

...And The Protection Of Cells

On a daily basis the body has to process a host of different toxins, generated from the food we eat, the air we breathe and the chemical reactions that sustain life. The majority of toxins are fat-soluble molecules, they are deposited in the body's fatty tissue and can remain there for prolonged periods of time. Toxin overload is linked to a wide variety of health problems.

Free radicals (toxic substances that damage cells when they react with oxygen) are at the heart of the aging process itself. Fortunately nature has provided an antidote to free radicals in the form of antioxidant nutrients.

The Detoxification System

In order to remove toxins the body uses a system designed to convert fat-soluble toxins into water-soluble molecules, which can be excreted through urine. The process occurs in two phases in the liver; in phase I a family of enzymes (enzymes are substances which kick-start chemical reactions) perform the initial breakdown of the toxin, however toxins are produced as a by-product of this phase, these new toxins then have to be converted for final excretion in a process known as phase II detoxification. Phase II must be functioning in balance with Phase I to successfully complete the detoxification process.

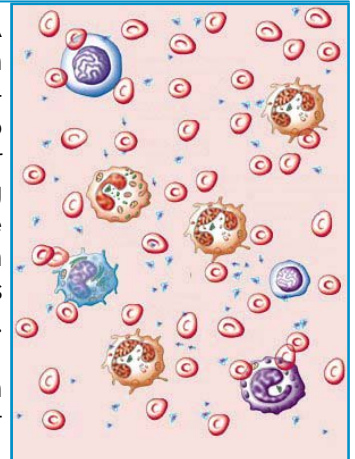
Liver detoxification effectively processes pharmaceutical drugs and alcohol among numerous other externally and internally generated toxins. The process is energy intensive, relies on a variety of nutrient derived co-factors and generates large amounts of free radicals.

Free Radicals

Oxidation is a chemical process in which electrons from a substance are transferred to what is known as an oxidizing agent. These oxidation reactions are critical for the body to function; however they also produce substances referred to as "free radicals." Exposure to tobacco smoke, environmental pollutants, compounds formed when meat is cooked or vegetable oil is heated and numerous food additives may result in oxidation reactions that damage cells.

Free radicals are considered dangerous because they are atoms with an odd number of electrons, which makes them more chemically reactive as electrons should be paired. These unstable atoms may take electrons from other atoms, such as the

ones that make up DNA or proteins, resulting in damage. Long term oxidative stress is thought to contribute to a number of conditions including the deterioration in eye sight associated with age, cancer, Alzheimer's disease and Parkinson's. Oxidised LDL ("bad") cholesterol can harden arteries and result in heart disease.



Protecting Your Cells– The Role Of Antioxidants

In general antioxidants react with free radicals to neutralise them; in some cases antioxidants become oxidized themselves and thus sparing cells and tissues from damage. Antioxidants that dissolve in water are known as hydrophilic and react with oxidants in the blood and in the free spaces inside cells. Antioxidants that dissolve in fats are known as hydrophobic and help to protect the fatty membrane that surrounds cells from a process known as lipid peroxidation. Each type of antioxidant may be more present in some body fluids and tissues than others. Antioxidants fit into two main classifications: antioxidants created by the body and antioxidants provided by the diet, both types of antioxidants work together to control free radicals.

The Body's Defences

- The body generates three antioxidant compounds:
1. Superoxide dismutase (SOD), which requires **zinc**, **copper** and **manganese**
 2. Glutathione peroxidase, which requires **selenium**

Information created by Quest Vitamin's Nutritionist. Questions and Comments please email us; nutritionists@questvitamins.co.uk

The Body's Defences Continued . . .

3. Catalase, which requires **iron**

Dietary Antioxidants

Vitamin C (ascorbic acid)-

Vitamin C is a water-soluble antioxidant; it is a powerful scavenger of free radicals, enabling it to regenerate vitamin E that has become oxidised. It is concentrated in the adrenal glands (which control the stress response), pituitary gland (which regulates hormones), spleen (used to filter blood) and the lens of the eye; vitamin C is in contact with every membrane where vitamin E is the principal antioxidant. Vitamin C is found in fresh fruit and vegetables, especially berries, citrus fruits and kiwi fruit; it is safe to supplement up to 2000mg daily. Smokers and those under stress have a particularly high requirement for vitamin C.

Vitamin E and Coenzyme Q10-

Vitamin E and coenzyme Q₁₀ are the principal fat-soluble antioxidants in fat containing body tissue. There are eight vitamin E compounds; they are primarily located in the fatty membrane surrounding cells. Vitamin E donates hydrogen to free radicals, stabilising them. In its reduced form coenzyme Q₁₀ is an effective fat soluble antioxidant, it is also able to regenerate α -tocopheroxyl radical (α -TO \cdot), a weak free radical version of vitamin E formed when it scavenges dangerous free radicals. Vegetable oils and nuts are rich in vitamin E; it is safe to supplement up to 800mg daily.

Carotenoids-

Carotenoids are the yellow, orange, and red pigments synthesized by plants. The main carotenoids are beta-carotene, lycopene, lutein and zeaxanthin, which all have antioxidant activity. Lycopene is scavenger of a free radical known as singlet oxygen. Lutein and zeaxanthin efficiently absorb blue light, protecting the eye from light induced oxidative damage. These nutrients are found in richly colored fruits and vegetables such as carrots, peppers, mangoes, apricots, tomatoes and spinach; the bioavailability of carotenoids is increased by heating the food. Supplementation is very safe but should not be undertaken by smokers.

Flavonoids-

Flavonoids are a group of plant compounds with antioxidant activity. Green tea, prunes, red grapes, berries, citrus fruits and cocoa rich dark chocolate are all very rich in flavonoids and have a strong antioxidant effect.

Key Nutrients For Detox & Cell Protection:

- ✓ Vitamin C
- ✓ Vitamin E
- ✓ Coenzyme Q10
- ✓ Carotenoids
- ✓ Flavonoids

Oxygen sustains life; however reactions involving it that occur continuously both inside and outside the body expose us to potentially damaging free radicals. The modern environment exposes us to a wide array of sources of free radicals; fortunately a diet rich in antioxidant rich foods combined with key supplements when exposed to cigarette smoke, heavy pollution, stress and intense exercise can help prevent disease and promote healthy aging.