

## *Dental Currents - Chapter 2*

### ***Understanding Inflammation***

**Inflammation is our body's normal defense** against all kinds of stressors or irritants. If we start from scratch to explain lifestyle disease processes like dental disease, cardiovascular disease, diabetes and some cancers, many start with inflammation. So let's start from scratch and explain what causes inflammation.

Our bodies are constantly producing energy to support life. This happens in the mitochondria of our cells. The areas of our body that require more energy, like the heart and brain, have more mitochondria per cell than less active areas like fat cells. In the production of energy, "free radicals" are a by-product. They are charged molecules that only last a very short time, before they steal an electron from somewhere to neutralize themselves. In doing so, they can damage proteins, fats and many parts of the cell, including the DNA. This is a process known as oxidation and is similar to an apple turning brown when you cut it, or a piece of steel rusting. The body defends itself with antioxidants. (makes sense, doesn't it!) Free radical production increases with increased stress.

To picture what is happening, visualize a fire burning in the fireplace. Every once in a while, the fire crackles and out jumps a glowing cinder to damage the carpet. This cinder in the fire is like a free radical creating damage in our body. The more we stoke the fire, the more cinders are created. The more we stress and excite our body, the more free radicals are created. To prevent damage to the carpet from the cinders, we put up a fire screen. To douse the oxidation by free radicals, our body relies on antioxidants.

The free radicals that cause the process of oxidation in our body come both from inside the body sources like energy production in the cell and outside sources like plaque on your teeth or cigarette smoke. One cigarette may contain 20 million free radicals!! Likewise, antioxidants are not only produced inside the cell to protect it but also come from outside sources like fresh fruits and vegetables.

In a healthy situation, the normal forces of oxidation are balanced by the antioxidant defences. It is important to realize that oxidation serves a very useful purpose in our body. Oxidation is the process the body uses to kill bacteria and viruses. As long as we have the antioxidant reserves to control the forces of oxidation caused by free radicals, we are in a state of health.

The battle really starts when the forces of oxidation due to a variety of stressors overwhelm the body's antioxidant defences. The amount that oxidation exceeds antioxidation is referred to as 'oxidative stress'. **The body responds to oxidative stress with a process called inflammation.** On a once-in-a-while basis, like a sliver in your finger, inflammation is necessary and good. In a chronic or long lasting situation, it wears the system down and symptoms occur that range from tooth decay and gum disease to heart disease, diabetes and more.