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A New Approach; Free Radicals, Eye Diseases And Dietary Relationship.

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ABSTRACT

The recent growth in the knowledge of free radicals and reactive oxygen species (ROS) in biology is producing a medical revolution that promises a new age of health and disease management. It is ironic that oxygen, an element indispensable for life, under certain situations has deleterious effects on the human body. Some foreign toxic substances are increasingly the production of free radicals in cells. Although some levels of antioxidant vitamins and minerals in the diet are required for good health, there is considerable doubt as to whether antioxidant supplements are beneficial or harmful; and if they are actually beneficial, which antioxidant(s) are needed and in what amounts. Indeed, some authors argue that the hypothesis that antioxidants could prevent chronic diseases has now been disproved and that the idea was guided from the beginning. Rather, dietary polyphenols may have non-antioxidant roles in minute concentrations that affect cell-to-cell signaling, receptor sensitivity, inflammatory enzyme activity or gene regulation. The aim of this review, is to free radicals and anti-oxidant eye diseases that diet with vegetables and fruits on their relationship by looking from different angles, is to contribute to science.

Keywords: free radicals, eye diseases, cataracts, nitrogen dioxide

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INTRODUCTION

These substances or produce free radicals directly or the elimination of free radicals and reduce the activity of an antioxidant. Most of the potentially harmful effects of oxygen are due to the formation and activity of a number of chemical compounds, known as ROS, which have a tendency to donate oxygen to other substances. Free radicals and antioxidants have become commonly used terms in modern discussions of disease mechanisms. A free radical can be defined as any molecular species capable of independent existence that contains an unpaired electron in an atomic orbital [1-4].

The presence of an unpaired electron results in certain common properties that are shared by most radicals. For example, the polluted air that dark color of nitrogen dioxide ($\text{NO}_2\bullet$) is one such substance. Nitrogen dioxide ($\text{NO}_2\bullet$) as a free radical itself, but also is an effective initiator lipid peroxidation.

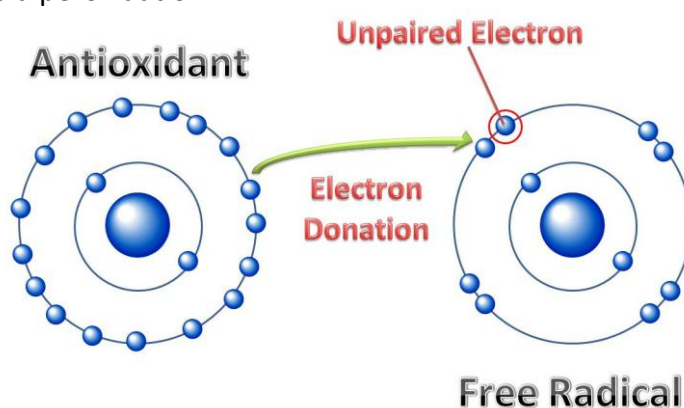


Figure 1: Antioxidant

People who eat fruits and vegetables have a lower risk of heart disease and some neurological diseases [5], and there is evidence that some types of vegetables, and fruits in general, may lower risk against some cancers [6]. Since fruits and vegetables happen to be good sources of nutrients and phytochemicals, this suggested that antioxidant compounds might lower risk against several diseases. This idea has been tested in a limited manner in clinical trials and does not seem to be true, as antioxidant supplements have no clear effect on the risk of chronic diseases such as cancer and heart disease [5,7] This suggests that these health benefits come from other substances in fruits and vegetables (possibly dietary fiber) or come from a complex mix of compounds. For example, the antioxidant effect of flavonoid-rich foods seems to be due to fructose-induced increases in the synthesis of the antioxidant uric acid and not to dietary antioxidants per se [8].

A cataract is a clouding of the lens inside the eye which leads to a decrease in vision. It is the most common cause of blindness and is conventionally treated with surgery. Visual loss occurs because opacification of the lens obstructs light from passing and being focused on to the retina at the back of the eye [9]. It is most commonly due to biological aging, but there are a wide variety of other causes. Over time, yellow-brown pigment is deposited within the lens and this, together with disruption of the normal architecture of the lens fibers, leads to reduced transmission of light, which in turn leads to visual problems. Those with cataracts commonly experience difficulty in appreciating colors and changes in contrast, driving, reading, recognizing faces, and coping with glare from bright lights [10].



Figure 2: These foods are typical antioxidant.



Figure 3: Normal lens and cataract

DISCUSSION

Fletcher A.E. et al. according to; cataract and age-related macular degeneration (AMD) are the major causes of vision impairment and blindness worldwide. Both conditions are strongly age related with earlier signs (usually asymptomatic) occurring in middle age and becoming severer and more prevalent with increasing age. The etiology of these conditions is thought to fit with the 'free radical theory' of ageing which postulates that ageing and age-related diseases result from the accumulation of cellular damage from reactive oxygen species (ROS). Mitochondrial energy production is a major source of endogenous ROS. External sources of ROS include environmental sources especially solar radiation, biomass fuels and tobacco smoking. There is strong evidence from epidemiological studies that smoking is a risk factor for both cataract and AMD. There is moderate evidence for an association with sunlight and cataract but weak evidence for sunlight and AMD. The few studies that have investigated this suggest an adverse effect of biomass fuels on cataract risk [1].

Free radicals damage contributes to the etiology of many chronic health problems such as cardiovascular and inflammatory disease, cataract, and cancer. Antioxidants prevent free radical induced tissue damage by preventing the formation of radicals, scavenging them, or by promoting their decomposition. Synthetic antioxidants are recently reported to be dangerous to human health. Thus the search for effective, nontoxic natural compounds with antioxidative activity has been intensified in recent years. In addition to endogenous antioxidant defense systems, consumption of dietary and plant-derived antioxidants appears to be a suitable alternative. Dietary and other components of plants form a major source of antioxidants [5].

Fletcher A.E. et al according to; the antioxidant defence system of the lens and retina include antioxidant vitamins C and E and the carotenoids lutein and zinc, and there is mixed evidence on their associations with cataract and AMD from epidemiological studies. Most epidemiological studies have been conducted in well-nourished western populations but evidence is now emerging from other populations with different dietary patterns and antioxidant levels [1].

S. Bagchi K, Puri S et al according to the study; the review discusses linkages of various micronutrients and antioxidants as well as oxidative stress with cataract. Dietary interventions as strategy for prevention of cataract and other ocular disorders are also reviewed. The traditional Indian diet, spices, and medicinal plants are rich sources of natural antioxidants; higher intake of foods with functional attributes including high level of antioxidants in functional foods is one strategy that is gaining importance. Newer approaches utilizing collaborative research and modern technology in combination with established traditional health principles will yield dividends in near future in improving health, especially among people who do not have access to the use of costlier western systems of medicine [5].

CONCLUSIONS

Decent look at the environment protected from external factors threatening our eye health, especially that triggered the formation of free radicals in the polluted air away from the stand, stands before us as an important topic. Consumption of food-based antioxidants like β -carotene lutein and zeaxanthin seem to be useful for the treatment cataracts. Supports of vitamin (A, C, E, Zn) may prevent advanced age-related macular degeneration only in high-risk individuals.

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