



The following information is taken from the book, The Antioxidant Miracle by Lester Packer, Ph.D. and Carol Colman, John Wiley & Sons, Inc., New York, New York © 1999, pgs. 17-19 re-printed in its entirety with permission.

How Antioxidants Work with Free Radicals

The job of defending the body against free radicals falls to the antioxidant defense system, a group of compounds that are uniquely qualified to disarm free radicals before they can attack their target tissue. Antioxidants are the free radical police of the body, on call whenever necessary to “Quench” free radicals wherever they may be, so that they cannot spread their destruction to other cells.

There are literally hundreds of naturally occurring antioxidants. Some Antioxidants are produced by the body, while others must be obtained from food or supplements.

When an antioxidant encounters a free radical, it engulfs it, and the free radical then joins its molecular structure. The antioxidant itself becomes a free radical. So what have you gained? These newly created free radicals are relatively weak and are not likely to do further harm as they BIND the free radical – TOXICANT. Therefore, you are sparing your cells and tissues from the destructive path of a free radical out of control.

Within the body, there is a dynamic interplay between five key antioxidants; vitamins C and E, CoQ10, (alpha) lipoic acid and glutathione. These are the network antioxidants. These special antioxidants work together to bolster and strengthen the entire system. When combined, they greatly enhance the activity of one another, helping the body to maintain the right antioxidant balance. In the Packer Lab, we have discovered that network antioxidants have special powers not shared by the others. What makes network antioxidants special is that they can “recycle,” or regenerate, one another after they have quenched a free radical, vastly extending their antioxidant power.

Here’s an example of how network antioxidants work together. When vitamin E disarms a free radical, it becomes a weak free radical itself. But unlike bad free radicals, the vitamin E can be recycled, or turned back into an antioxidant, by vitamin C or Coenzyme Q10. These network antioxidants will donate electrons to vitamin E, bringing it back to its antioxidant state. The same scenario occurs when vitamin

C or glutathione defuses a free radical and becomes a weak free radical in the process. These antioxidants can be recycled back to their antioxidant form by (alpha) lipoic acid or vitamin C.

The primary job of the antioxidant network is to prevent antioxidants from being lost through oxidation. As one network antioxidant saves the other, the cycle continues, ensuring that the body will maintain the right antioxidant balance.

This particular scenario-antioxidant meets free radical, antioxidant overtakes the free radical, antioxidant becomes a "friendly" free radical antioxidant is recycled by another network antioxidant – occurs countless times in the body in the blink of an eye. It's virtually impossible for us to comprehend how often or how fast this all happens, but to give you a rough idea of the frequency with which antioxidants are called into action by the body, consider this: my colleague, Bruce Ames, a well known scientist in the field of antioxidants, estimates that the number of oxidative hits daily to DNA per human cell is about 10,000. Now multiply that by the trillions of cells in the body, and you can begin to understand the magnitude of these numbers. If you do not replenish the lost antioxidants through food and supplements, you will be leaving yourself vulnerable to further damage.

Although the network antioxidants work in SYNERGY, each has a unique niche in the cell where it exerts protective action. For example, the cell membrane is made primarily of fats or lipids, but the cell itself is filled with water. Fat-soluble vitamin E and Co Q10 protect the fatty portion of the cell membrane from free radical attack. But don't count on them to protect the watery portions of the cell, or blood, which is primarily water. These areas are accessible only to the water-soluble antioxidants such as vitamin C and glutathione.

There is only one antioxidant we know of that is allowed in both watery and fatty areas – lipoic acid. Lipoic acid is unique in that it can function in both zones and can regenerate both water-soluble (vitamin C and glutathione) and fat-soluble (vitamin E) antioxidants.

The important thing to remember is that each of the network antioxidants is greater than the sum of its parts, and that when combined, they create a juggernaut against the lethal forces of oxidation.