

Hydrogenated Water Helps Reduce Oxidative Stress

Hydrogenated water helps reduce the oxidative stress that accelerates aging. If you are interested in slowing aging, reducing inflammation, and protecting yourself from many diseases and medical conditions, hydrogen water may be the key to your success.

Free radicals and other reactive oxygen species (ROS) are the result of normal enzymatic and nonenzymatic reactions in the human body. For example, stress, inflammation and exercise can create free radicals.

Free radicals can also be generated because of external influences such as

- Radiation
- X-rays
- Ozone
- tobacco smoke
- Exposure to ultraviolet rays
- Air pollutants
- Industrial chemicals

Oxidative stress due to excess free radicals progressively damage lipids, proteins, carbohydrates, RNA and DNA. This causes damage to cells and homeostatic disruption. The damage accumulates over time throughout the body.

Free radical damage is important because it manifests itself as disease and sickness. Free radical damage is associated with a number of conditions including premature aging, cancer, hypertension, heart diseases, stroke, arthritis, atherosclerosis, metabolic syndrome and diabetes.

Balance Between Reactive Oxygen Species and Antioxidants

The body experiences oxidative stress when the the production of reactive oxygen species exceeds the activity of the antioxidant defense system.

So, a lot of activity has been expended to find safe, effective, natural ways to increase antioxidants in the body.

Most people know that foods containing beta-carotene, vitamin C, and vitamin E have proven antioxidant properties. The trace mineral selenium is often included in this group. In addition, the body itself produces antioxidants such as glutathione, ubiquinol, and uric acid as part of its normal activities.

Hydrogen as an Antioxidant

But, hydrogen is even more basic than complex molecules such as vitamins and selenium in neutralizing a reactive oxygen species. Hydrogen can combine with reactive oxygen species to prevent DNA damage. But, how do we introduce hydrogen into the body? Hydrogen is present in the atmosphere in minute quantities, only about one part per million.

There are a number of ways to introduce hydrogen into the body. Some of these techniques include:

- Inhaling hydrogen gas
- Drinking hydrogen dissolved water (hydrogen water)
- Taking a bath in hydrogen water
- Injections of hydrogen-dissolved saline
- Dripping hydrogen saline into the eyes
- Modifying intestinal bacteria to produce more hydrogen

While introducing hydrogen into the body may seem new or trendy, it has been used for many years in gas mixtures used for deep diving and for prevention of decompression sickness.

Inhaling hydrogen gas has a rapid effect and is good for acute oxidative stress. But hydrogen in the air is flammable. This limits its use for therapeutic effects mainly to medical facilities. Outside of controlled environments in medical institutions, hydrogen is normally delivered by dissolving hydrogen in water, usually through bubbling or other direct contact with hydrogen.

Water with dissolved hydrogen (but low in dissolved oxygen) has a high pH. It has the ability to scavenge reactive oxygen species and protects the body from oxidative damage.

Mouse studies of dissolved hydrogen indicate, among other benefits, that it reduces atherosclerosis, improved kidney function, and improves brain injuries.

Antioxidants such as vitamins C and E help with glycemic control in both humans and animals. So, if dissolved hydrogen can act as an antioxidant, it may also help with glycemic control.

Clinical Studies of Hydrogenated Water

While many studies have been done on mice and rats, here are a couple of studies on humans.

In one study 30 patients (24 who had type 2 diabetes which was controlled with diet and exercise and 6 who were insulin resistant) were enrolled in a randomized, double-blind, placebo-controlled, crossover study to determine the effects of hydrogen-rich water. Half these patients consumed 900 mL of hydrogen-rich water and the other half were provided 900 mL of placebo water daily for 8 weeks. After a twelve week "wash-out" period the crossover period

began were the groups switched water types.

Various biomarkers of oxidative stress, insulin resistance, and glucose metabolism were measured before and after the 8 week trial.

Patients receiving hydrogenated water showed significantly lower levels overall of LDL cholesterol and specifically the dangerous small dense LDL as well as significantly lower urinary 8-isoprostanes (an indicator of oxidative stress).

Patients on hydrogenated water also showed increased plasma levels of adiponectin (indicating enhanced insulin sensitivity) and extracellular-superoxide dismutase (important for antioxidant defense). In addition, in 4 of the 6 patients with insulin resistance, the final glucose tolerance test showed normal.

In another study of 20 patients with potential metabolic syndrome (displaying one or more of the metabolic syndrome characteristics). Subject consumed 300-400 mL of hydrogenated water 5 times per day resulting in a total of 1.5 L to 2.0 L of hydrogenated water.

Various measures were made at the start, after 4 weeks and after the 8 week trial period.

After 4 and 8 weeks, the concentration of urinary TBARS (a measure of oxidative stress) decreased significantly from the start of the trial. There was an increase of SOD (superoxide dismutase) indicating increased antioxidant defense. There was a significant increase in good HDL cholesterol as well as a decrease in the ratio of total cholesterol to HDL cholesterol. This study showed no statistically significant difference in fasting glucose levels.

Considerations in Purchasing a Hydrogen Water Generator

You will find hydrogen water generators priced from about \$40 on up. Some expensive versions cost several thousand dollars.

They all work by electrolysis of water. When positive and negative electrodes are placed in water, the water molecule (H_2O) is broken up with hydrogen bubbling up from the negative electrode and oxygen bubbling up from the positive electrode.

Cheaper hydrogen water generators place both electrodes at the bottom of the water container so both hydrogen and oxygen bubble up into your water. Because water normally contains some salts, you will also get chlorine bubbling up into your water.

Models costing over \$100 often use Proton Exchange Membrane or PEM technology. Here the positive (oxygen) and negative (hydrogen) electrodes are separated by a membrane that allows hydrogen to bubble up into your water container, but oxygen and chlorine bubbles into another chamber where it is

discharged into the air.

This video explains this concept.

Hydrogen water may NOT be safe to drink! Find out WHY

Conclusions About Hydrogen Water You Can Use

Many studies have shown the potential for hydrogen to act as an antioxidant and defend against oxidative stress.

You probably already take vitamins C and E to help combat oxidative stress, slow aging, and help prevent many of the common diseases of aging. And now you can add hydrogen water to your tool box.

More oxygen generators are appearing on the market. Be sure to choose on with PEM technology to get the cleanest, purest hydrogen water for you and your loved ones.

Hydrogen Water References

[Free radicals, antioxidants and functional foods: Impact on human health](#) as published in *Pharmacognosy Review*

[Molecular hydrogen is a novel antioxidant to efficiently reduce oxidative stress with potential for the improvement of mitochondrial diseases](#) as published in *Biochimica et Biophysica Acta*

[Supplementation of hydrogen-rich water improves lipid and glucose metabolism in patients with type 2 diabetes or impaired glucose tolerance](#) as published in *Nutrition Research*

[Effectiveness of Hydrogen Rich Water on Antioxidant Status of Subjects with Potential Metabolic Syndrome—An Open Label Pilot Study](#) as published in *Journal of Clinical Biochemistry and Nutrition*

Vitamins: Fat Or Water Soluble?

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Vitamins are organic substances essential in small amounts for the body's normal growth and activity. They are obtained naturally from plant and animal foods. Vitamins have two classifications, fat- or water-soluble, depending on the materials in which they dissolve.

Fat-Soluble Vitamins:

Fat-soluble vitamins include A, D, E and K. These vitamins are stored in the body's fat tissues before they are absorbed in the blood stream. Because the body stores these vitamins, it is not always necessary to get a fresh supply each day. Caution should be used when taking fat-soluble vitamins to avoid the potential of harmful, toxic levels.

Fat-soluble vitamins are required for the maintenance of healthy bones, skin and hair and for bringing nourishment to the cells. Vitamin A is essential for vision, especially night vision. Vitamin K is essential for the formation of blood-clotting proteins.

The major dietary sources of these vitamins are green leafy vegetables, deep orange or yellow fruits and vegetables, cod liver oil, sardines, butter, egg yolks, fortified milk, almonds, wheat germ, peanut butter, corn oil, sunflower seeds, and liver.

Water-Soluble Vitamins:

Water-soluble vitamins include B1, B2, B3, B6, B12 and vitamin C, as well as folic acid and biotin. Water-soluble vitamins, unlike fat-soluble vitamins, are not easily stored in the body and are often lost from foods in the cooking process. It is therefore important to include these vitamins in a daily dietary regimen.

B vitamins are involved in fat and protein breakdown. The B vitamins are required for healthy nervous system function, healthy skin, hair, eyes and liver function. Some of the B vitamins require other B vitamins to work correctly in the body.

Vitamin C (ascorbic acid) is important to the body in the production of collagen, creating connective tissue and supporting our organs. Other functions include protecting the fat-soluble vitamins and preventing scurvy.

The major dietary sources of these vitamins are cereal grains, meat, poultry, eggs, fish, milk, legumes and fresh vegetables. Vitamin C is found in citrus fruits, guava, red bell pepper, papaya, orange juice, broccoli, green bell pepper, strawberries, cantaloupe, tomato juice, mango, potato, cabbage, tomato, collard greens, spinach, Brussels sprouts, turnip greens, cauliflower, blackberries, and blueberries.