

## MINERAL ANTIOXIDANTS by Dr. John Fudens HMC DVM PH

Trace minerals are one of the body's front line defenses against free radicals. Free radicals are the unstable molecules that attack and damage body cells. They occur naturally but in numbers that a healthy immune system can handle. When we do not live an optimum lifestyle, in all phases, the free radicals can increase in number, overwhelm the immune system and do damage to the body tissue causing symptoms.

Trace minerals are greatly missed and ignored, for the most part, in the diet of most Americans. Modern agricultural practices, with the heavy use of specific petroleum based fertilizers to maximize crop yield, have depleted the soil of many trace minerals. Thus our conventionally grown foods lack the mineral and trace elements needed for proper human nutritional needs.

Trace minerals process free radicals particularly oxygen radicals. Oxygen is the life-giving molecule of respiration. All body cells use oxygen to convert food energy into the cellular usable form called adenosine triphosphate (ATP). ATP can be used immediately for energy functions in the body or stored for later use.

Oxygen is the kicker in this process. Like fire, oxygen can be both dangerous and beneficial. Pure oxygen can save lives in acute cases of oxygen deprivation but if given over long periods of time and under high pressure it can cause rapid death because of damage to the nervous system.

Under normal condition the body finds oxygen both good and bad and when dangerous, the trace mineral antioxidants come into play. With normal respiration the body's metabolism produces highly reactive and toxic oxygen free radicals which are molecules with either a positive or negative charge. These molecules are called super oxide and when they contact stable body molecules the unpaired electrons are dumped into the stable molecules making them unstable.

One favorite target of the oxygen free radicals is the polyunsaturated fatty acids of the cell membranes. Once these cell membranes are damaged chaos occurs because vital nutrients cannot enter the cells and toxic waste products stay inside. More free radicals are produced, above normal, when the metabolism increases, stress occurs, in trauma or from surgery, injury, inflammation, drugs or radiation.

The absorption of trace minerals is complicated. All minerals have a different pH whereby absorption occurs with maximum efficiency. Some are more soluble in acid pH, others in alkaline pH. The best is for minerals to be taken in combination with amino acids called amino acid chelates. The body uses amino acids, from digested food protein, to combine with trace minerals. This only works if the amino acids can attach to the minerals before they reach the

intestines. If the minerals are amino acid chelated, as in supplements, they can be absorbed for longer periods of time and more efficiently.

The absorption of amino chelates is complicated. There is approximately 20 feet of small intestine all covered with tiny finger like projections called villi. Thus, there are millions of cubic centimeters of absorption surface available to take the amino acid chelates into the blood. The villi recognizes the amino acids and the minerals ride along hidden in the protein complex. This is the ideal scene from a physiological point of view. The minerals are protected by the amino acids but once inside the cellular body the minerals break free and are used by the cells.

We have a built in enzyme system for handling the oxygen radicals. There are two steps to this process. First the enzyme super oxide dismutase (SOD) eliminates the radical super oxide producing hydrogen peroxide which is also unstable. Second the enzyme catalase or glutathione peroxide converts the hydrogen peroxide into harmless water and oxygen. Catalase can be both inside the cell or freely in the bloodstream protecting the blood vascular system from damage.

So the best way to be sure you have your trace mineral antioxidants is to take the amino acid chelated forms. This way if your diet is optimal, not likely in this society, no harm is done as the chelated forms are nontoxic to the body.

TO YOUR GOOD HEALTH

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