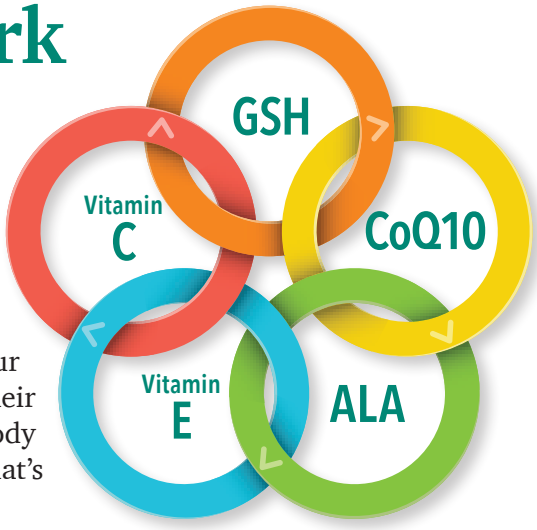
The Antioxidant Network



by Ivy Wood

Antioxidants. Do we really know what they do for us? No, we don't. Because if we did, we'd make sure to get not just one or two but a *network* of them!

You have assuredly heard of antioxidants, helpful nutrients found in a multitude of places – fruits, veggies, minerals, some even made in your body – and that they're good for you, but what actually are they? Their name simply means that they're *against oxidation*. They defend your body to prevent the harmful effects of oxidative damage. But wait, now what's oxidative damage? Let's back up a bit so I can explain.

Your body's cells are working hard to produce energy to keep every cell in your body alive. But as a normal part of this process, cells also produce *free radicals*. Free radicals are molecules that contain unpaired electrons. When an electron is unpaired, it wants to do whatever it can to become a pair again – even going so far as to steal electrons from other molecules. This is why they are called *radicals*.

When they steal electrons from other molecules – such as your DNA or other important cell structures – they cause radical damage to them. This damage is known as *oxidative damage*, and it is implicated in a number of health problems including cancer, heart disease, Alzheimer's, and even the aging process itself.[5] As such, free radicals must be taken care of as quickly as possible. Who do your cells call when they need free radicals extinguished? Antioxidants.

Antioxidants come in to save your cells by donating the electron free radicals need and thus eliminate their threat to the body. Because free radicals are produced regularly, your body needs a constant supply of antioxidants to combat them. According to Dr. Lester Packer, PhD of UC Berkeley, regarded as the foremost antioxidant research scientist, "There are literally hundreds of naturally occurring antioxidants. Some antioxidants are produced by the body, while others must be obtained from food or supplements." However, five of those antioxidants are especially important and comprise what Dr. Packer calls the *antioxidant network*.

The Network

The top five antioxidants are glutathione, alpha lipoic acid (ALA), coenzyme Q10 (CoQ10), and vitamins C and E. They are unique as they greatly enhance the power of one another. Normally an antioxidant is used up after neutralizing a free radical, while network antioxidants can recycle one another, greatly extending their fighting ability. When all five are present at adequate levels in the body they can recycle one another all the more efficiently, making the network greater than the sum of its parts.

Like any good network, the collective value holds true only when each member holds a responsible position. In the antioxidant network, there are both water and fat soluble positions for good reason. The cell membrane is a fatty material and requires a fat soluble antioxidant for protection, such as vitamin E and CoQ10. The interior of a cell is water based so only water soluble antioxidants are allowed inside. Enter vitamin C and glutathione. ALA is the exception as it is both water and fat soluble and has a defensive edge both in and outside a cell. This network leaves no gap in coverage where free radicals can enter and cause cellular damage and havoc.

Glutathione: The Leader

Glutathione (GSH) is considered one of the most important antioxidants in the body. In fact, in its absence cells die. GSH protects cells by quashing particularly dangerous forms of free radicals. Specifically, it aids in the defense and repair of DNA, thus it is a protective factor against cancer. Your liver uses GSH to help filter and detoxify your blood.[2]

When you reach the age of forty, your capacity to produce GSH begins to decline. According to Dr. Packer, a low level of GSH is linked to disease and premature death. So it is essential that you keep GSH levels high. Supplementing may not be the answer, as oral GSH is poorly absorbed. ALA, the universal antioxidant to the rescue. ALA not only recycles glutathione, but supplementing ALA also significantly raises GH levels in tissues where it is needed most.

The Universal Antioxidant

ALA offers a wide range of protection due to its ability to enter both fatty and watery portions of the cell. Thus it is considered universal to all areas of the body. Being universal

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allows ALA to recycle all four other network antioxidants. ALA is special in other ways. For one, it is essential in producing the fuel used by all cells to function and live. ALA efficiently increases the production of a protein critical to DNA repair. The life span of nerve cells depend on DNA and the neuroprotective benefit[3] of ALA, too.

There's more. For over four decades, ALA has been used in Europe for the treatment of diabetes as ALA helps metabolize fats and sugar, as well as for diabetic neuropathy in Germany. ALA is considered effective and safe to supplement at therapeutic levels, and some studies suggest even several grams a day to be tolerable for humans.[4] All of these benefits add up to one universal antioxidant and many are due to ALA's ability to raise protective GSH levels.

The Energizer

CoQ10 does double-duty in cells by quenching free radicals and helping with energy production. Recent research has shown many disorders involve mitochondrial dysfunction, creating an energy crisis. Parkinson's and fibromyalgia are two such disorders CoQ10 deficiency directly affects mitochondrial function and can lead to "all dysfunctions exacerbating fibromyalgia".[6] Supplementation helps improve those symptoms. A 2016 study on SEID (ME/CFS) reports improvement in multiple symptoms with CoQ10 ubiquinol.[7] CoQ10 is found in and required by all cells. Without CoQ10, cells die. It is that simple.

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The heart is a perfect example of CoQ10 dependence as CoQ10 is found most abundantly in heart muscle. Japan has used CoQ10 to treat and prevent heart disease for decades. As the energizer, CoQ10 provides the energy necessary to revitalize function and reduce oxidation of cholesterol in blood vessels. Like ALA, this nutrient also recycles vitamins C and E to maximize immune function.

Vitamins C & E

You may think we forgot something! It seems the roles of vitamins C and E are missing. But you'll have to read about them in *The Antioxidant Network, Part Two.*

Supplement

Now you understand the importance of most of your antioxidant network. So what to do? You can wait for the rest of the story or follow the advice of Dr. Packer now. He states "We need to supplement all of them," and that "in almost every circumstance, combinations of antioxidants have been proven to be more effective than single antioxidants." Here's why.

Vitamins C and E, are not produced in the body and must be obtained through diet or supplementation. Although you do produce GSH, ALA, and CoQ10, their levels decline as you age. And be mindful that the network antioxidants work best when *all* are present, so if you are missing even one of the key players, your overall network protection is compromised.

Don't look to your diet alone to supply all you need. The Linus Pauling Institute (LPI) states that Americans only consume about 25% of their required CoQ10 from food and the extent to which food sources contribute to tissue CoQ10 is "unclear". Studies conducted at the National Institutes of Health (NIH) show tissues and cells in healthy, young subjects attained near-maximal concentrations of vitamin C at a dose of 400 mg/day. An orange provides 70 mg so you'd have to eat 6 a day[1]. LPI suggests 500 mg of C a day as minimal. Green leafy veggies are cited as a source of vitamin E by the NIH's Office of Dietary Supplements, but you would have to eat 56 cups of broccoli to equal 200 IUs. ALA at 30 mg would necessitate 402 pounds of beef liver.

Start Now

One way to get your daily network quota is to look to your multivitamin mineral (MVM) complex. A good MVM should have antioxidants, so check the label. Multi-Gold™ for example has 9 in all, with vitamins A, C, and E, ALA, CoQ10, plus helper bioflavonoids, and even the immune minerals selenium and zinc. Taking a daily MVM helps you stock your network, combat disease and stay healthy.

References omitted for space considerations and available upon request.

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Read more on each of the network antioxidants in the TyH Health Library Online!

Lester Packer, PhD is the world's foremost antioxidant research scientist, a noted author, and director of the Packer Lab at the University of California, Berkeley. **Linus Pauling, PhD** was named the father of orthomolecular medicine, the study of health on a cellular level. The Linus Pauling Institute's Micronutrient Information Center is a source for scientifically accurate information regarding the roles of nutrients in preventing disease and promoting health.

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