Journal of Pharmacreations

PharmaCreations

ISSN: 2348-6295

Pharmacreations | Vol.8 | Issue 2 | Apr - Jun- 2021

Journal Home page: www.pharmacreations.com

Research article Open Access

Lycoten capsule : a multiple nutrient antioxidant, anti-microbial, anti-inflammatory protection with anti-aging benefits.

Govind Shukla, C. Subrahmanyam, Akanksha Sonal Khess, C.J Sampath Kumar.

Lactonova Nutripharm (P) Ltd, Makers of LYCOTEN Capsules
81/3, IDA Mallapur, Hyderabad, Telangana, India-500 076.

ABSTRACT

An **antioxidant** is a molecule capable of inhibiting the oxidation of other molecules
Oxidation is a chemical reaction that transfers electrons from a substance to anoxidizing agent , Oxidation reactions can produce free radicals. In turn, these radicals can start chain reactions
Antioxidants terminate the chain reactions by removing free radical intermediates, and inhibit other oxidation reactions. They do this by being oxidized themselves, so antioxidants are often called as reducing agents such as thiols, ascorbic acid or polyphenols.
Antioxidants are widely used as ingredients in dietary supplements and have been investigated for the prevention of diseases such as cancer, coronary heart disease and even altitude sickness.
Antioxidants are our first line of defense against free radical damage, and are critical for maintaining optimum health and wellbeing. The need for antioxidants becomes even more critical with increased exposure to free radicals. Pollution, cigarette smoke, drugs, illness, stress, and even exercise can increase free radical exposure. Because so many factors can contribute to oxidative stress, individual assessment of susceptibility becomes important. Many experts believe that the Recommended Dietary Allowance (RDA) for specific antioxidants may be inadequate and, in some instances, the need may be several times the RDA. As part of a healthy lifestyle and a well-balanced, wholesome diet, antioxidant supplementation is now being recognized as an important means of improving free radical protection. Damage to cells caused by free radicals is believed to play a central role in the aging process and in disease progression. The present paper Reviews the Role of LYCOTEN in maintaining optimum health and wellbeing.

INTRODUCTION

To protect the cells and organ systems of the body against reactive oxygen species, humans have evolved a highly sophisticated and complex antioxidant protection system. It involves a variety of components, both endogenous and exogenous in origin, that function interactively and synergistically to neutralize free radicals.
These components include:
• Nutrient-derived antioxidants like ascorbic acid (vitamin C), tocopherols and tocotrienols (vitamin E), carotenoids, and other low molecular weight compounds such as glutathione and lipoic acid.
• Antioxidant enzymes, e.g., superoxide dismutase, glutathione peroxidase, and glutathione reductase, which catalyze free radical quenching reactions.
• Metal binding proteins, such as ferritin, lactoferrin, albumin, and ceruloplasmin that sequester free iron and copper ions that are capable of catalyzing oxidative reactions.
• Numerous other antioxidant phytonutrients present in a wide variety of plant foods

Fig 1: Natural antioxidants in body

TABLE I: VARIOUS ROS AND CORRESPONDING NEUTRALIZINGANTIOXIDANTS

ROS	NEUTRALIZINGANTIOXIDANTS
Hydroxyl radical	Vitamin C, glutathione, flavonoids, lipoic acid
Superoxide radical	Vitamin C, glutathione, flavonoids, SOD
Hydrogen peroxide	Vitamin C, glutathione, beta carotene, vitamin E, CoQ10, flavonoids, lipoic acid
Lipid peroxides	Beta carotene, vitamin E, ubiquinone, flavonoids, glutathione peroxidas

DIETARY ANTIOXIDANTS

Vitamin C, vitamin E, and beta carotene are among the most widely studied dietary antioxidants. Vitamin C is considered the most important water-soluble antioxidant in extracellular fluids. It is capable of neutralizing ROS in the aqueous phase before lipid peroxidation is initiated. Vitamin E, a major lipid-soluble antioxidant, is the most effective chain-breaking antioxidant within the cell membrane where it protects membrane fatty acids from lipid peroxidation. Vitamin C has been cited as being capable of regenerating vitamin E.

Beta carotene and other carotenoids are also believed to provide antioxidant protection to lipid-rich tissues. Research suggests beta carotene may work synergistically with vitamin E.

A diet that is excessively low in fat may negatively affect beta carotene and vitamin E absorption, as well as other fat-soluble nutrients. Fruits and vegetables are major sources of vitamin C and carotenoids, while whole grains and high quality, properly extracted and protected vegetable oils are major sources of vitamin E.

PHYTONUTRIENTS

A number of other dietary antioxidant substances exist beyond the traditional vitamins discussed above. Many plant-derived substances, collectively termed "phytonutrients," or "phytochemicals," are becoming increasingly known for their antioxidant activity. Phenolic compounds such as flavonoids are ubiquitous within the plant kingdom: approximately 3,000 flavonoid substances have been described in Natural Antioxidants in Human Health and Disease. ed. Frei, B. Academic Press: San Diego, 1994.

In plants, flavonoids serve as protectors against a wide variety of environmental stresses while, in humans, flavonoids appear to function as "biological response modifiers."

Flavonoids have been demonstrated to have anti-inflammatory, antiallergenic, anti-viral, anti-aging, and anti-carcinogenic activity.

The broad therapeutic effects of flavonoids can be largely attributed to their antioxidant properties. In addition to an antioxidant effect, flavonoid compounds may exert protection against heart disease through the inhibition of cyclooxygenase and lipoxygenase activities in platelets and macrophages.

ENDOGENOUS ANTIOXIDANTS

In addition to dietary antioxidants, the body relies on several endogenous defense mechanisms to help protect against free radical-induced cell damage. The antioxidant enzymes – glutathione peroxidase, catalase, and superoxide dismutase (SOD) – metabolize oxidative toxic intermediates and require micronutrient cofactors such as selenium, iron, copper, zinc, and manganese for optimum catalytic activity. It has been suggested that an inadequate dietary intake of these trace minerals may compromise the effectiveness of these antioxidant defense mechanisms. Research indicates that consumption and absorption of these important trace minerals may decrease with aging .Intensive agricultural methods have also resulted in significant depletion of these valuable trace minerals in our soils and the foods grown in them. Glutathione, an important water-soluble antioxidant, is synthesized from the amino acids glycine, glutamate, and cysteine. Glutathione directly quenches ROS such as lipid peroxides, and also plays a major role in xenobiotic metabolism. Exposure of the liver to xenobiotic substances induces oxidative reactions through the up regulation of

detoxification enzymes, i.e., cytochrome P-450 mixed-function oxidize. When an individual is exposed to high levels of xenobiotics, more glutathione is utilized for conjugation (a key step in the body's detoxification process) making it less available to serve as an antioxidant. Research suggests that glutathione and vitamin C work interactively to quench free radicals and that they have a sparing effect upon each other. Lipoic acid, yet another important endogenous antioxidant, categorized as a "thiol" or "biothiol," is a sulfur-containing molecule that is known for its involvement in the reaction that catalyzes the oxidative decarboxylation of alpha-keto acids, such as pyruvate and alphaketoglutarate, in the Krebs cycle. Lipoic acid and its reduced form, dihydrolipoic acid (DHLA), are capable of quenching free radicals in both lipid and aqueous domains and as such has been called a "universal antioxidant." Lipoic acid may also exert its antioxidant effect by chelating with pro-oxidant metals. Research further suggests that lipoic acid has a sparing effect on other antioxidants. Animal studies have demonstrated supplemental lipoic acid to protect against the symptoms of vitamin E or vitamin C deficiency.

Additional physiological antioxidants are listed in Table II.

TABLE II:ANTIOXIDANT PROTECTION SYSTEM

Endogenous Antioxidants

• Bilirubin
• Thiols, e.g., glutathione, lipoic acid, N-acetyl cysteine
• NADPH and NADH
• Ubiquinone (coenzyme Q10)
• Uric acid
• Enzymes:
– copper/zinc and manganese-dependent superoxide dismutase (SOD)
– iron-dependent catalase
– selenium-dependent glutathione peroxidase

Dietary Antioxidants

• Vitamin C
• Vitamin E
• Beta carotene and other carotenoids and oxycarotenoids, e.g., lycopene and lutein
• Polyphenols, e.g., flavonoids, flavones, flavonols, and proanthocyanidins

Metal Binding Proteins

• Albumin (copper)
• Ceruloplasmin (copper)
• Metallothionein (copper)
• Ferritin (iron)
• Myoglobin (iron)
• Transferrin (iron)

OXIDATIVE STRESS

As remarkable as our antioxidant defense system is, it may not always be adequate. The term "oxidative stress" has been coined to represent a shift towards the pro-oxidants in the pro-oxidant/antioxidant balance that can occur as a result of an increase in oxidative metabolism. Increased oxidative stress at the cellular level can come about as a consequence of many factors, including exposure to alcohol, medications, trauma, cold, infections, poor diet, toxins, radiation, or strenuous physical activity. Protection against all of these processes is dependent upon the adequacy of various antioxidant substances that are derived either directly or indirectly from the diet. Consequently, an inadequate intake of antioxidant nutrients may compromise antioxidant potential, thus compounding overall oxidative stress.

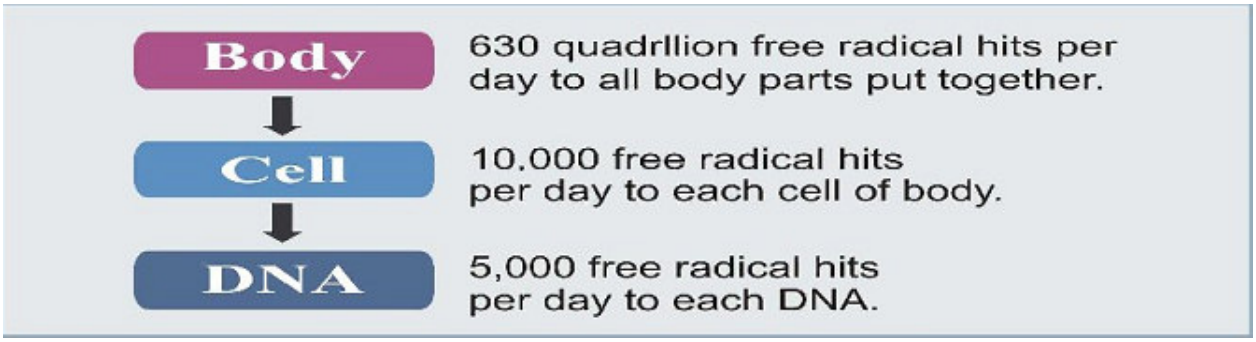


Fig 2: Free radical damage to body, cell & DNA

OXIDATIVE STRESS AND HUMAN DISEASE

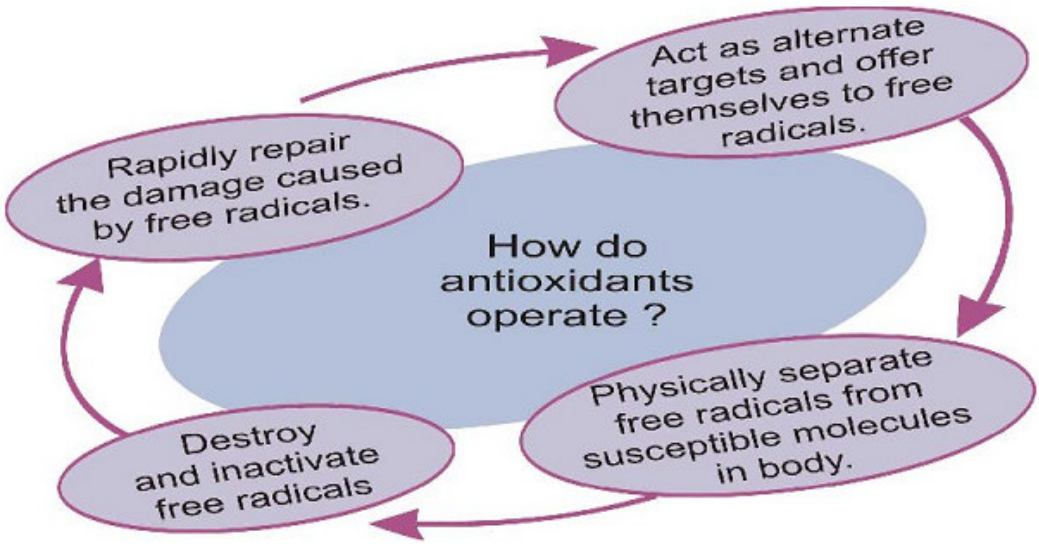
Oxidative damage to DNA, proteins, and other macromolecules has been implicated in the pathogenesis of a wide variety of diseases, most notably heart disease and cancer.

A growing body of animal and epidemiological studies as well as clinical intervention trials suggests that antioxidants may play a pivotal role in preventing or slowing the progression of both heart disease and some forms of cancer.

TABLE III: CONDITIONS ASSOCIATED WITH OXIDATIVE DAMAGE

- Atherosclerosis
- Cancer
- Pulmonary dysfunction
- Cataracts
- Arthritis and inflammatory diseases
- Diabetes
- Shock, trauma, and ischemia
- Renal disease and hemodialysis
- Multiple sclerosis
- Pancreatitis
- Inflammatory bowel disease and colitis
- Parkinson's disease
- Neonatal lipoprotein oxidation
- Drug reactions
- Skin lesion & Aging

Role of LYCOTENCAPSULES in Preventing Oxidative Damage caused by free radicals.



LYCOTEN,A MULTIPLE NUTRIENT ANTIOXIDANT,ANTI-MICROBIAL,ANTI-INFLAMMATORY PROTECTION WITH ANTI-AGING BENEFITS.

LYCOTEN,A multiple nutrient Antioxidant, Antimicrobial, Antiinflammatory protection with Antiaging benefits is a unique formulation consisting of Lycopene 5mg oleoresin embedded in 9mg of Lactoproteins (whey).Lactoproteins work as carriers resulting in reduction of crystal size from 5µM to <500nm in lycopro complex. this makes LYCOTEN30% more bioavailable.

Composition of LYCOTEN capsule

Each Film coated Tablet Contains: (approx)
Lycopene 10%-50 mg
Lactoproteins -9 mg
Vitamin A- 20mg
Vitamin E(as Tocopherol Acetate)-10 I.U.
Zinc Methionine: 15 mg
L-Selenomethionine-60 mcg

Role of lycoten capsules in preventing cardiovascular disorders

Heart disease is the leading cause of death . It is estimated that one in three person will eventually die from this disease. While several factors, such as high cholesterol levels, hypertension, cigarette smoking, and diabetes, are believed to promote atherosclerosis, a growing body of evidence suggests a critical step in its development is the oxidation of low-density lipoprotein (LDL) within the arterial wall. This theory is supported by several epidemiological studies which link in low intakes of dietary antioxidants to an increased frequency of heart disease. Additionally, an inverse relationship between heart disease and plasma antioxidant levels has been reported.

Antioxidants in LYCOTEN have been shown to prevent LDL oxidation in vitro and retard the progression of atherosclerosis in animal models. Several human studies found supplemental vitamin E increased vitamin E levels in LDL, increased the resistance of LDL oxidation, and decreased the rate of LDL oxidation. It has been estimated that dietary increases in antioxidant vitamins may reduce the risk of heart disease by 20-30%.

Role of lycoten capsules in preventing cancer

Cancer is the second leading cause of death all over the world. It is estimated that diet may account for as much as 35% of all human cancers. Epidemiological evidence consistently relates low antioxidant intake or low blood levels of antioxidants with increased cancer risk. In fact, low dietary intake of fruits and vegetables doubles the risk of most types of cancers.*(Natural Antioxidants in Human Health and Disease, San Diego 1994)*

Oxidants are capable of stimulating cell division, which is a critical factor in mutagenesis. When a cell with a damaged DNA strand divides, cell metabolism and duplication becomes deranged.

Thus, a mutation can arise which in turn is an important factor in carcinogenesis. It is believed that antioxidants exert their protective effect by decreasing oxidative damage to DNA and by decreasing abnormal increases in cell division. Both cigarette smoking and chronic inflammation–two of the major causes of cancer–have strong free radical components in their mechanisms of action. Some research has indicated that people who smoke tend to have lower antioxidant levels than nonsmokers and are at an increased risk for both cancer and cardiovascular disease. Well over 100 studies have reported that reduction in cancer risk is associated with a diet high in vitamin C in LYCOTEN.(Epidemiologic Studies. ch 6, p 157-197.) As mentioned earlier, the amount of fruits and vegetables included in the diet appears to have a significant impact on cancer risk. Although antioxidant activity in LYCOTEN is believed to be responsible for much of the protection against tumorgenesis, additional anticancer activities have been observed from several plant-derived substances. Sulfur containing phytochemicals, such as the allyl sulfides found in the allium family (garlic, onions, and leeks), and isothyocyanates and sulphoraphane (cabbage, broccoli, and cauliflower) have been shown to inhibit various steps in tumor development in animal and in vitro studies. Indoles, also found in cruciferous vegetables, and terpenes, natural constituents of citrus oils, may also be protective.(Milner, J.A., Reducing the Risk of Cancer. ch 3, p 39-70.)

Role of lycoten capsules in preventing pulmonary disorders

Because of its large surface area, the respiratory tract is a major target for free radical insult, not to mention the fact that air pollution is a major source of ROS. Recent studies suggest that free radicals may be involved in the development of pulmonary disorders such as asthma. Cellular damage caused by free radicals is thought to be partly responsible for the bronchial inflammation characteristic of this disease. It has been suggested that increasing antioxidant intake may help to reduce oxidant stress and help to prevent or minimize the development of asthmatic symptoms.

(*J Am Coll Nutr* 1995;14(4):317-324)

Vitamin C, vitamin E, and beta carotene supplementation in LYCOTEN has been associated with improved pulmonary function. Some evidence suggests glutathione, or possibly N-acetyl cysteine, which is a precursor to glutathione, may be helpful in protecting against pulmonary damage as well.

Other major pathologies that may involve free radicals include neurological disorders and cataracts. Neural tissue may be particularly susceptible to oxidative damage because it receives a disproportionately large percentage of oxygen and it has a high concentration of polyunsaturated fatty acids which are highly prone to oxidation.(Natural Antioxidants in Human Health and Disease. ed. Frei, B. Academic Press: San Diego, 1994.)

Formation of cataracts is believed to involve damage to lens protein by free radicals, causing the lens to lose its transparency. Some evidence suggests that cataract progression might be slowed with regular consumption of supplemental antioxidants, in particular vitamin E, vitamin C, and the carotenoids in LYCOTEN. It is estimated that if cataract development were delayed by 10 years as a result of increased antioxidant protection, the number of cataract surgeries performed in the U.S. would decrease by more than half.(*J Am Coll Nutr* 1993;12(2):138-146.)

Role of lycoten capsules in preventing *diabetes*

Data from phase I of the Third National Health and Nutrition Examination Survey (1988- 1991) were used to examine concentrations of lycopene and other carotenoids in 40- to 74-yearold persons with normal glucose tolerance (n =1,010), impaired glucose tolerance (n = 277), newly diagnosed diabetes (n = 148), and previously diagnosed diabetes (n = 230), based on World Health Organization criteria. After adjustment for age, sex, race, education, serum cotinine (a metabolic byproduct of nicotine), serum cholesterol, body mass index, physical activity, alcohol consumption, vitamin use, and carotene and energy intake, lycopene was inversely related to fasting serum insulin after adjustment for confounders ($p<0.05$). These data suggest a possible role for lycopene in the pathogenesis of insulin resistance and diabetes. A study investigated the relationship between hyperglycemia and serum carotenoids, including lycopene, and intake of vegetables and fruits. Subjects were recruited with a history of diabetes mellitus (n=133) or with hyperglycemia diagnosed using a conservative 5.6-percent cutoff value for hemoglobin A1c (n=151). Serum levels of carotenoids and retinol were measured using high-performance liquid chromatography. Regular intake of carotenoids, including lycopene in LYCOTEN, might be a protective factor against hyperglycemia.

Lycotencapsules prevent oxidative damage on skin thus prevents

Pre-mature ageing ,Wriknes, Hyper-pigmentation, Psoriasis, Eczema, Blemishness. LYCOTEN helps in cellular repair, Firms up the skin & retains moisture, Slows down signs of ageing & promotes skin rejuvenation & texture.

Lycoten capsules in male infertility

LYCOTEN capsules Protects sperm from oxidative damage. Significantly improves sperm quality. Increases sperm count. Concentration, Motility ,Morphology

Lycoten capsules in female infertility

LYCOTEN capsules Protects ovum & gametes, Ensures successful nidation, Improves pregnancy rate & outcome. Reduces chances of complications. LYCOTEN capsules Prevents & reduces chances of pre-eclampsa & PIH, Helps in adequate growth of foetus - reduces IUGR chances ,Reduces risk of abortions. Helps in successful pregnancy.

Other Clinical Indications

Studies have also investigated the relationship and/or use of LYCOTEN for cataracts, longevity, malaria, digestive-tract cancers, immune modulation, Alzheimer's disease, and preeclampsia. Patients with HIV infection or inflammatory diseases may have depleted lycopene serum concentrations.

Dosage

- ☐ 1-2 capsules daily with meals

Indications

Lycoten Capsules prevent **Cardiovascular Disorders**

- Lowers BP & increases plasma nitrate levels
- Prevents oxidative damage of LDL
- Inhibits enzymatic synthesis of cholesterol
- Reduces risk of CHD, MI & prevents atherosclerosis
- Prevents end organ damage

Lycoten Capsules prevent **Diabetes**

- Improves endothelial dysfunction markers
- Decreases lipid peroxidation
- Improves glycemic control

Lycoten Capsules prevent **Oxidative damage on skin thus prevents**

- Pre-mature ageing ,Wriknes, Hyper-pigmentation, Psoriasis, Eczema, Blemishness
- Helps in cellular repair
- Firms up the skin & retains moisture
- Slows down signs of ageing & promotes skin rejuvenation & texture.

LYCOTEN Capsules prevents **male infertility**
Oxidative stressis an important aspect in male infertility

- Infertile men have very high levels of semen ROS
- Spermatogenesis is very sensitive to oxidative stress
- Protects sperm from oxidative damage
- Significantly improves sperm quality. Increases sperm count. Concentration, Motility ,Morphology

LYCOTEN Capsules prevent **Female infertility**

- Protects ovum & gametes
- Ensures successful nidation
- Improves pregnancy rate & outcome
- Reduces chances of complications
- Prevents & reduces chances of pre-eclampsa & PIH
- Helps in adequate growth of foetus - reduces IUGR chances
- Reduces risk of abortions.

REFERENCES

1. Ford ES, Will JC, Bowman BA, Narayan KM. Diabetes mellitus and serum carotenoids: findings from the Third National Health and Nutrition Examination Survey. Am J Epidemiol. 1999; 149(2):168-76. doi: 10.1093/oxfordjournals.aje.a009783, PMID 9921962.
2. Suzuki K, Ito Y, Nakamura S, Ochiai J, Aoki K. Relationship between serum carotenoids and hyperglycemia: a population-based cross-sectional study. J Epidemiol. 2002; 12(5):357-66. doi: 10.2188/jea.12.357, PMID 12395879.
3. Gale CR, Hall NF, Phillips DI, Martyn CN. Plasma antioxidant vitamins and carotenoids and age-related cataract. Ophthalmology. 2001; 108(11):1992-8. doi: 10.1016/s0161-6420(01)00833-8, PMID 11713067.
4. Gross MD, Snowdon DA. Plasma lycopene and longevity: findings from the Nun Study. FASEB J. 2001; 15:A400.
5. Metzger A, Mukasa G, Shankar AH, Ndeezi G, Melikian G, Semba RD. Antioxidant status and acute malaria in children in Kampala, Uganda. Am J Trop Med Hyg. 2001;65(2):115-9. doi: 10.4269/ajtmh.2001.65.115, PMID 11508384.
6. Franceschi S, Bidoli E, La Vecchia C, Talamini R, D'Avanzo B, Negri E. Tomatoes and risk of digestive-tract cancers. Int J Cancer. 1994;59(2):181-4. doi: 10.1002/ijc.2910590207, PMID 7927916.
7. De Stefani E, Oreggia F, Boffetta P, Deneo-Pellegrini H, Ronco A, Mendilaharsu M. Tomatoes, tomato-rich foods, lycopene and cancer of the upper aerodigestive tract: a case-control in Uruguay. Oral Oncol. 2000;36(1):47-53. doi: 10.1016/s1368-8375(99)00050-0, PMID 10889919.
8. Watzl B, Bub A, Brandstetter BR, Rechkemmer G. Modulation of human T-lymphocyte functions by the consumption of carotenoid-rich vegetables. Br J Nutr. 1999;82(5):383-9. doi: 10.1017/s0007114599001634, PMID 10673911.
9. Mecocci P, Polidori MC, Cherubini A, Ingegni T, Mattioli P, Catani M, Rinaldi P, Cecchetti R, Stahl W, Senin U, Beal MF. Lymphocyte oxidative DNA damage and plasma antioxidants in Alzheimer disease. Arch Neurol. 2002;59(5):794-8. doi: 10.1001/archneur.59.5.794, PMID 12020262.
10. Palan PR, Mikhail MS, Romney SL. Placental and serum levels of carotenoids in preeclampsia. Obstet Gynecol. 2001;98(3):459-62. doi: 10.1016/s0029-7844(01)01437-5, PMID 11530129.
11. Polidori MC, Mecocci P. Plasma susceptibility to free radical-induced antioxidant consumption and lipid peroxidation is increased in very old subjects with Alzheimer disease. J Alzheimers Dis. 2002;4(6):517-22. doi: 10.3233/jad-2002-4608, PMID 12629261.