

Review Article

Therapeutic Effect of Antioxidants on Prevention and Treatment of Cancer

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ABSTRACT

Antioxidant is a molecule that has the ability to slow down or prevent oxidation of the other molecules. Oxidation is a chemical reaction that transmits electrons from a substance to an oxidizing materials. These reactions produce free radicals that initiate a series of damaging reactions to cells. In fact, antioxidants end up this chain of reactions by taking away the intermediate free radicals. On the other hand, they control other oxidative reactions by oxidizing themselves. Antioxidants include several groups such as vitamin C, vitamin E, carotenoids, ubiquinone, bio-flavone, lipoic acid, cartonene. Among these groups vitamin C, vitamin E and beta-carotene are known as the main antioxidants. Selenium, the mineral, plays an important role as an antioxidant. Vitamin C reduces nitrosamine which is carcinogen. Studies have shown that taking lycopene through continuous consumption of tomato prevents prostate cancer in men. This combination places in carotenoids group and it is found abundantly in tomato. Generally, antioxidants eliminate carcinogenic substances which generate in the body and it also reduces the proliferation of cancer cells.

Key words: Antioxidant, Cancer, Vitamin C, Vitamin E, Carotenoid, Free radicals

Today everywhere is speaking about the advantages of antioxidants, from prevention of heart disease to reduce brain & eye damages. Antioxidants in the fruits and vegetables have been the favorite of the public. According to scientific studies, frequent use of natural antioxidants is associated with the prevention of cardiovascular disease and cancer. Antioxidants are nutrients in foods that can prevent

body damage (1).

Antioxidant roles are associated with lowering oxidative stress, malignant transformation, DNA damage and other parameters of cell damage in different studies with lowered incidence of certain types of cancer and degenerative diseases. Antioxidants decrease the damaging effects of reactive oxygen species (ROS) and can impair

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References

1. Lobo V, Patil A, Phatak A, Chandra N. Free radicals, antioxidants and functional foods: Impact on human health. *Pharmacognosy reviews.* 2010;4(8):118.

many of the events that contribute to epidermal toxicity and disease. Though, increased free radical action can overwhelm ROS defense mechanisms, contributing to the development of cutaneous diseases, disorders, and cancer. The two main classes of antioxidant defenses are those whose role is to prevent the generation of ROS and those that intercept any radicals that are generated (2). The defense system exists in aqueous and membrane compartments of cells and can be enzymatic and nonenzymatic. A second category of natural antioxidants are repair processes, which remove the damaged biomolecules before they accumulate to cause altered cell metabolism or viability (2). Problems such as heart problems, muscles breakdown, diabetes and cancer are all caused by these free radicals. Antioxidants increase the strength of the immune system, thus reducing the amount of infection in the body. Stress, smoking and sunburn reduce the effect of antioxidants. Free radicals are reacted with some parts of cell such as DNA and cell membrane cause to destroy cell activity or even the death of them. Naturally, immune system is making these free radicals neutral and innocuous but destructive environmental elements such as ultraviolet, alcohol, environment pollutions or other oxidizing agents can overwhelm the cutaneous antioxidant

and immune response capacity, leading to oxidative damage, immunotoxicity and cancer (3).

In this situation, free radicals are harmful and dangerous for body health. To prevent this atoms act, the body should have a defensive barrier of antioxidants. Antioxidant are the molecules which obstruct the act of free radicals and prevent the destruction of vital cells (4). Prevention of cell destroy cause to present disease such as cancer, cardiovascular disease and the oldness of skin. More than 4000 antioxidant combinations exist in foods but more than all, vitamin C, vitamin E, beta carotene and mineral material named selenium are important. Most of people imagine the purpose of receiving more antioxidant is receiving supplements but we should know only food supplement don't have antioxidant rather than fruits, vegetables and branny grains have more antioxidant (5, 6).

Main subject

Vitamin E: or a-tocopherol has been defined as a radical-chain breaker, which, due to its hydrophobic nature, operates in a lipid environment. The effects of vitamin E as an antioxidant are thus restricted to its direct effects in membranes and lipoprotein domains (7).

References

2. Cheeseman K, Slater T. An introduction to free radical biochemistry. British medical bulletin. 1993;49(3):481-93.
3. Halliwell B, Gutteridge JM. Free radicals in biology and medicine: Oxford University Press, USA; 2015.
4. Pham-Huy LA, He H, Pham-Huy C. Free radicals, antioxidants in disease and health. International journal of biomedical science: IJBS. 2008;4(2):89.
5. Liu RH. Potential synergy of phytochemicals in cancer prevention: mechanism of action. The Journal of nutrition. 2004;134(12):3479S-85S.
6. Coulter ID, Hardy ML, Morton SC, Hilton LG, Tu W, Valentine D, et al. Antioxidants vitamin C and vitamin e for the prevention and treatment of cancer. Journal of general internal medicine. 2006;21(7):735-44.
7. Rimm EB, Stampfer MJ, Ascherio A, Giovannucci E, Colditz GA, Willett WC. Vitamin E consumption and the risk of coronary heart disease in men. New England Journal of Medicine. 1993;328(20):1450-6.

Vitamin E is anticancer and if it is used in a small amount, it can increase cancer up to 10 times in women. Corn oil, soya bean oil, green bean and liver have vitamin E. This vitamin which is soluble which is saved with the fats and other body tissues (8).

Vitamin E has important effects in body such as delay in cell oldness and sunburn cure. The daily need of this in men is 15 international units and in women 12 international units (9). The important food references of vitamin E are herbal oils, wheat bud, units, beans and branny grains.

Vitamin C: The other name of this vitamin is ascorbic acid which is water soluble and exist in all of body's liquid so, it is one of the first defensive line of body but it can not be saved (10). So, we should use fruit and vegetable connectedly and regularly. The daily need of this vitamin is 60gr. Receiving vitamin C more than 2000 ml gr in day in some people have harmful secondary signs such as kidney stone, queasiness and diarrhea. The most important references of vitamin C are: citerus, green pepper, Broccoli, kiwi, cabbage and cantaloupe (11).

Beta-carotene: β -carotene is natural compounds with lipophilic properties and the most prominent. The most of carotenoids contain an extended system of conjugated double bonds, which is responsible for their antioxidant activity; β -carotene deactivates 1O_2 , depending largely on their physical quenching (12).

Carotenoids have also been shown to be capable of inhibiting free-radical reactions. β -carotene very efficiently reduces trichloromethylperoxyl radicals, inhibiting the oxidation of model compounds by peroxyl radicals (12). Carotene is a major constituent of commercially available products administered for systemic photoprotection. Carotene supplements are frequently used as so-called oral sun protectants, but studies proving a protective effect of oral treatment with β -carotene against skin responses to sun exposure are scarce and conflicting results have been reported (13).

Hydrazine sulfate: is a monoamine oxidase inhibitor. It is metabolically active, improving the abnormal glucose tolerance and reducing the increased glucose production rates seen in cancer patients with weight loss (14). Hydrazine sulfate is

References

8. Klein EA, Thompson IM, Tangen CM, Crowley JJ, Lucia MS, Goodman PJ, et al. Vitamin E and the risk of prostate cancer: the Selenium and Vitamin E Cancer Prevention Trial (SELECT). *Jama*. 2011;306(14):1549-56.
9. Lee I-M, Cook NR, Gaziano JM, Gordon D, Ridker PM, Manson JE, et al. Vitamin E in the primary prevention of cardiovascular disease and cancer: the Women's Health Study: a randomized controlled trial. *Jama*. 2005;294(1):56-65.
10. Rose RC. Transport of ascorbic acid and other water-soluble vitamins. *Biochimica et Biophysica Acta (BBA)-Reviews on Biomembranes*. 1988;947(2):335-66.
11. Klein B, Perry A. Ascorbic acid and vitamin A activity in selected vegetables from different geographical areas of the United States. *Journal of Food Science*. 1982;47(3):941-5.
12. Burton GW, Ingold K. Beta-carotene: an unusual type of lipid antioxidant. *Science*. 1984;224(4649):569-73.
13. Stahl W. Systemic photoprotection by carotenoids. *Nutrition for healthy skin*: Springer; 2010. p. 65-70.
14. Chlebowski RT, Bulcavage L, Grosvenor M, Tsunokai R, Block JB, Heber D, et al. Hydrazine sulfate in cancer patients with weight loss. A placebo-controlled clinical experience. *Cancer*. 1987;59(3):406-10.

used for treating colon and rectal (colorectal) cancer, lung cancer, brain cancer (neuroblastoma), Hodgkin's disease (lymph cancer), and other cancers. It is also used for the general weight loss and wasting (cachexia) associated with cancer (15).

Hydrazine sulfate has a potential role in maintaining weight in patients with cancer cachexia. Whether maintenance of body weight under these conditions will be associated with improvement in important clinical outcome variables and overall survival will require future prospective, long-term, placebo-controlled evaluation in cancer populations with less advanced disease given defined systemic therapy (14).

4. Selenium: selenium as a mineral material has an important antioxidant role. It prevents the explosion of cancer it is better to receive the necessary Selenium from food (16). Because it is poisonous and dangerous for body to receive a lot of selenium from supplements. The best food

references are fish, meat, grains, cereals, egg and garlic. The vegetables which are grown in rich lands of selenium are good references of it. Many studies have shown that those who consume a lot of vegetables, by getting more substances called "phytochemicals", they have more resistance to cancer. Phytochemicals are substances that produce different colors and aromas in vegetables and tend to absorb carcinogens in the body and prevent their destructive effects on cells. Among the vegetables, the family of cress has the most anti-cancer effect. The other beneficial herbs are cabbage, lettuce and spinach (16, 17).

Isolflavone: which exists in soya bean, prevents breast, ovarian and prostate cancers (18). The level of isoflavone is related to its association with reduced prostate cancer risk. The protective effect of soy only occurs at a certain level, the studies of homogeneous populations with low levels of soy consumption would not have the capability to detect the protective effect (19).

References

15. Chlebowski RT, Bulcavage L, Grosvenor M, Oktay E, Block JB, Chlebowski JS, et al. Hydrazine sulfate influence on nutritional status and survival in non-small-cell lung cancer. *Journal of Clinical Oncology*. 1990;8(1):9-15.
16. Willett W, Stampfer M. Selenium and cancer. *BMJ: British Medical Journal*. 1988;297(6648):573.
17. Rayman MP. Selenium in cancer prevention: a review of the evidence and mechanism of action. *Proceedings of the Nutrition Society*. 2005;64(4):527-42.
18. Lee MM, Gomez SL, Chang JS, Wey M, Wang R-T, Hsing AW. Soy and isoflavone consumption in relation to prostate cancer risk in China. *Cancer Epidemiology and Prevention Biomarkers*. 2003;12(7):665-8.
19. Kolonel LN, Hankin JH, Whittemore AS, Wu AH, Gallagher RP, Wilkens LR, et al. Vegetables, fruits, legumes and prostate cancer: a multiethnic case-control study. *Cancer Epidemiology and Prevention Biomarkers*. 2000;9(8):795-804.

Conclusion

The using of fresh food matters to receive antioxidants, such as vitamin C, vitamin E, carotenoids, ubiquinone, bio-flavone, lipoic acid and cartonene can help to prevented cancer. Furthermore, antioxidants eliminate carcinogenic substances which generate in the body and it also reduces the proliferation of cancer cells.