

## Synthetic Antioxidants 'Can Harm Your Health'

Antioxidants are part of many plants and a myriad of foods we eat every day.

Their health promoting effects have been well documented. Antioxidants work by donating an electron to a molecule that has been compromised by oxidation, bringing it back into a state of proper function. Having been "used up" in this way, the antioxidant molecule is then either re-charged by accepting an electron from another type of antioxidant or it is re-cycled into building material such as - in the case of vitamin C - collagen for purposes of tissue repair.

According to this Wikipedia entry, "Antioxidants are widely used as ingredients in dietary supplements, which are used in the hope of maintaining health and preventing diseases such as cancer and coronary heart disease. Although some studies have suggested antioxidant supplements have health benefits, other large clinical trials did not detect any benefit for the formulations tested, and excess supplementation may even be harmful."

Despite this warning and the campaign against antioxidants - don't throw out your supplements just yet. Vitamins 'could shorten lifespan' and Antioxidants Don't Mean Longer Life are the titles of some typical articles discussing the findings of a Danish meta analysis of clinical trials involving beta carotene, vitamin A and vitamin E which was recently re-published by JAMA, the Journal of the American Medical Association. The results - a slight increase in mortality in those taking the pills - contradict both experience and good sense.

They are opposed to the results of a large number of epidemiological studies, which have found positive effects of higher levels of intake of the natural antioxidants in fruits and vegetables. The doubt being thrown on the healthful properties of antioxidants, says Beldeu Singh, is due to the fact that many studies designed to clinically test the effects of antioxidants do not take into account nutrient synergy - they are designed around the use of only one single substance. But what's even more important, when researching "antioxidants" - they are not even using the real thing! Most pharmaceutical studies rely on synthetic versions or artificial analogs of these healthy nutrients. The difference seems to be that, contrary to the natural variety, the synthetic analogs cannot be recycled and re-used by the organism, once they have donated their electron. When they are "spent", they tend to turn into harmful metabolic byproducts that increase, rather than decreasing, the total load of oxidative stress on the organism. That may, according to Beldeu Singh, explain the apparently contradictory results. There is another 'confounding' factor: The ease with which a meta analysis - a study that examines only the results of previous studies and re-interprets them - can be manipulated to say almost anything and the contrary of it. Meta analyses have previously been used by pharmaceutical interests to show how wonderful their products are, or how bad the (competing) non-patentable natural substances are.

## SYNTHETIC ANTIOXIDANTS ARE HARMFUL

Beldeu Singh

We know that food and dietary sources contain antioxidants. Minerals and antioxidants are part of our nutritional intake and epidemiological studies show that populations with high antioxidant intake from dietary sources are at a lower risk to diseases such as cancers, hypertension cardiovascular disease, stroke etc more so in contrast with malnourished people. We also know the role of antioxidants in our biochemistry is to scavenge free radicals or convert hydrogen peroxide formed during cell metabolism into water and oxygen as soon as it is formed and that ability is part of health. Yet studies try to show that antioxidants are "harmful". If so, do not take fruits and vegetables for they are rich sources of natural antioxidants! Go on a diet that is low or devoid of antioxidants...is that what these scientists want you to believe?

Utter rubbish. But science does not spew such rubbish, only the conclusions of some scientists. If your diet is low in natural antioxidants, free radicals begin to be in excess of your antioxidant ability to biochemically neutralize them (scavenge) and there will be oxidative damage and free radical chain reactions that will damage molecules and cell membranes and quickly lead to the development of disease states as well as impair the function of your immune system.

Oxidative stress is implicated in most human diseases because the superoxide can oxidatively damage molecules in the mammalian biological system. These oxidatively damaged molecules can initiate disease states. For instance, oxidatively damaged glucose and protein molecules form glycated proteins that can lead to cataracts etc. Oxidatively damaged glucose molecules cannot form conjugates to enter cell walls and pass into the cell where they can be used to produce ATP. Also, oxidatively damaged cell membranes lose their functional integrity that can lead to disease states. And there is a bigger problem with excess superoxide. Excess superoxide is the amount of superoxide that cannot be scavenged by the antioxidants or the antioxidant system in the cells and it can react with other useful molecules such as nitric oxide (NO) to produce the highly reactive secondary radical called the peroxynitrite radical that can damage cell membranes and lead to disease conditions such as cardiovascular disease, arthritis, ED etc. It is also well established that if the glutathione-catalase system cannot effectively convert hydrogen peroxide formed during cell metabolism, it can react with the excess superoxide to form the very deleterious hydroxyl radicals that can damage cell membranes, protein molecules, hormone molecules, enzyme molecules and even mRNA and DNA molecules and lead to the development of a host of disease states and cancers. The biochemical mechanisms that point to the role of free radicals in the development of disease states and cancers and degenerative conditions as well as in the progress of aging became clear over the last two decades of research and are now well understood. From an implication, free radicals and free radical reactions and free radical-induced reactions are now understood as the cause of many diseases pointing to the biochemical origin of disease other than caused by pathogens. The biochemically harmful effects of free radicals are real and measurable and are not alleged harmful effects as stated in a recent report in JAMA (Goran Bjelakovic

et al, Mortality in Randomized Trials of Antioxidant Supplements for Primary and Secondary Prevention Systematic Review and Meta-analysis, JAMA, February 28, 2007 Vol 297, No. 8 847-857).

Only natural antioxidants can effectively scavenge free radicals in the mammalian biological system and do it safely. The antioxidants in mammalian biological systems work in an integrated network system. L-ascorbic acid can donate electrons to all the water-soluble antioxidant molecules in the system directly, a process that recharges or recycles them and it can also donate electrons to alpha-lipoic acid that can then donate electrons to both the water-soluble and fat-soluble antioxidant molecules of the mammalian biological system and any other natural antioxidant molecules (from food or edible sources) that can work within the natural antioxidant system of mammals. This is a critical factor in the antioxidant defense mechanism. Populations that consume a diet that offers natural antioxidant molecules from a variety of sources tend to have a lower risk of cardiovascular disease, arthritis, diabetes, hypertension and cancers. Hence, antioxidants from fruits, green leafy vegetables and fish oils and natural olive oil or sesame seed oil or coconut oil would prove to be better for health. The mammalian biological system operates on the L-form antioxidants. These are antioxidants found in natural sources, excepting olive oil which occurs in the D-form in nature. Free radical biochemistry is harmful and can produce deleterious and lethal effects over time whereas natural antioxidants scavenge free radicals and prevent or minimize the harmful effects of free radical biochemistry in the body. That is not difficult to understand but there is another interesting point about antioxidants. The healthy biochemical pathways of the mammalian biological system operating on L-form antioxidants involve the production and utilization of ATP molecules, production of antibodies, collagen, melatonin, hormones and other useful biomolecules - all of them dependent on antioxidant-driven biochemical processes that can be disrupted by excess free radicals. In such a system, the antioxidant molecules that donate electrons during the scavenging activity become "spent" but remain stable and may either be recharged and recycled for further scavenging activity or may be broken down and utilized in the synthesis of other useful biomolecules. For instance, L-ascorbic acid may be converted into collagen with the help of colloidal copper or colloidal gold after it is "spent". Natural antioxidants, therefore, actually prevent the development of disease states by preventing oxidative stress by excess free radicals and by preventing the development of secondary radicals. Otherwise, they decrease or diminish oxidative damage and its harmful effects. Now there is interest in tapping the potential of natural antioxidants from food or edible sources for inducing and promoting rapid free radical scavenging activity to study the antioxidant-driven effects for reversing the cellular and biochemical damage of excess. Many people are taking antioxidant supplements to supplement the natural antioxidant intake from their diet to improve the free radical scavenging activity in their bodies as a way to prevent health problems and prevent the development of disease states or otherwise to slow down the aging process or slow down the progression of disease conditions that are free-radical induced. Yet, the authors of the report in JAMA titled Mortality in Randomized Trials of Antioxidant Supplements for Primary and Secondary Prevention Systematic Review and Meta-analysis are not sure when they

state whether antioxidant supplements are beneficial or harmful is uncertain. Many primary or secondary prevention trials of antioxidant supplements have been conducted to prevent several diseases. They conclude that antioxidant supplements, with the potential exception of selenium, were without significant effects on gastrointestinal cancers and increased all-cause mortality.

The methodological quality of some of the trials was assessed using the published reports, which may not reflect the actual design and bias risk of the trials. Some authors responded to our requests for further information. All available nonenzymatic antioxidants work differently in the human body and most of them exert effects that are nonantioxidant. We are not able to point to the specific biochemical mechanisms behind the detrimental effects (Goran Bjelakovic et al, Mortality in Randomized Trials of Antioxidant Supplements for Primary and Secondary Prevention Systematic Review and Meta-analysis, JAMA, February 28, 2007"Vol 297, No. 8 847-857).

They performed adjusted-rank vitamin C; vitamin A and vitamin C; vitamin C and vitamin E; vitamin E and selenium; selenium and zinc; beta carotene, vitamin C, and vitamin E; beta carotene, vitamin C, vitamin E, and selenium; beta carotene, vitamin C, vitamin E, selenium, and zinc; vitamin A, vitamin C, vitamin E, selenium, and zinc; vitamin A, vitamin C, vitamin E, selenium, methionine, and ubiquinone. In 11 trials, participants were supplemented with different mixtures of antioxidants as well as with vitamins and minerals without antioxidant properties. The fact is that most antioxidants in the mammalian biological system also work in a synergistic fashion. For instance, L-ascorbic acid recycles melatonin and enhances its effects three fold. Melatonin is a brain-body antioxidant that has anti-cancer effects, primarily due to its ability to donate electrons to both the lipid and non-lipid part of the cell wall. This biochemical repair restores cell wall integrity and that in turn promotes aerobic respiration and consequently prevents the cell wall from acquiring a strong positive charge {positive cell membrane potential (CMP)} a key factor in the transformation to from aerobic respiration to anaerobic respiration which initiates the formation of cancer cells. It has been suggested that antioxidant supplements may show interdependency and may have effects only if given in combination (Hercberg et al, The potential role of antioxidant vitamins in preventing cardiovascular diseases and cancers, Nutrition. 1998;14:513-520). That is clearly a logical suggestion within the working of the mammalian biological system and the fact that the natural antioxidant molecules work in an integrated fashion in a network and also in synergistic roles. Most of the studies on vitamins are designed around the administration of one vitamin and many of these studies use analogues or synthetics instead of the L-form molecules from food sources. Synthetic vitamins are like any other synthetic molecules but because of their antioxidant nature, they are able to donate one electron, after which they do not remain stable but are broken down in a metabolic process that yields hydrogen peroxide. Administering synthetic vitamins in persons with disease states can thus be counter-productive. These people already have a problem associated with or directly caused by excess free radicals, including hydroxyl radicals. Adding substances into their biological system that can lead to the formation or more hydroxyl radicals only exacerbates their free radical biochemistry. There are several studies that show that synthetic vitamins are harmful.

For a therapeutic purpose, there is a need to enhance the free radical scavenging potential in patients with disease states that successfully converts all the hydroxyl radicals and hydrogen peroxide into water and oxygen as soon as they are formed " something that occurs during the prime of youth. The aim of the review in the JAMA study (Goran Bjelakovic et al, Mortality in Randomized Trials of Antioxidant Supplements for Primary and Secondary Prevention Systematic Review and Meta-analysis, JAMA, February 28, 2007"Vol 297, No. 8 847-857) was to analyze the effects of antioxidant supplements (beta carotene, vitamins A and E, vitamin C [ascorbic acid], and selenium) on all-cause mortality of adults included in primary and secondary prevention trials. The authors found that antioxidant supplements, with the potential exception of selenium, were without significant effects on gastrointestinal cancers and increased all-cause mortality. That would be quite the natural expectation if synthetic antioxidants were used as supplements in patients with cancers. Cancer patients have high amounts of excess superoxide and a large number of hydroxyl radicals. Several new review studies on nutrients, called meta-analysis, seem to contradict either what we know from previous research, or what our intelligence tells us should be true. You only have to scan the headlines and pay attention to the "newly found" dangers of this or that natural substance. From St. John's Wort to Kava Kava, from vitamin C to vitamin E, we hear that they are "not effective" or worse - that they may be dangerous. We know one fundamental truth and that is nutrition and nutritional intake through food is what makes us grow and is essential for health. And we also know that by increasing our natural antioxidant intake through supplements made from food substances, but not in undue excess, we increase the free radical scavenging potential in our bodies and tend to improve health. That is basic health science or food science. Yet a new field of study called meta-analysis may be used to discredit the role and function of natural supplements or does it prove one fact very bluntly synthetic vitamins are harmful.