



## **Accurate Clinic**

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[www.AccurateClinic.com](http://www.AccurateClinic.com)

### **"Oxidative Stress" and Antioxidants**

When considering the need, or at least the potential benefit, of taking a multi-vitamin supplement or other nutritional supplements on a daily or regular basis, one should ask first if they are already maintaining an ideal diet. If the answer is no, then the argument is established that there is at least a potential benefit. The question then becomes what supplements are best to provide nutrients that are most likely to be sub-optimal in your diet.

Based on current theories in nutrition, our diets should include plenty of vegetables (especially raw) and fruit. But most people probably do not get optimal amounts of the nutrients associated with these vegetables and fruits. These nutrients include vitamins, minerals, antioxidants and misc. other nutrients. Vitamins and minerals are addressed on separate handouts and those supplement recommendations for the most part are based on specific medical conditions, including blood tests.

#### **"Oxidative Stress" and antioxidants**

Current nutritional research supports the belief that many diseases, including diabetes, hypertension, cardiovascular diseases, obesity, liver disease, arthritis and cancer, are a result of "Oxidative Stress." Oxidative stress is when there is over-abundance of reactive oxygen species (ROS), or "free radicals", which are destructive molecules that are in our food, our environment and created by our cells during normal metabolic processes. To combat these ROS our cells have protective systems to manufacture antioxidants, but as we age there is a gradual impairment of these systems resulting in damage to our cells which can lead to the above diseases.

Ever since Linus Pauling, science has turned to antioxidants to offset the damages of oxidative stress to maintain health. Antioxidant supplements are widely recommended and their use is widespread. Studies have shown that diets high in natural antioxidants (such as the Mediterranean (anti-inflammatory) diet, Okinawan or Paleo diets) seem to provide protection against oxidative stress. Statistics suggest that populations following these diets have less degenerative disease and greater longevity.

#### **NRF2 activators**

Recent research has identified certain processes to be very effective at stimulating our body's natural mechanisms for creating antioxidants through a process called NRF2 activation. NRF2 activation can be achieved through exercise, calorie restriction (including fasting) and ingestion of natural nutrients that are NRF2 activators. Common NRF2 activators include curcumin (from turmeric spice - probably the best studied and most potent NRF2 activator), along with resveratrol (from grapes), quercetin (from onions) and sulphoraphane (from broccoli) followed by antioxidants found in green tea and other sources. Different nutrients may activate NRF2 by different mechanisms and when taken together may be synergistic, or more effective when taken together than when taken separately.

Supplementing with NRF2 activators is believed to offer a number of remarkable health benefits, from reducing inflammation and pain to protection against diabetes (reducing insulin resistance) and protection against a variety of degenerative and immune-based diseases.

#### **Bioavailability**

Because antioxidants and NRF2 activators are present naturally in many vegetables and fruits, when we eat these foods we reap the benefits.

But do we?

The truth is sometimes yes, sometimes no. When we cook plant foods, many antioxidants are destroyed, sometimes as much as 97%. Unfortunately, even when eaten raw the antioxidants in food are often poorly absorbed through the stomach or intestines. Even when they get absorbed into the blood, they often have poor penetration into cells, especially into the brain and nervous system. In many cases the antioxidants we ingest simply do not get to where they can do the most benefit: within the cells. In other words, nutrients in our food are sometimes not very bioavailable.



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### **Nanoformulations**

Over the last few years, science has developed new techniques to overcome the problem of bioavailability, including use of nanoformulations. Nanoformulations reduce the size of the nutrient particles down to tiny micron levels and sometimes attach the nutrient to a second component that allows for the particle to be much better absorbed. Studies have demonstrated that nanoformulations such as "phytosomal curcumin" have improved absorption to be as much as 29 times more effective.

Microsizing and nanoformulations are revolutionizing the pharmaceutical industry by providing the means to allow medications and nutrients that are poorly absorbed to become effectively absorbable and bioavailable. Currently, NRF2 activators that have been nanoformulated include curcumin, quercetin, grape seed extract and green tea extract.