What are Antioxidants?

Recently we often hear the term “antioxidants” – but what are the benefits of antioxidants? You could say that oxidation of the body equals ageing of the body and antioxidants protect the body from that process.

The main cause of oxidation of the body is “free radicals”, which we hear mentioned a lot these days. Oxygen taken in when we breathe is used for metabolizing the body’s cells, but around 1% to 2% of the oxygen contains unpaired electrons, which make molecules unstable. These are what are generally referred to as “free radicals.” Free radicals indiscriminately scavenge electrons from surrounding tissue, causing oxidation and damage. This occurs in the skin, organs, blood vessels and body fluids – everywhere, and triggers various forms of ageing such as spots, wrinkles, arteriosclerosis, diabetes, and senile dementia. Free radicals are also attributed with causing cancer in cells by damaging the cancer-controlling genes in the DNA inside cells.

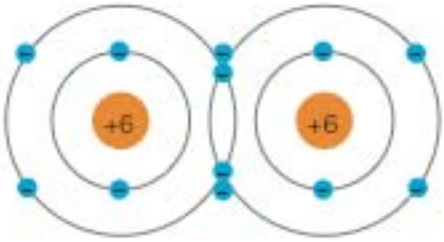

Fig 1 (top): Stable oxygen molecules. Oxygen molecules are stable if they have eight electrons in the outer orbits and so these oxygen molecules are each sharing two oxygen atoms to achieve stability.

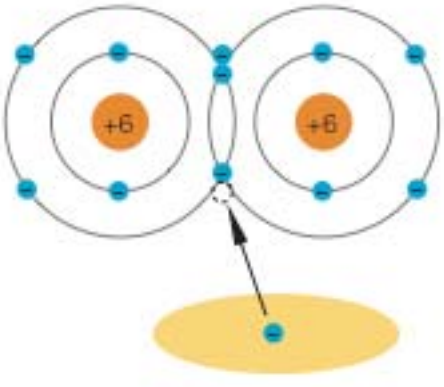

Fig 2 (bottom): An example of free radicals. One of the shared electrons in the outer orbit is lost, making the cells unstable. Free radicals scavenge surrounding electrons

(and oxidize surrounding tissue) as they try to get a total of eight electrons to become stable.

There are a wide range of causes that increase the generation of free radicals, including UV rays, smoking, exhaust fumes, agricultural chemicals, detergents, electromagnetic waves, stress, etc. and it is very difficult for people living in modern society to avoid all of these. It would be no exaggeration to say that any person living these days would have a large number of free radicals in their bodies.

It is antioxidants that disable the source of all these ills – the free radicals. Our cells provide electrons to free radicals and then oxidize themselves and it is antioxidants that prevent our cells from oxidizing.

Our bodies already have antioxidant enzymes, which perform the function of synthesizing antioxidants in the body, but the production of antioxidants peaks in our twenties and then decreases. As a result, as we get older, our bodies have accumulated damage from attack by free radicals and this presents as ageing and in the form of various diseases. However, it has been made clear that the various antioxidants that we consume as food render the free radicals in our bodies harmless, in the same way that antioxidant enzymes do. This is the significance of actively consuming various antioxidants in our food.