formation

In addition, vitamin C has a very important role in immune function, in the production of transmitters and hormones in nerve tissue, carnitine synthesis and in the absorption and use of other nutritional values

ANTIOXIDANT EFFECT

In addition, vitamin C is an important antioxidant.

Provides first-line antioxidant protection of the body

its antioxidant aids fat-soluble vitamin E and carotenes. Vitamin C also includes glutathione peroxidase, catalase, superoxide dismutase antioxidant enzymes….

Vitamin C recovers oxidized vitamin E and thus It increases the antioxidant effects of vitamin E.

ANTIOXIDANT EFFECT

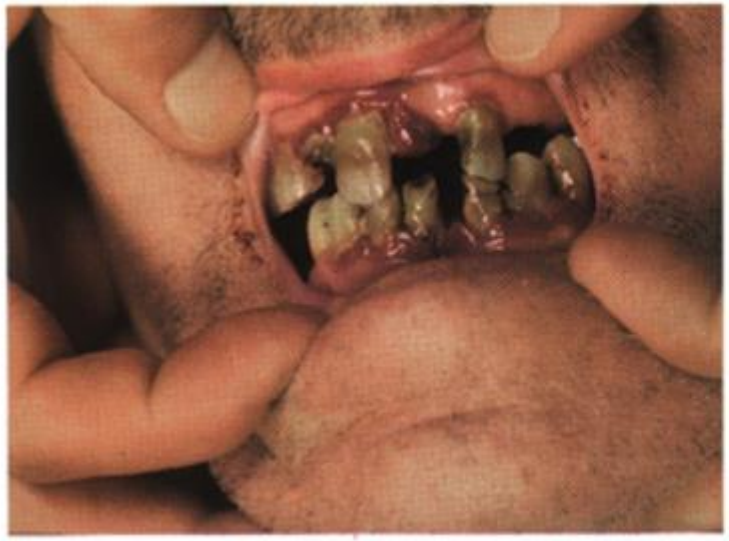
Together with vitamin E and vitamin C, glutathione has an important role in combating free radicals. Glutathione synthesis in genetically defective cases, cellular damage is seen. Most erythrocytes, leukocytes and nerve cells are affected. Antioxidants such as glutathione, vitamin E, vitamin C, N-acetyl Cysteine NAC) are used to increase the body's antioxidant activity in patients with impaired glutathione synthesis.

People who took vitamin C had four times the amount of glutathione in white blood cells and an eight fold increase in plasma glutathione level.

IMMUN FUNCTION

Vitamin C increases interferon level and activity by enhancing leukocyte functions. The number of antibodies increases and their response. Vitamin c affects the immune system by increasing the production of thymus hormones.

-Asthma
- Hypertension
- Atherosclerosis
Autoimmune diseases
- Infections
- Cancer
- - Infertility
- Candida infection
- - Macular degeneration
- Capillary fragility
- - Menopause
- Cataract
- - Mitral valve prolapse
- Cervical dysplasia
-Gingivitis
- Skin ulcers
- Glaucoma
- Sports injuries
- Multiple sclerosis
- Krohn's disease
- - Osteoarthritis
- Colds
- - Parkinson's disease
- Kroner artery disease
- - Periodontal disease
- Diabetes
- - Peptic ulcer
- Eczema
- - Peripheral vascular disease
- Gallbladder disease
- - Preeclampsia
- Fatigue
- - Rheumatoid arthritis
- Hepatitis
- - Wound healing



Scurvy;
Easy Damaged Collagen
Wound Healing Difficult
Easy Opening Wounds
Bleeding Gums
Skin Bleeding
Bone Structure Abnormal
Anemia (İron And Folate Absorption)
Hypercholesterolemia

CANCER PROTECTION

Vitamin C works as an antioxidant and preserves cellular elements such as DNA It acts as a protective against cancer. Vitamin C also helps to prevent environmental contamination and chemical poisoning, strengthen the immune system and prevent the formation of cancer-causing compounds in the body

Vitamin C reportedly exerts substantial cancer chemopreventive effects mainly due to its strong antioxidant activities against DNA damage. This antioxidant has also been used as a dietary supplement to prevent oxidative stress–mediated chronic diseases such as cancer, cardiovascular disease, hypertension, stroke, neurodegenerative disorders, and aging.

The elimination or minimization of exposure to diverse environmental carcinogens is one strategy for preventing the majority of human cancers, but the complete avoidance of exposure to etiologic factors that can induce the initiation of cancer may be unrealistic. Since tumor promotion is closely linked to oxidative and inflammatory processes and is a relatively long-term and reversible process, it can be efficiently reversed and suppressed by vitamin C.

A recent theory on epigenetics suggests that greater attention must be paid to multistage carcinogenesis that does not involve DNA damage. Cancer prevention strategies that involve intervention at the tumor-promotion stage (a reversible and long-term process) are more practical than those intervening at the tumor-initiation stage (an irreversible and short-term process). The chemopreventive effects of vitamin C appear to be related to antipromoting or antiprogressive activities such as antiinflammatory activity, enhancement of cell-to-cell communication, and antiangiogenetic properties as well as antioxidant activity