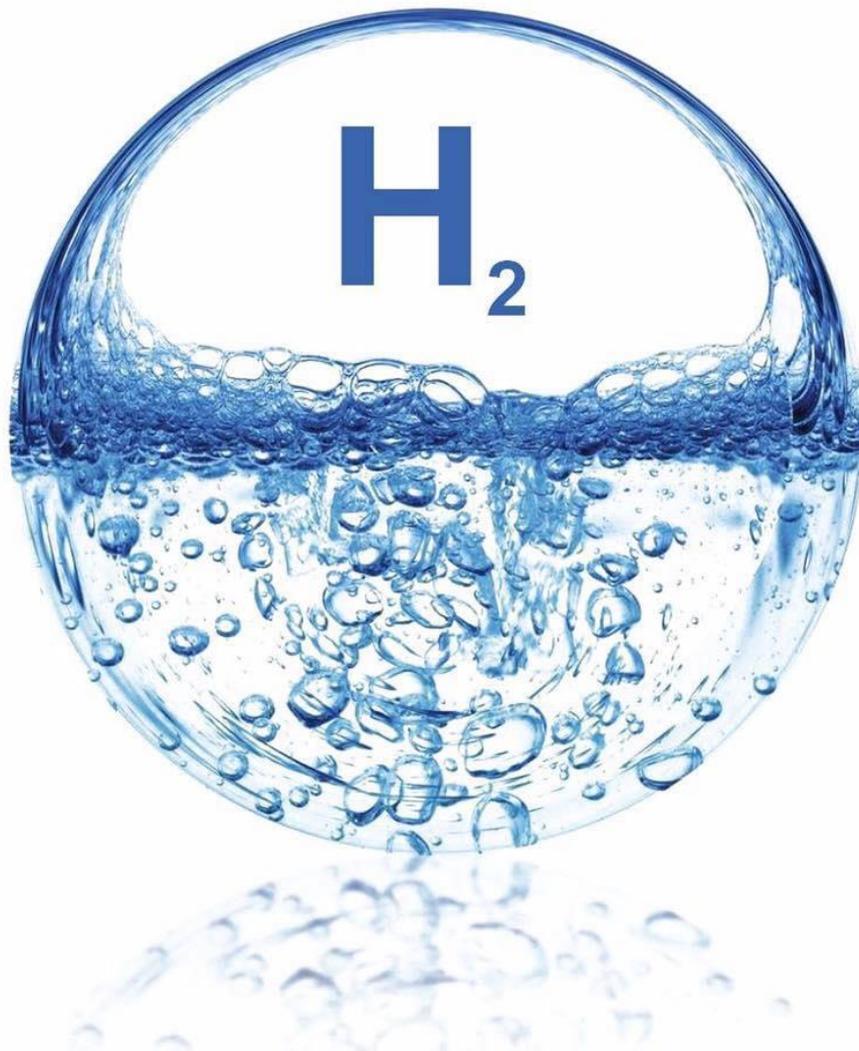


Hydrogen-Rich Water

--- the water for your health



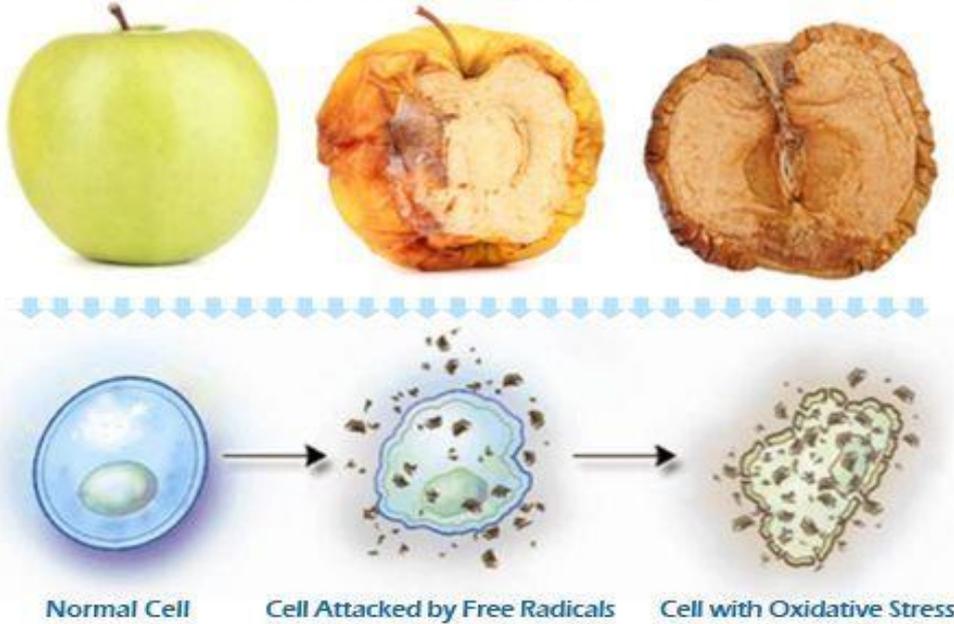
1. Do you know the harmful oxidative stress is attacking your body?

Do you know that your body is under constant attack from oxidative stress all the time? Just like the apple turns brown, the metal becomes rusty. You have wrinkles on your face after years of oxidative stress damage to your body cells.

Our Cells get oxygen by breathing it. 98% of the oxygen is combined with glucose and fat in organelles and then converted into energy to meet the needs of cell activity. The other 2% of oxygen is converted into oxygen free radicals as dangerous waste. Free radicals can interact with a variety of substances, causing a series of destructive chain reactions to cells. This process is called oxidative stress.

There are many diseases that have been proved to be derived from oxidative stress.

These apples demonstrate how oxidative stress breaks down your cells, causing premature aging and disease.

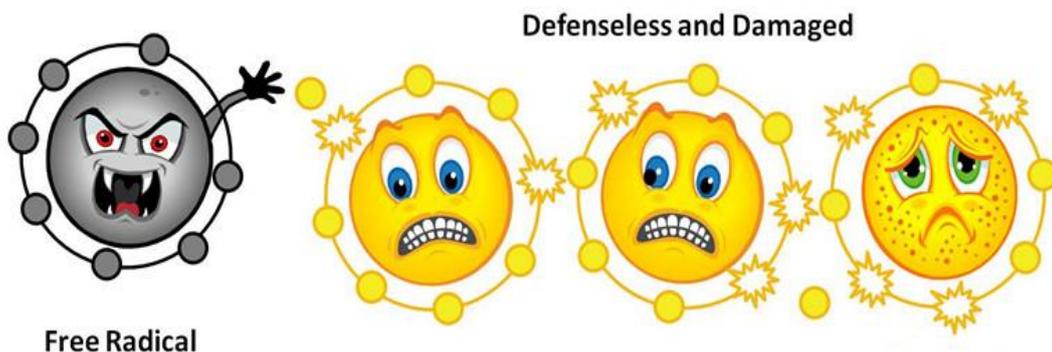


Body cells damaged by oxidative stress



Oxidative stress is associated with many human diseases.

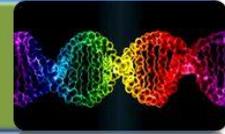
The dangerous free radicals are atoms or groups of atoms with an unpaired number of electrons and can be formed when oxygen interacts with certain molecules. To seek stability, free radicals tend to rob an electron from whatever molecule happens to be nearby. In turn, the molecule that loses an electron to a free radical becomes unstable, and becomes a new free radical. As such, free radicals can be the cause of a never-ending chain reaction, like dominoes. Their chief danger comes from the damage they can do when they react with important cellular components such as DNA, or the cell membrane.



A free radical is robbing an electron from a nearby healthy cell.

Accumulation of free radicals is associated with skin ageing and many diseases.

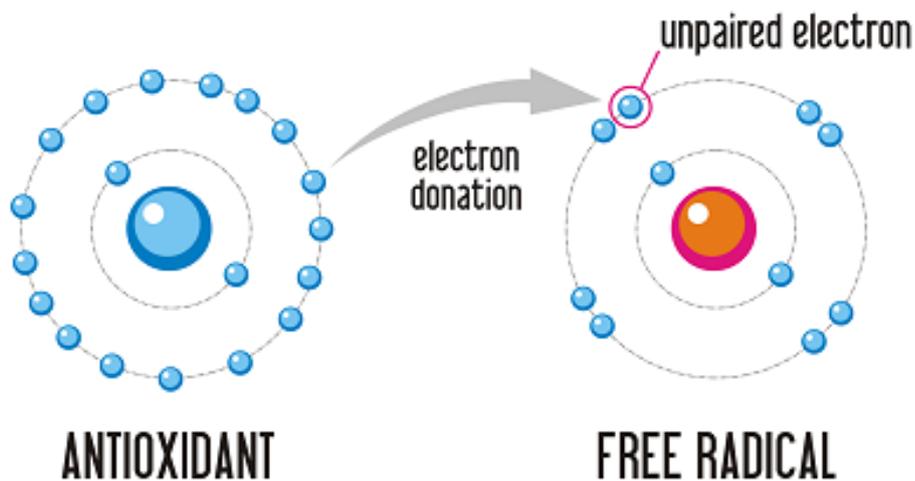
Free Radical Diseases



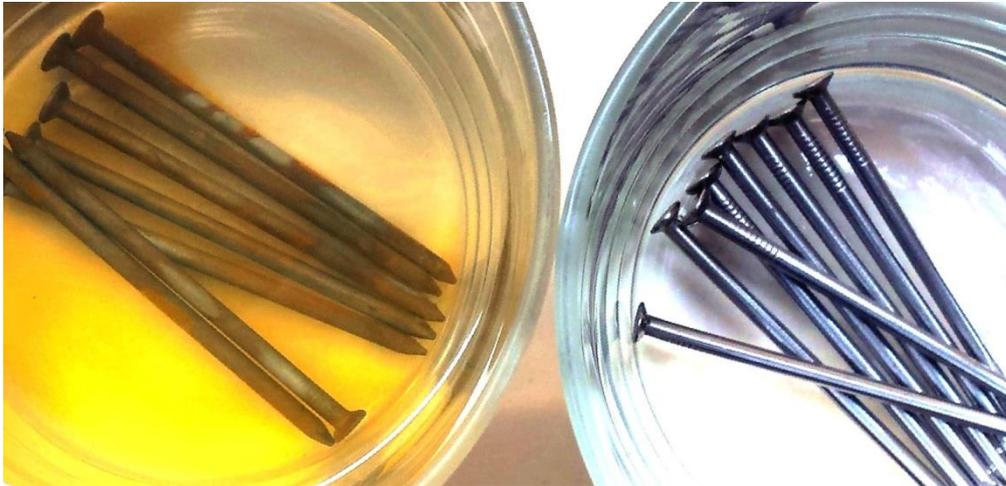
2. How molecular hydrogen works to remove toxic free radicals ?

Antioxidants are a saving grace! They are compounds that can contribute an electron to a free radical so that the free radical does not take an electron from healthy atoms.

How antioxidants reduce the free radicals



Common antioxidants are fruits and vegetables, while hydrogen molecules are the most powerful antioxidants.



Nails will rust in ordinary water, but not in hydrogen water.

Scientific researchers tell us, “Molecular hydrogen is extremely unique since it has the capability to act at the cellular level. Hydrogen is qualified to cross the blood brain barrier, to enter the mitochondria, and even has the ability to translocate to the nucleus under certain conditions. Once in these ideal locations of the cell, previous studies have shown that hydrogen exerts on antioxidant, anti-apoptotic, anti-inflammatory, and cytoprotective properties that are beneficial to the cell”.

Acute oxidative stress causes serious damage to tissues, and persistent oxidative stress is accepted as one of the causes of many common diseases including cancer.

The hydrogen molecule has the strongest penetration because it is the smallest and lightest element in the universe. When ingested, it travels throughout the bloodstream, the energy centers of a cell, and penetrates the nucleus, where the majority of DNA is stored. Once there, it significantly reduces free radicals—inflammation-causing molecules linked to everything from accelerated skin aging to cancer.



Hydrogen (H_2) has potential as an antioxidant in preventive and therapeutic applications. H_2 selectively reduced the hydroxyl radical, the most

cytotoxic of reactive oxygen species (ROS), and effectively protect cells; Thus H₂ can be used as an effective antioxidant therapy; owing to its ability to rapidly diffuse across membranes, it can reach and react with cytotoxic ROS and thus protect against oxidative damage. And there are three main properties that explain hydrogen's therapeutic effects.

- 1) Molecular hydrogen can easily diffuse into the subcellular compartments, reducing the levels of cytotoxic oxygen radicals and protecting the DNA, RNA and proteins from oxidative stress.
- 2) Molecular hydrogen also triggers the activation or upregulation of additional antioxidant enzymes (e.g. glutathione, superoxide dismutase, catalase, etc.) and/or cytoprotective proteins of the body.
- 3) Molecular hydrogen may be a novel-signaling molecule that can alter cell signaling, cell metabolism and gene expression, and explain the anti-inflammatory, anti-allergic, and anti-apoptotic (or anti-cell death) effects.

Reference:

Hydrogen acts as a therapeutic antioxidant by selectively reducing cytotoxic oxygen radicals

DR. SHIGEO OHTA, PHD., (NIPPON MEDICAL SCHOOL , Japan)

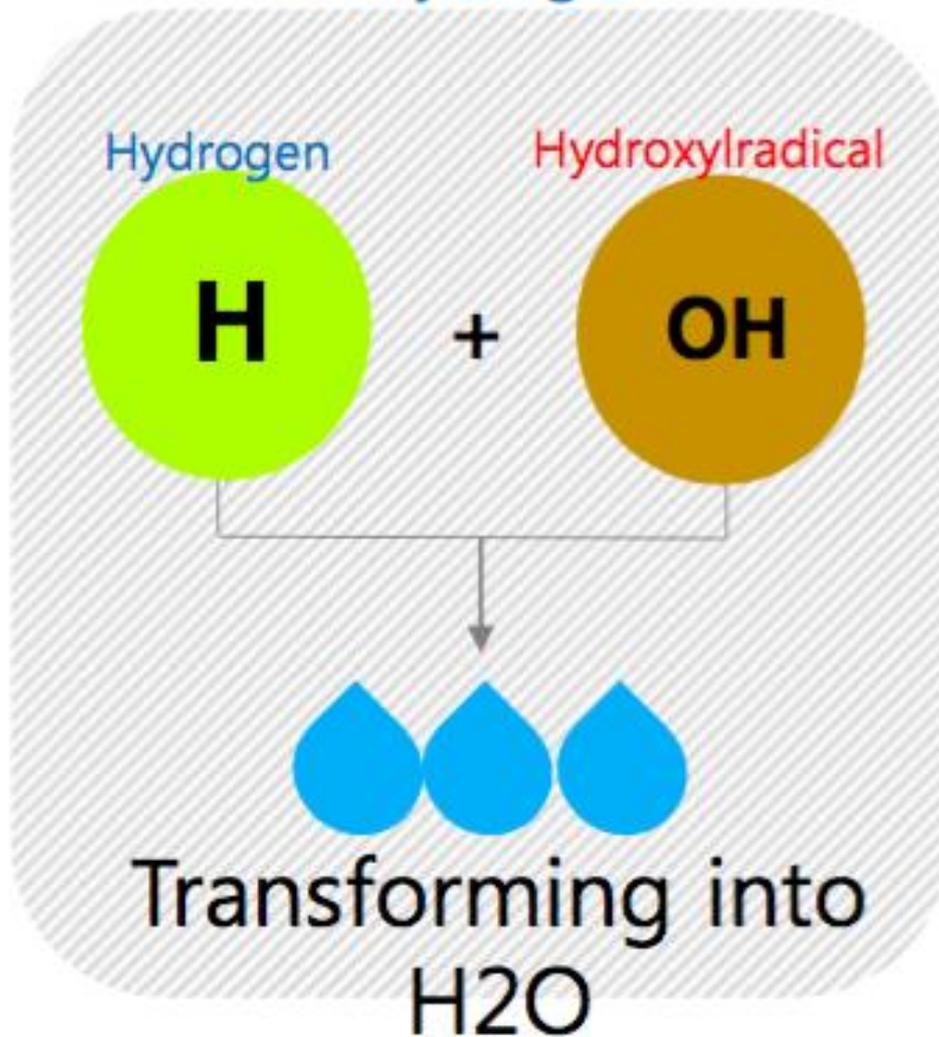
Nature Medicine 13, 688–694 (2007)

3.What is hydrogen water and should you drink it?

Hydrogen-rich water is water with infused hydrogen gas (hydrogen molecules), hydrogen molecules in water act as powerful antioxidants. These molecules help neutralize oxygen free radicals that contribute to disease development, inflammation, and aging.

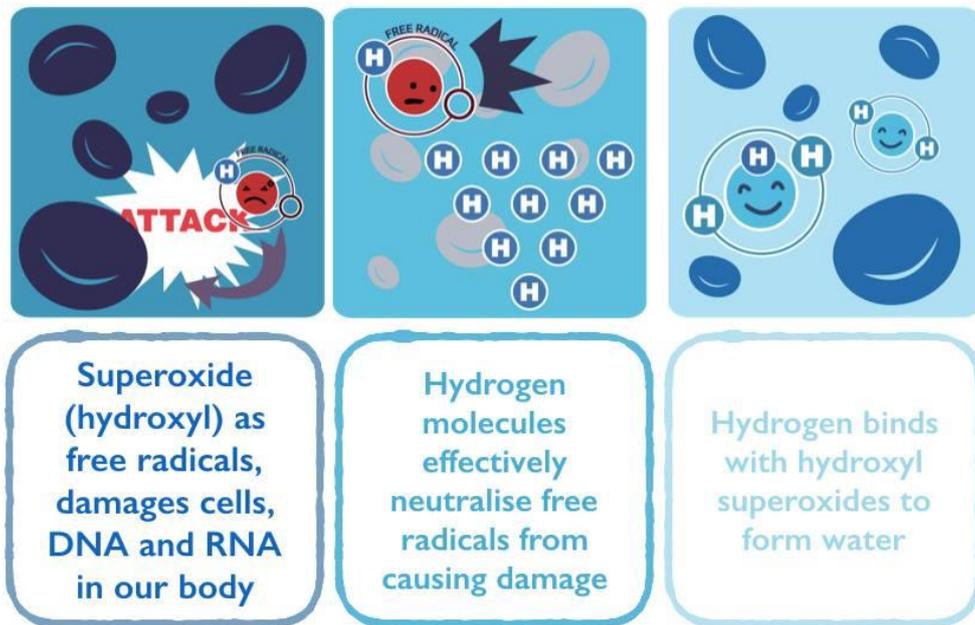
Water, which is essential to life, is formed by the combination of oxygen (a powerful oxidizer) and hydrogen (a powerful reducer). By drinking hydrogen rich water, it is absorbed into intestine within 1 minute, and spreads through whole body within 10 minutes, so it works on removing free radicals and prevent cellular damage. Each sip of Hydrogen-rich water will fill your bodies with trillions of hydrogen molecules. As a natural antioxidant, molecular hydrogen successfully effective molecule to scavenger or pair up with toxic hydroxyl radicals and neutralizes them.

Eliminating oxygen free radical of hydrogen



There is no toxicity of Molecular Hydrogen (H₂) because the byproduct of the free-radical neutralizing reaction is water. Each molecule of H₂ will neutralize to hydroxyl radicals into two molecules of H₂O hydrating your cells which has only positive effect. That water will be flushed out of the body with urine and sweat.

How Molecular Hydrogen Works?



Therefore molecule of hydrogen has high-powered therapeutic potential. Hydrogen is a novel and innovative therapeutic tool and can be used like intravenous vitamin C therapy and can be used in a daily basis by drinking Hydrogen-rich water. The undeniable advantage, as mentioned above, is the size of the hydrogen molecule. It can easily penetrate human cells and mitochondria.

The overabundance of toxic free radicals leads to accelerated aging and a number of serious diseases. Common antioxidants, derived from vitamins and food can not cover the entire body due to the larger

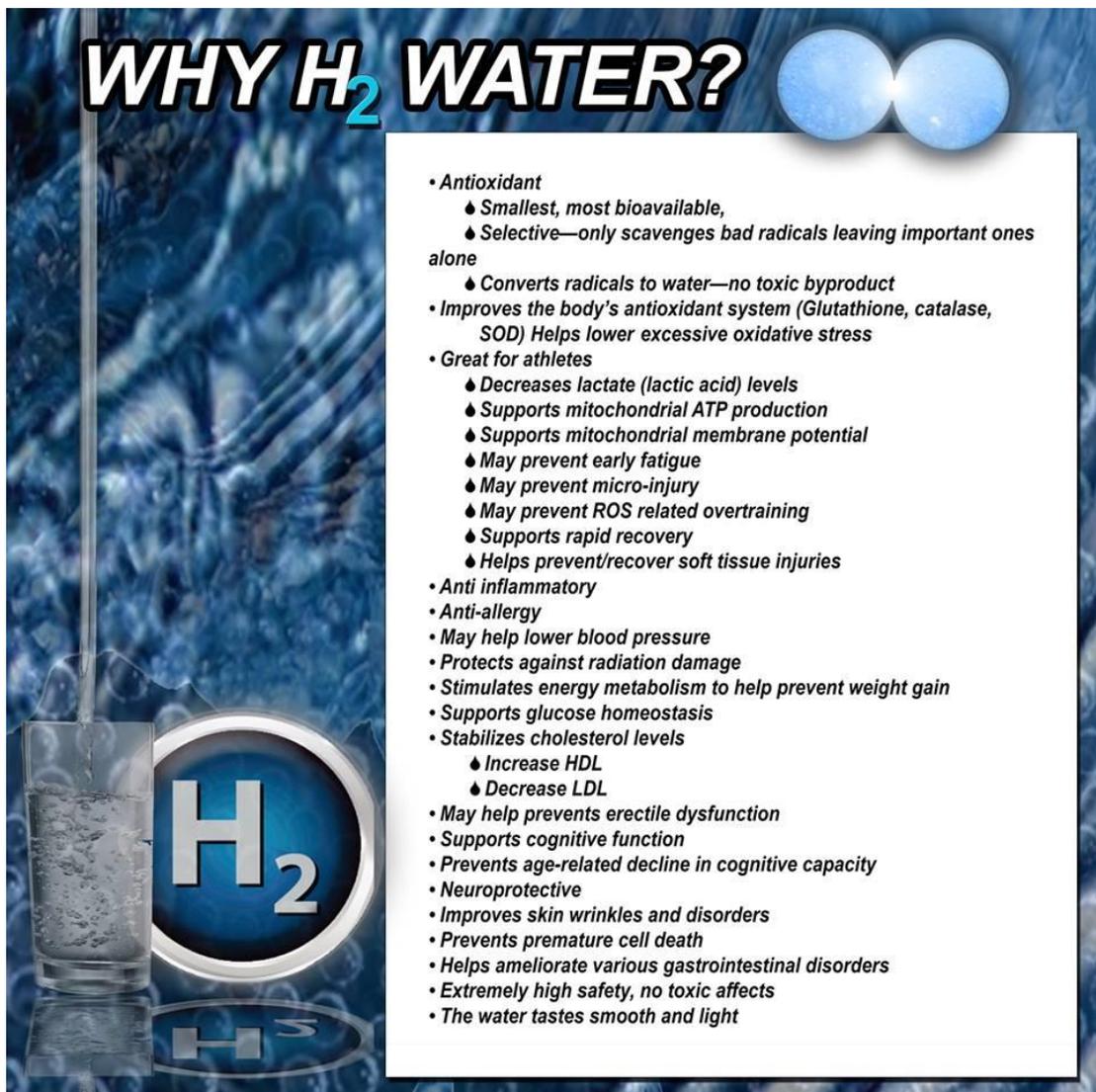
size, and therefore their effectiveness is much lower. Hydrogen therapy is safe as there is no upper limit of use. The more water you drink infused with hydrogen the better, especially if you have late stage cancer and need to turn things around quickly.

This fact indicates that there is no side effect and no restrictions on consumption of plenty of water enriched with hydrogen for people at any age including infants, children, pregnant women and elderly people.

			
Health groups	People often stay up late, life stress, irregular life	Elderly	People want to stay young body
Hydrogen-rich water for those people			
			
the preferences of people drinking and lavish meals	Regular exercise group	Pregnant woman	Three high patients

Hydrogen water can hugely benefit your health and prolong your lifespan.

Reducing blood sugar, anti-inflammatory, anti-wrinkles, anti-aging, neuroprotective, Weight loss and more Hydrogen water has been found to have many health benefits.



WHY H₂ WATER?

- **Antioxidant**
 - ◆ Smallest, most bioavailable,
 - ◆ Selective—only scavenges bad radicals leaving important ones alone
 - ◆ Converts radicals to water—no toxic byproduct
- Improves the body's antioxidant system (Glutathione, catalase, SOD) Helps lower excessive oxidative stress
- Great for athletes
 - ◆ Decreases lactate (lactic acid) levels
 - ◆ Supports mitochondrial ATP production
 - ◆ Supports mitochondrial membrane potential
 - ◆ May prevent early fatigue
 - ◆ May prevent micro-injury
 - ◆ May prevent ROS related overtraining
 - ◆ Supports rapid recovery
 - ◆ Helps prevent/recover soft tissue injuries
- Anti-inflammatory
- Anti-allergy
- May help lower blood pressure
- Protects against radiation damage
- Stimulates energy metabolism to help prevent weight gain
- Supports glucose homeostasis
- Stabilizes cholesterol levels
 - ◆ Increase HDL
 - ◆ Decrease LDL
- May help prevent erectile dysfunction
- Supports cognitive function
- Prevents age-related decline in cognitive capacity
- Neuroprotective
- Improves skin wrinkles and disorders
- Prevents premature cell death
- Helps ameliorate various gastrointestinal disorders
- Extremely high safety, no toxic affects
- The water tastes smooth and light

The Health Benefits of Hydrogen Water

- 1) Hydrogen Water is an Antioxidant and Prevents Brain Damage
- 2) Hydrogen Help Skin Care and Reduce Wrinkles
- 3) Hydrogen Water Suppresses Inflammation
- 3) Hydrogen Water Reduces Muscle Fatigue, Motor Deficits, and Muscle Degeneration
- 4) Hydrogen Water Prevents Metabolic Syndrome
- 5) Hydrogen Water Help in Weight Loss
- 6) Hydrogen Water Enhances Mitochondrial Function
- 7) Hydrogen Water Treats Diabetes
- 8) Hydrogen Water May Treat Metabolic Acidosis
- 9) Hydrogen Water May Prevent Cancer
- 10) Hydrogen Water Reduces Side Effects of Cancer Treatments
- 11) Hydrogen Water Boosts Skin Health

- 12) Hydrogen Water Enhances Wound Healing
- 13) Hydrogen Water Limits Damage of Transplant Organs
- 14) Hydrogen Water Improves Bladder Dysfunctions
- 15) Hydrogen Water is Cardio-Protective
- 16) Hydrogen Water Protects the Eye
- 17) Hydrogen Water Prevents Hearing Loss
- 18) Hydrogen Water Combats Allergy
- 19) Hydrogen Water Ameliorates Kidney Disease
- 20) Hydrogen Water Protects the Liver
- 21) Hydrogen Water Promotes Gut Health
- 22) Hydrogen Water Protects the Lung
- 23) Hydrogen Water Relieves Pain
- 24) Hydrogen Water May Prolong Lifespan

25) Hydrogen Water is Antibacterial and May Promote Oral Health

氢水
生命的动力
HYDROGEN
WATER
FUEL OF LIFE

Drinking **Hydrogen Water** Is The Only Effective Means To **Remove Harmful Free Radicals** From The Body



氢阻止自由基的侵害
Free radicals damage prevented by hydrogen

氢结合自由基以防止细胞损伤和破坏
Hydrogen combines with free radicals to prevent cellular damage and destruction



转换成无害的水
To produce safe and harmless water

氢结合自由基转换成安全及无害的水。随后将被排出体外。
Free radicals combined with hydrogen and transform into safe and harmless water to be discharged from the body.

氢水的抗氧化能力 HYDROGEN WATER IS NATURE'S STRONG ANTIOXIDANT

喝1.5公升的氢水跟吃以下数量的水果拥有同等的抗氧化效果：
Drinking 1.5L of hydrogen Water has the same antioxidant effects as consuming fruits and vegetables shown below:



- 以上是以蔬果的β-胡萝卜素作为比较。The comparison of values was made by measuring beta carotene content in fruits and vegetables.
- 来自日本的Shitama大学教授Hatana Gyazuki研究成果。Research results from Japan's Shitama University Professor Hatana Gyazuki :- based on data with only 550 ppb (parts per billion) of hydrogen content



Molecules hydrogen help to slow body aging and wrinkles.

4.How much hydrogen-rich water should an adult drink per day to get a beneficial result ?

IHSA comments on the world-wide certification of drinkable hydrogen water; declared by “International Hydrogen Standards Association”

Drafted by:

Shigeo Ohta, Japan

GaeHo Lee, Korea

XueJun Sun, China

Shucun Qin, China

Tyler W. LeBaron, USA

Introduction

Currently throughout the world, biomedical researchers and the general public are learning about molecular hydrogen therapy, including hydrogen gas inhalation, hydrogen infused water (hydrogen water), etc. for the prevention of various diseases and overall health and wellness. The efficacy of molecular hydrogen are published after cautious scientific researches. Molecular hydrogen is a colorless, odorless, and tasteless gas, it is difficult for the consumer public to determine the concentration, or even the presence of molecular hydrogen in these products.

Hydrogen water as water or liquids containing dissolved molecular hydrogen, which is termed by the chemical formula H_2 .

Methods to determine the hydrogen concentration

Gas chromatography (GC) will be considered the primary method for measuring molecular hydrogen.

GC should be the most reliable method for specialists in chemical analyses. In brief this method requires the transfer of H₂ from the aqueous phase to the gas phase using a tightly closed vessel, where hydrogen concentration can be measured by GC. The standard operation procedure (SOP) for measurement by GC will soon be determined by IHSA to mitigate systematic errors.

IHSA will also adopt a secondary method using an electrode that is specific to hydrogen. Several electrodes are currently available commercially; however, each has a merit and shortcoming. Thus, one electrode will be carefully selected for the measurement, and the standard operation procedure (SOP) determined by IHSA. There may be other suitable options for general consumer use, but not for IHSA certification use, that IHSA may recommend (e.g. different brands of electrodes, sensors, H₂Blue, etc.). However, methods that depend on using the oxidation-reduction potential (ORP) to estimate hydrogen in water is not

recommended. Although a negative ORP is one of the characteristics of hydrogen water, ORP itself does not show the hydrogen concentration. Thus, ORP should not be used as the method for measurement of the hydrogen concentration.

The Unit indicating hydrogen concentration

IHSA will use the unit of mg/L when discussing the concentration of hydrogen in water. This will help reduce the confusion from using other commonly units. For example, ppm (parts per million) has been familiar for consumers and often used; however, ppm indicates two ways; one is weight per weight (wt/wt) and the other is weight per volume (wt/vol). Since hydrogen is a gaseous molecule, these two ways are often used, leading to some confusion. Thus, for this recommendation and certification, milligram (mg) and milligram per liter(mg/L) are adopted as a dose and a concentration of hydrogen, respectively.

Concentration/dose

After much debate and consideration, we suggest that the minimal amount of hydrogen should be established as a dose per day in a maximal volume of solution. The standard has been determined to provide at least 0.5 mg of H₂ by ingesting a maximal volume of 1 L of product water. It is understood that more research is needed to fully know the minimum effective dose (MED) and the minimum effective concentration (MEC) of H₂ at the cellular level. Ideally, the dose would be given in mg/kg of body weight with an optimal time factor based on its half-life and pharmacokinetics/pharmacodynamics. However, this is more challenging with H₂ because unlike conventional pharmacological agents, H₂ does not have single/specific receptor/target or organ function. The MED/MEC will likely vary based on age, body weight, disease, genetics, intestinal bacteria, diet, etc. The IHSA recommendation is simply a standard based on the current cell, animal, and human clinical studies. It is not perfect and is

subject to change based on additional biomedical research.

Justification

Animal and human studies generally provide between 0.5 mg to 1.6 mg or more per day. Unlike conventional drugs, it is logical that humans may require a similar equivalent dose of H2 as do rodents because there are no receptors to bind H2 as there are for drugs. The IHSA standard of a minimum of a 0.5 mg dose per liter of water is supported by the lower dose studies in animals and humans. For example, in a mouse model of Parkinson's disease, Fujita, K. et al (2009) reported that a concentration of 0.08 ppm, but not 0.04 ppm was effective. Interestingly, 0.08 ppm would provide a dose of H2 per day that is similar to a human ingesting about 0.5 mg of H2 per day ($0.08 \text{ mg/L} * 0.005 \text{ L}/0.05 \text{ kg} * 60\text{kg} = 0.48 \text{ mg H2}$). Similarly, a 0.04 ppm would equate to about 0.25 mg per day in humans. These doses are in line with two human

studies that suggest that 0.5 mg, but not 0.25 mg per day is effective.

In one human study (Ito, M. et al. 2011), subjects ingested 0.25 mg/day by drinking 0.5 L of 0.5 ppm H₂ water. At this low dose, there were no observed benefits. The researchers suggested that if they either a) consumed the same amount of water at a higher concentration, or b) consumed a higher volume of water at a similar concentration, then they would have noticed a benefit. Indeed, the preliminary data (open-label trial) in the same article, used 1 L of water (0.5 mg H₂ per day), and significant benefits were observed (*only 0.5 L were consumed in the placebo-controlled trial because patients struggled to consume 1 L per day). Another human study provided 0.5 mg H₂ per day by ingestion 1 L of 0.5 ppm, and noted significant benefits (Song G. et al. 2013).

Dose instead of concentration

Setting a specific concentration (e.g. 0.8 ppm) can be contested by companies who state that people

can get a higher dose of hydrogen by drinking 1 liter of 0.5 ppm, than they could by drinking a 250-mL can of 1 ppm H₂ water (0.5 mg vs. 0.25 mg).

Volume

Although one can reach 0.5 mg of H₂ by ingesting a large volume of low concentration H₂-water (e.g. 5 L of 0.1 ppm), this is problematic because some have difficulty drinking high volumes of water, and it is possible that ingesting H₂ in this manner may not result in equivalent therapeutic effects as ingesting 0.5 mg at once. This is because the cellular concentration may not reach the “unknown” minimal required concentration (e.g. 5-10 μ M). Based on the above human studies, and current guidelines for ingesting water, we have set the maximal volume as 1 liter of 0.5 ppm dissolved hydrogen.

So what device should you use ?

Criteria for Hydrogen-water generating devices:

1) provides at least 0.5mg per liter serving regardless of source water composition being used

in the device (e.g. RO water or mineral water with a pH range of 5.8 to 8.6)

2) passes safety test for toxins/heavy metals

3) produces the minimum concentration of 0.5 mg/L:

a. for the duration of the manufacture warranty

b. or for at least 1 year if not stated (Maybe this should be given in “processing hours” not time.

4) pH must be in range 5 to 9.5 regardless of source water composition (e.g. RO water or mineral water with a pH range of 5.8 to 8.6)

Only hydrogen water devices whose concentration is more than 0.5 ppm can provide a dose of 0.5 mg of H₂ per liter of product, which is recommended.

References

Fujita, K., Seike, T., Yutsudo, N., Ohno, M., Yamada, H., Yamaguchi, H., Sakumi, K., Yamakawa, Y., Kido, M.A., Takaki, A. and Katafuchi, T., 2009. Hydrogen in drinking water reduces dopaminergic neuronal loss in the 1-methyl-4-phenyl-1, 2, 3,6-tetrahydropyridine mouse model of Parkinson's disease. PloS one, 4(9), p.e7247.

Ito, M., Ibi, T., Sahashi, K., Ichihara, M., Ito, M. and Ohno, K., 2011. Open-label trial and randomized, double-blind, placebo-controlled, crossover trial of hydrogen-enriched water for mitochondrial and inflammatory myopathies. Medical gas research, 1(1), p.24.

Song, G., Li, M., Sang, H., Zhang, L., Li, X., Yao, S., Yu, Y., Zong, C., Xue, Y. and Qin, S., 2013. Hydrogen-rich water decreases serum LDL-cholesterol levels and improves HDL function in patients with potential metabolic syndrome. Journal of lipid research, 54(7), pp.1884-1893.

5. Why should you choose Hibon hydrogen water generators ?

Anti-aging



.....Anti-oxidants



HIBON...The Water for Your Health

Hydrogen Water Generator



1. Technology

SPE/PEM technology working principle:

SPE :Solid polymer electrolysis PEM :Proton exchange membrane

Our Hydrogen-rich water products use SPE (Solid poly electrolytic) technology, and electrolysis plate has PEM (proton exchange membrane) membrane, so they produce pure and safe hydrogen-rich water, without by-products such as ozone (O₃), chlorine (cl) and other oxides.

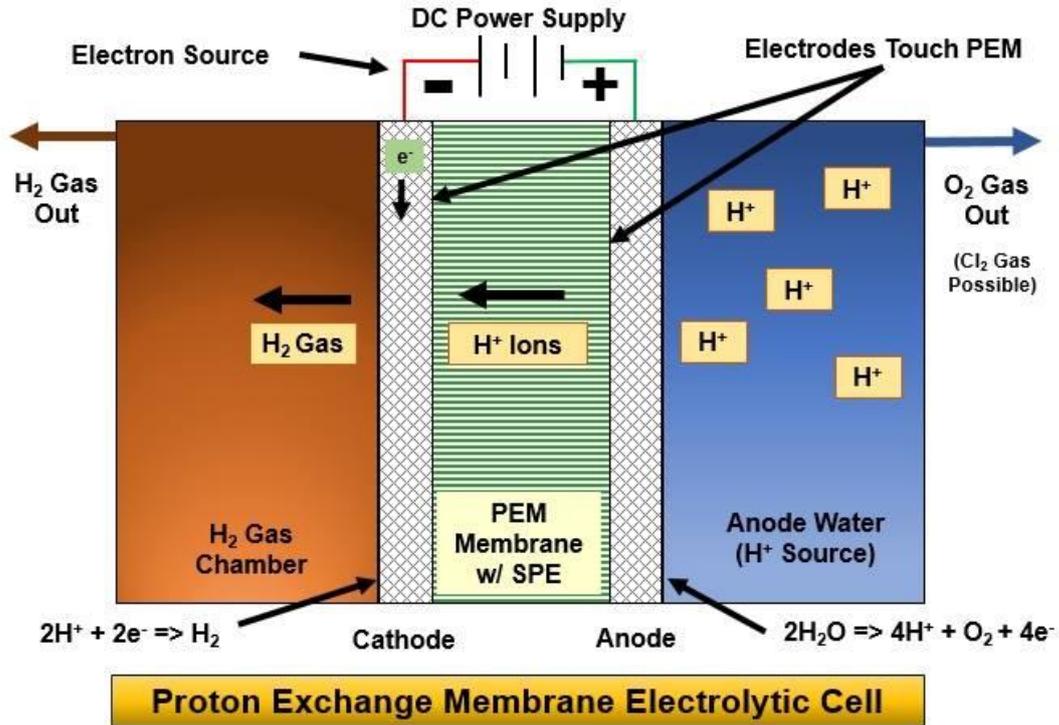
Proton Exchange Membrane Diagram is the heart of a hydrogen infusion machine (HIM) electrolytic cell is the proton exchange membrane (PEM) with solid polymer electrolyte (SPE), a very different type of membrane from that used in a standard alkaline ionizer. Here is a diagram, a description of the components, and an overview of the chemistry involved in the production of H₂ gas:

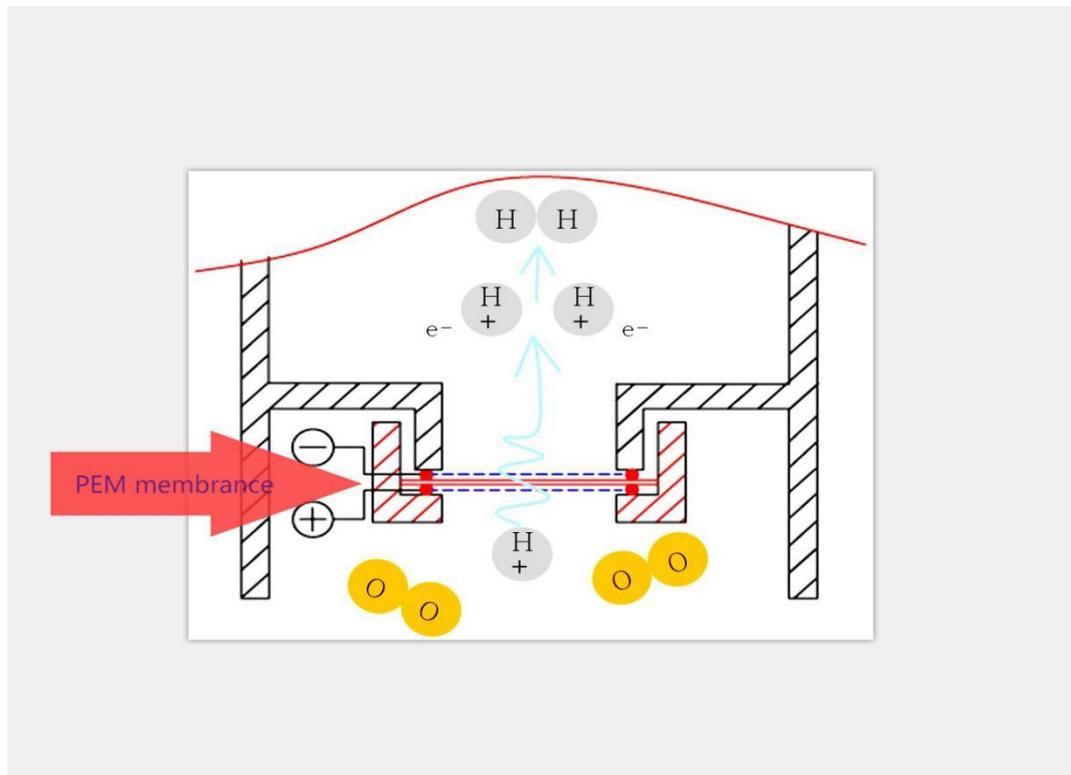
- 1). Water at the anode provides source of H^+ ions.
- 2). PEM permits migration of H^+ ions from anode to cathode.
- 3). At cathode, H^+ ions combine with electrons from the power supply (reduction reaction) to form H atoms which pair-up to form H_2 gas.
- 4). Oxygen gas produced at the anode (through oxidation of hydroxide) must be vented (alternatively, chlorine gas may be produced instead of oxygen, depending on source water chloride levels).
- 5). PEM contains an electrolyte (SPE, solid polymer electrolyte, an electrical conductor), and therefore electrolysis is not dependent on source water minerals.
- 6). Lower electrical resistance between anode & cathode results in less voltage drop and more efficient electrolytic production of H_2 .

Chemical reaction formula :

Anode Reaction: $2\text{H}_2\text{O} \rightarrow \text{O}_2 + 4\text{H}^+ + 4\text{e}^-$

Cathode Reaction: $4\text{H}^+ + 4\text{e}^- \rightarrow 2\text{H}_2$





2. Materials

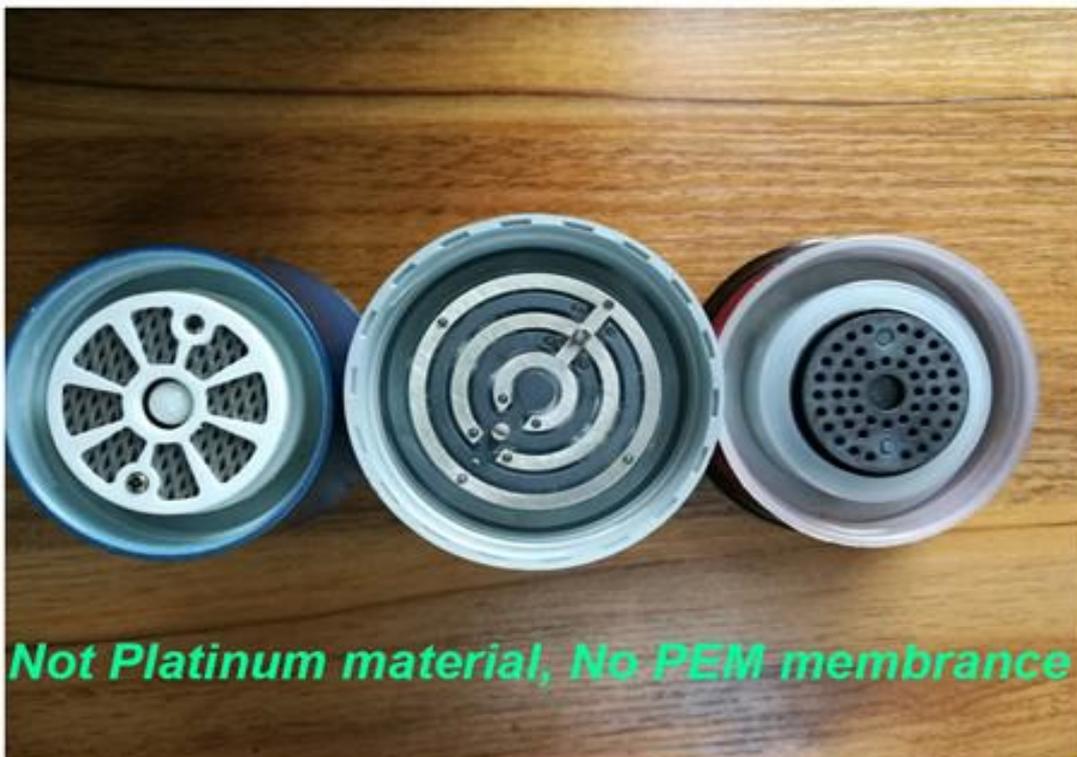
Hibon hydrogen water generators use titanium and platinum as electrode materials. They are safe , nontoxic and have long durable working life. While there are some products use common metal materials which is dangerous for drinking, they may rust or produce toxic substances

The materials comparison between Hibon and other cheap products

Hibon material picture:



Other cheap products materials picture:



3. The dose / concentration of hydrogen dissolved in water and the ORP.

According to working time, the longer it works ,the higher the hydrogen concentration will be.

Concentration range of dissolved hydrogen:

0.6 – 3.5 ppm

ORP range : -350 – -750 mV

4. Specific designs for different users.

The portable hydrogen water generator is designed for those people who want to use it anywhere. You can use the glass upper bottle at home .And when you are traveling , just take the generator. You can put it in your bag since it has small size.



(Remove the original upper bottle, then put the commercial water bottle on the generator. Only the generator base is necessary to take during your holiday or travelling)

The pitcher is designed for a family or office use, since it has a large volume of 1.5 L.



5. Available water

Distilled water, purified water, Reverse Osmosis water are all acceptable.

6. Certifications

Our products have been certified by EU and USA
FDA and some other organizations.

