

# The Antioxidant Report

**How They Can Protect Your Face  
and Body from the Effects of Aging**

**First Edition**

A [Fountain Of Youth](http://www.fountain-of-youth.net) Publication

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# **The Antioxidant Report**

## **Table of contents**

Introduction & Overview	Page 4
Oxidative Stress	Page 7
Antioxidants and Anti-Aging	Page 9
How Much Do We Need?	Page 11
15 of the Most Powerful Antioxidants	Page 13
Affiliate program – Make Money With Our Books	Page 25

# **Introduction & Overview**

## **The Antioxidant Report**

## **Introduction to Antioxidants**

Our bodies are complex systems requiring proper nutrition to maintain a healthy balance, to fight off disease and to mitigate the effects of aging. Antioxidants may be our body's best defense against the wear and tear we face daily.

## **Free Radicals**

Your body faces a variety of environmental and internal attacks. The effects of ultraviolet light, radiation, pollution, toxins and diet all act to threaten your health. Inside your body, a war is raging. The vast array of processes necessary for life also creates byproducts that can lead to health problems. Among these byproducts are free radicals.

Free radicals, if left unchecked, can wreak havoc on your body, damaging cells and leading to premature aging. Some theories even state that free radicals are the very cause of aging, though there is much research left to do to figure out all of the complexities of the aging process.

Stable molecules have a set number of paired electrons with no electrons free. Free radicals are molecules missing an electron in their outer shell. When an electron bond is broken, the molecule has an

open electron and becomes very unstable and reactive. Things in nature tend to go in pairs, and electrons are no exception. If an electron on a molecule is open, it will seek out another electron to complete the pair. Molecules trying to seek a state of equilibrium will try to grab an electron from the nearest molecule. When they manage to grab an electron from another molecule, the result turns that molecule into a new free radical. This begins a chain reaction, as the new free radical will try to restore equilibrium by grabbing an electron from the next available molecule and so on unless something interrupts the chain.

If the free radical molecule happens to be part of the DNA in a cell, it can damage DNA and change the information stored there. It is somewhat like randomly scrambling words in a document. The general message may still be intact, but the scrambled portion may convey the wrong meaning. The cell then replicates, thus replicating the damaged DNA. This might lead to unfavorable mutations, cancer and other diseases. Over time, the damage can destroy the cell. Left unchecked, the accumulated damage could kill the entire organism.

In addition to leading to major disease and illness, free radical damage also contributes to wrinkles. Wrinkles are the result of a variety of processes. Free radicals damage cell membranes, DNA and proteins.

They can break down collagen (a major supporting component of skin) and cause inflammation in the skin; this ultimately leads to wrinkles.

There is also research examining the link between free radicals and graying hair. The theory is that, over time, free radicals damage cells that produce melanin, the pigment that gives hair its color. Once free radicals damage too many of the melanin-producing cells, the hair turns gray due to a lack of melanin.

### **Oxidative Stress**

Damage done to cell DNA that leads to mutations and cancer is a specific and serious problem, but that is not the only damage that free radicals cause in the human body. Free radicals can damage all components of a cell.

All of the damage from free radicals adds up. Your body has repair mechanisms, but if the damage outpaces your body's ability to repair itself, then this leads to a condition referred to as oxidative stress. If the oxidative stress becomes too great, it can lead to cell death and even kill us.

Your body produces oxidants as a natural part of the process of life. Your cells burn oxygen to convert nutrients into energy, and free radical production is an unavoidable side effect of this critical process. Adding to this the bombardment of free radicals from other sources, internal and external factors (including inflammation, infection and stress along with pollution, smoke, radiation and an array of other internal and external free radical producing stimuli) can overwhelm your body's ability to keep up with repairs.

### **Antioxidants**

How can you help your body keep up with all of the free radical damage when it seems so many factors work against you?

Free radicals and oxidative stress are the problem, and antioxidants are the solution. Antioxidants provide our best defense against the ravages of free radicals and oxidative stress.

A free radical will cause a chain reaction and continue doing damage until something ends the chain. The only thing that will end the chain is to bring all of the free radical molecules back to a state of equilibrium – so the molecule no longer has a free electron making it unstable.

Simply put, antioxidants provide an easy target for the free radical. However, rather than turn into another free radical and continuing the damaging chain, an antioxidant traps the free radical and neutralizes it until it is transported to enzymes which combine two free radicals together to create one stable molecule.

Some antioxidants are water-soluble while others are fat-soluble. This is the reason why it is important to get a variety of antioxidants in your diet. Vitamin C and alpha lipoic acid are water-soluble antioxidants, while vitamin E and vitamin A are examples of fat-soluble antioxidants.

Your body produces some antioxidants (for example, glutathione and melatonin) in order to combat free radicals, but its supply is inadequate. You must give your body an ample supply of antioxidants from dietary sources to make sure there are enough to combat the ravages of free radical damage. These antioxidants may be those that the body cannot produce and/or may supplement the antioxidants that your body produces naturally.

### **Antioxidants and Anti-aging**

The damage from free radicals and the build up of oxidative stress might be the most critical factors in the aging process and death.

The accumulated damage from free radicals eventually causes our cells to die. When too many cells die, we die.

As you age, your body's ability to repair itself diminishes. When your body can no longer keep up with free radical damage, you begin to notice the effects cosmetically and internally. You get wrinkles, your muscles and organs deteriorate, and you do not recover from injury and sickness as quickly as when you were younger. You may feel tired, lack endurance and generally feel – well, *old*.

There are two approaches to anti-aging. The first approach is to make sure we maintain health for as long as we are alive. This involves admitting that we have a biological limit to the number of years we will live and that we should maximize our health for those years to make sure we do not decrease the number of years we have to live by allowing our body to deteriorate faster than necessary. We acknowledge that we have a biological clock and that it will eventually run out, no matter how well we treat our body.

The second approach to anti-aging involves finding ways to increase our longevity beyond its natural biological limits. That is, we want to reset our biological clock so it takes longer to run out. In hundreds of

ways, we already do this with the development and use of advanced surgical procedures, cancer therapy, disease inoculation and the vast array of other treatments and therapies that are not technically “natural” but have enabled us to live longer than ever and to live healthier longer. We still currently have limits to how long we can live, but we are increasing those limits through medical science, research and experimentation.

Antioxidants fall somewhere in-between the two anti-aging strategies. Medical science has increased our knowledge of the processes of aging. We know that antioxidants can help prevent and ease some of the ravages of age. We know that providing our body more antioxidants may help us live longer.

Antioxidants can be a part of an overall anti-aging strategy. They are not the fountain of youth, but they may help us live longer and healthier lives.

### **How Much Do We Need?**

This question has controversy attached to it, no matter which antioxidant you ask about. In the United States, the FDA sets recommended daily values for given vitamins and nutrients. These recommendations are outdated and are nearly useless, even though

they continue to be published on every food package in the United States.

*Writer's note: I wish you luck in trying to find out what the recommended daily allowance is for anything using the FDA or another U.S. government site. They do not make anything obvious, instead choosing to push the "five a day" campaign while burying any real nutritional information.*

From the FDA:

*DVs actually comprise two sets of reference values for nutrients: Daily Reference Values, or DRVs, and Reference Daily Intakes, or RDIs. But these two sets are "behind the scenes" in food labeling; only the Daily Value term will appear on the label to make label reading less confusing.*

The FDA daily values are almost certainly too small for most any antioxidant they recognize. On top of that, they do not suggest daily values for many potentially beneficial antioxidants, such as lycopene or grape seed extract.

Adding to the problems of figuring out how much to take are individual differences in body chemistry, genetics, weight, sex, etc. It is ridiculous to talk about a nutrition program that fits the needs of

everyone. It is unreasonable to expect a nutritional program will fit our needs at all stages of life (or from even day-to-day, depending on the circumstances).

Overall, there is no appropriate, specific quantity of antioxidants to recommend. That would be foolish. *It is up to you to figure out what your needs are. Work with a physician, nutritionist or other healthcare professional to help develop an antioxidant plan to fit your individual needs.*

### **15 of the Most Powerful Antioxidants**

While each of these may have a variety of biological functions, all of them have in common that they are powerful antioxidants. This means they may be extremely important in neutralizing damaging free radicals inside the human body. Our bodies require many of these antioxidants for life while others – though not an absolute necessity – may have tremendous health benefits.

As mentioned above, it is impossible to recommend a daily value of an antioxidant or even to recommend if someone should take a particular antioxidant without considering all of the variables of an individual's health and lifestyle.

These antioxidants have powerful biological effects and may interact with drugs or worsen certain health problems. As always, consult your physician or other qualified medical professional before you supplement or increase your intake of a given antioxidant.

### **Lycopene**

Lycopene is an open-chain, unsaturated carotenoid that provides the red coloring to tomatoes, guava, rose hips, watermelon and pink grapefruit.

Cooking diminishes the benefit of some antioxidants, but cooking and processing tomatoes actually increases the bioavailability of the lycopene. Combining lycopene-rich foods with oils increases the absorption of lycopene from the digestive track into the bloodstream. For example, pizza and spaghetti, long maligned as unhealthy, may actually provide fantastic combinations of the antioxidant lycopene and the fats necessary for its absorption.

Lycopene is insoluble in water, so the surrounding vegetable fiber must be broken down to enable lycopene's absorption. This is why processing tomatoes by cooking and crushing them makes much more

lycopene available for absorption than one gets by simply eating raw tomatoes.

Lycopene finds its way into the testes, prostate and adrenal glands in high concentration, potentially protecting these areas from the ravages of free radicals and perhaps lowering the risk of cancer and other diseases.

Food high in lycopene includes tomato products, watermelon and pink grapefruit.

There is strong evidence that lycopene can help protect against a variety cancers and other diseases and should be considered as part of an overall antioxidant regiment.

### **Vitamin C**

Despite being necessary for human life, controversy surrounds vitamin C, primarily about the proper daily intake. There is strong evidence that we should probably take significantly more than the FDA recommended daily value.

Unlike most animals, humans cannot manufacture their own vitamin C. Vitamin C is also water-soluble, and we have no way of storing it

inside our body. This means that we need a daily supply of vitamin C. Optimally, we would get vitamin C throughout the day, as it easily flushes from our system.

Cooking foods can significantly reduce their vitamin C levels. Since it is water-soluble, it easily leaches out into liquid. Raw fruits and vegetables are the best sources of vitamin C.

Foods high in vitamin C include orange juice (from concentrate), citrus fruits such as oranges, lemons and limes, red bell peppers and a variety of other fresh fruits and vegetables. You can get additional vitamin C from supplements. If vitamin C irritates your stomach, you may also look for "buffered" vitamin C tablets or liquid vitamin C.

### **Vitamin E**

Vitamin E is a fat-soluble vitamin necessary for human life. It is available in eight different forms. Each form has a certain activity level and functional use in the body. Alpha-tocopherol is the most active form of vitamin E in humans.

It is somewhat difficult to get enough vitamin E in food sources, especially in low-fat diets. If you buy supplements, make sure they are natural alpha-tocopherol (this is the most bioactive form).

Foods high in vitamin E include wheat germ oil, sunflower oil, almonds, hazelnuts, peanut butter, peanuts and sunflower seeds.

Vitamin E can act as an anticoagulant and may increase the risk of bleeding problems.

### **EGCG (epigallocatechin gallate)**

EGCG is a catechin found in tea, especially in green tea, but also in black, oolong and white tea.

There is much evidence to support the health benefit of EGCG. Drinking tea is probably the best way to get EGCG rather than in supplement form (e.g., green tea extract).

Drinking tea, especially green and white tea, may have many other health benefits you miss by taking an extract.

### **Vitamin A**

Vitamin A is a fat-soluble vitamin necessary for human life.

Cooking foods with vitamin A does little to reduce the vitamin content.

Many foods are high in vitamin A, so getting ample amounts in your diet should not be very difficult. Good food sources include sweet potatoes, carrots, spinach and cantaloupe.

### **Vitamin D**

Vitamin D is another extremely important fat-soluble vitamin necessary for human life – and another powerful antioxidant.

Some call Vitamin D the “sunshine” vitamin because your body can use UV rays from the sun to synthesize it. Getting 15 minutes of unfiltered sunlight two or three times a week may be the best way to get vitamin D. Remember that this must be *unfiltered* sunlight (=without sunscreen). Sunscreens block UV rays. But remember, too much sun exposure can lead to skin damage and cancer, so wearing sunscreen for prolonged exposure to the sun is important.

Individuals who do not or cannot go out that frequently or those who live in areas where sunlight exposure is minimal during the winter months will probably need additional vitamin D in diet or supplements.

Dietary sources of vitamin D include cod liver oil, salmon, mackerel, sardines, tuna and milk.

## **Selenium**

Selenium is a trace mineral necessary for human life.

While selenium is not a direct antioxidant, it teams with proteins to make selenoproteins, which are important antioxidant enzymes.

Selenium is a trace mineral and can be toxic at high levels. Foods which provide selenium include tuna, beef, cod, turkey, chicken and eggs.

Most individuals get plenty of selenium in their diet without supplementation, though selenium deficiency is common in some parts of the world.

## **Grape Seed Extract**

Grape seed extract is, as the name implies, extracted from grape seeds.

Grape seed extract contains chemicals known as polyphenols, which are powerful antioxidants.

Supplements are the only way to get grape seed extract.

### **Vitamin K**

Vitamin K is necessary for human life. Produced by bacteria in the intestines, vitamin K is necessary for normal blood clotting

Dietary sources of vitamin K include spinach, lettuce, kale, cabbage, cauliflower, broccoli and milk.

### **Coenzyme Q10**

Coenzyme Q10 (CoQ10) is a compound found naturally in the energy-producing center of the cell known as the mitochondria.

It is widely regarded for supplementation in a wide range of cases, from high blood pressure to congestive heart failure to diabetes and stroke damage reduction. It is also considered an immune system booster.

Coenzyme Q10 is available to us in oily fish, whole grains and supplements.

### **Lutein**

Lutein is a fat-soluble antioxidant and another carotenoid. Found in some fruits and flowers, many of its benefits are in eye health. It actually influences pigmentation in the eye, and a reduced pigmentation is associated with macular degeneration. Unfortunately, despite awareness of its potential benefits, even mainstream multivitamins with lutein contain such small quantities they may not help.

You can get lutein in green leafy vegetables such as kale, spinach and collard greens.

Many people may find it difficult to get enough lutein in their diet. Lutein supplements are available.

### **B Vitamins (3): B<sub>2</sub> (Riboflavin), B<sub>3</sub> (Niacin), and B<sub>6</sub> (Pyridoxine)**

B vitamins assist our bodies in an array of ways. In the case of B<sub>2</sub>, B<sub>3</sub>, and B<sub>6</sub>, each water-soluble vitamin has the additional perk of antioxidant benefits.

- B<sub>2</sub> is available in dark leafy greens, dairy, fish, and eggs.
- B<sub>3</sub> (also known as nicotinic acid) works on both toxin removal and DNA repair in the body. Sources include nuts, a broad range of fruits and vegetables, and many animal products.

- B<sub>6</sub> is important for red blood cell metabolism and enzymes used in protein metabolism; in addition, it helps control blood sugar levels. Humans consume it in fortified cereals, beans, meat, poultry, fish, and some fruits and vegetables.

### **Alpha Lipoic Acid (ALA)**

Alpha lipoic acid is a powerful and biologically active compound.

In addition to its powerful antioxidant effect, studies of ALA show promise in other areas of health. ALA may increase insulin-stimulated glucose disposal (potential benefits in diabetes treatment), and ALA may be effective in treatment of numerous neurodegenerative disorders, including Alzheimer's and Parkinson's disease.

Food sources of ALA include liver, spinach, broccoli and potatoes.

### **Beta-Carotene**

Beta-carotene is a carotenoid that gives the orange coloring to many plants.

Beta-carotene is a precursor to Vitamin A for humans.

Sources of beta-carotene include many fruits and vegetables (for example, carrots, sweet potatoes, and pumpkin).

A study of beta-carotene supplementation to decrease the risk of lung cancer and cardiovascular disease in smokers, former smokers and workers exposed to asbestos revealed a surprising and disconcerting result. Beta-carotene supplementation may have *increased* the instances of lung cancer and cardiovascular disease and may have increased the risk of death from lung cancer and cardiovascular disease.

This does not mean smokers should avoid foods rich in beta-carotene and other carotenoids. Foods rich in carotenoids have health benefits and may reduce the risks of cancer and other diseases.

### **Melatonin**

Melatonin is a powerful hormone found in all living creatures. In humans, the pineal gland's pinealocytes produce melatonin.

Melatonin is critical in regulating the sleep-wake cycle (called circadian rhythms). Production of melatonin is greatest in the dark. This is why sleeping at night and in a dark place is important for melatonin production.

Melatonin is a powerful antioxidant. Unlike other antioxidants, melatonin does not undergo redox cycling. Redox cycling is where a molecule repeatedly gains and sheds electrons. Redox cycling could allow other antioxidants (such as vitamin C) to promote free radical formation. Melatonin, once it captures a free radical, forms several stable end-products and will not return to its previous form.

Melatonin declines dramatically with age and melatonin deficiency may be responsible for a variety of age-related diseases. Studies on mice show that increasing melatonin levels can increase lifespan.

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The End