



hydrogen

11/17/2021

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Molecular Hydrogen: Positive Impacts on Health

Structured Data

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PDF Version of the webpage (first 10 pages)

This webpage QR code

<http://www.infinitysupercritical.com/hydrogen.html>

Molecular Hydrogen

Hydrogen can be added to the botanical extraction process, or when making full spectrum oil, hemp water, or hemp creams.

What is Molecular Hydrogen ?

Hydrogen has great potential in the regulation of oxidative stress, inflammation, energy metabolism of organelles, and programmed cell death. Many animal experiments and clinical trials have established the protective effects of hydrogen on many organs and systems.

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The effects of Hydrogen enriched water or other methods is most beneficial for subjects over the age of 30.



Emerging mechanisms and novel applications of hydrogen gas therapy

Keywords: hydrogen therapy, selective anti-oxidation, therapeutic applications, hydrogen pathway, anti-inflammation, anti-apoptosis, hydrogen gas, future directions

Significance: Growing molecular mechanisms have discovered a plethora of downstream targets for hydrogen gas therapy that include autophagy (via the adenosine 50-monophosphate-activated protein kinase-mammalian target of rapamycin pathway), histone modification, mitochondrial unfolded protein response, acute oxidative stress after exercise, and oxidative stress secondary to aging.

Abstract: Clinical and pre-clinical studies have reported a broad range of applications for hydrogen gas therapy. Classically, conventional antioxidant therapy is limited because it neutralizes both the detrimental and protective effects of reactive oxygen species. As a weak reducing agent, hydrogen gas avoids this paradox by reacting with strong oxidants while leaving other beneficial oxidants reactive.



Hydrogen-rich water for improvements of mood, anxiety, and autonomic nerve function in daily life

Significance: Hydrogen has anti-oxidant activity and can prevent inflammation, and may thus contribute to improve QOL.

Abstract: Chronic oxidative stress and inflammation cause deteriorations in central nervous system function, leading to low QOL. In healthy individuals, aging, job stress, and cognitive load over several hours also induce increases in oxidative stress, suggesting that preventing the accumulation of oxidative stress caused by daily stress and daily work contributes to maintaining QOL and ameliorating the effects of aging. Hydrogen has anti-oxidant activity and can prevent inflammation, and may thus contribute to improve QOL.



Hydrogen: A Potential New Adjuvant Therapy for COVID-19 Patients

Keywords: Hydrogen, COVID-19, therapy, cytokine storm, mucus

Significance: Hydrogen has been shown to have antioxidant, anti-inflammatory, hormone-regulating, and apoptosis-resistance properties, among others.

Abstract: Hydrogen has been shown to have antioxidant, anti-inflammatory, hormone-regulating, and apoptosis-resistance properties, among others. Based on a review of the research, the use of hydrogen might reduce the destructive cytokine storm and lung injury caused by SARS-CoV-2 during COVID-19 (Corona Virus Disease 2019) in the early stage, stimulating ropy sputum drainage, and ultimately reducing the incidence of severe disease. Molecular hydrogen treatment has the potential to become a new adjuvant therapy for COVID-19, but its efficacy and safety require large clinical trials and further confirmation.



Hydrogen: A Novel Option in Human Disease Treatment

Significance: Hydrogen has great potential in the regulation of oxidative stress, inflammation, energy metabolism of organelles, and programmed cell death. Many animal experiments and clinical trials have established the protective effects of hydrogen on many organs and systems.

Abstract: H₂ has shown anti-inflammatory and antioxidant ability in many clinical trials, and its application is recommended in the latest Chinese novel coronavirus pneumonia (NCP) treatment guidelines. Clinical experiments have revealed the surprising finding that H₂ gas may protect the lungs and extrapulmonary organs from pathological stimuli in NCP patients. The potential mechanisms underlying the action of H₂ gas are not clear. H₂ gas may regulate the anti-inflammatory and antioxidant activity, mitochondrial energy metabolism, endoplasmic reticulum stress, the immune system, and cell death (apoptosis, autophagy, pyroptosis, ferroptosis, and circadian clock, among others) and has therapeutic potential for many systemic diseases. This paper reviews the basic research and the latest clinical applications of H₂ gas in multiorgan system diseases to establish strategies for the clinical treatment for various diseases.



Molecular hydrogen: a therapeutic antioxidant and beyond

Keywords: hydrogen-saturated water/saline, hydrogen gas, free radical scavenger, anti-inflammation, anti-apoptosis, biological effect, clinical application, hydrogen-oxygen nebulizer machine

Significance: Overall, the impact of molecular hydrogen in medicine is extraordinary. The non-toxic and rapid intracellular diffusion features of this biological gas ensure the feasibility and readiness for its clinical translation.

Abstract: Molecular hydrogen (H₂) medicine research has flourished since a landmark publication in Nature Medicine that revealed the antioxidant and cytoprotective effects of hydrogen gas in a focal stroke model. Emerging evidence has consistently demonstrated that molecular hydrogen is a promising therapeutic option for a variety of diseases and the underlying comprehensive mechanisms is beyond pure hydroxyl radicals scavenging. The non-toxicity at high concentrations and rapid cellular diffusion features of molecular hydrogen ensure the feasibility and readiness of its clinical translation to human patients.



A review of experimental studies of hydrogen as a new therapeutic agent in emergency and critical care medicine

Keywords: Hydrogen, Reactive oxygen species, Antioxidant, Emergency, Critical care medicine

Significance: Recent evidence has shown that hydrogen is a potent antioxidative, antiapoptotic and anti-inflammatory agent and so may have potential medical applications in cells, tissues and organs.

Abstract: Hydrogen is the most abundant chemical element in the Universe, but is seldom regarded as a therapeutic agent. Recent evidence has shown that hydrogen is a potent antioxidative, antiapoptotic and anti-inflammatory agent and so may have potential medical applications in cells, tissues and organs. There are several methods to administer hydrogen, such as inhalation of hydrogen gas, aerosol inhalation of a hydrogen-rich solution, drinking hydrogen dissolved in water, injecting hydrogen-rich saline (HRS) and taking a hydrogen bath. Drinking hydrogen solution (saline/pure water/other solutions saturated with hydrogen) may be more practical in daily life and more suitable for daily consumption. This review summarizes the findings of recent studies on the use of hydrogen in emergency and critical care medicine using different disease models.



The evolution of molecular hydrogen: a noteworthy potential therapy with clinical significance

Keywords: Antioxidant, Cytoprotection, Hydrogen therapy, Mechanisms, Reactive oxygen species

Significance: Hydrogen is likely to be instrumental in exerting a protective effect against Parkinsons disease. The effects of excess accumulation has been reported and speculated to be negligible. It has also been discovered that hydrogen poses no risks for explosion or flammability at concentrations less than 4.7 percent of air.

Abstract: Studies on molecular hydrogen have evolved tremendously from its humble beginnings and have continued to change throughout the years. 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 antioxidant, anti-apoptotic, anti-inflammatory, and cytoprotective properties that are beneficial to the cell. Hydrogen is most commonly applied as a gas, water, saline, and can be applied in a variety of other mediums. There are also few side effects involving hydrogen, thus making hydrogen a perfect medical gas candidate for the convention of novel therapeutic strategies against cardiovascular, cerebrovascular, cancer, metabolic, and respiratory diseases and disorders. Although hydrogen appears to be faultless at times, there still are several deficiencies or snares that need to be investigated by future studies. This review article seeks to delve and comprehensively analyze the research and experiments that alludes to molecular hydrogen being a novel therapeutic treatment that medicine desperately needs.



Recent Advances in Studies of Molecular Hydrogen against Sepsis

Keywords: molecular hydrogen, sepsis, oxidative stress, apoptosis, shock, autophagy

Significance: Molecular hydrogen was first reported in Nature Medicine (2007) as a natural antioxidant and selective scavenger of oxygen free radicals to treat oxidative stress.

Abstract: Sepsis is a syndrome comprised of a series of life-threatening organ dysfunctions caused by a maladjusted body response to infection with no effective treatment. Molecular hydrogen is a new type of antioxidant with strong free radical scavenging ability, which has been demonstrated to be effective for treating various diseases, such as infection, trauma, poisoning, organ ischemia-reperfusion, metabolic diseases, and tumors. Molecular hydrogen exerts multiple biological effects involving anti-inflammation, anti-oxidation, anti-apoptosis, anti-shock, and autophagy regulation, which may attenuate the organ and barrier damage caused by sepsis. However, the underlying molecular mechanisms remain elusive, but are likely related to the signaling pathways involved. This review focuses on the research progress and potential mechanisms of molecular hydrogen against sepsis to provide a theoretical basis for clinical treatment.



Effects of the long-term consumption of hydrogen-rich water on the antioxidant activity and the gut flora in female juvenile soccer players from Suzhou, China

Keywords: hydrogen-rich water, anti-oxidant, anti-inflammatory, gut flora, diversity, soccer player, Suzhou

Significance: The consumption of hydrogen-rich water for two months might play a role modulating in the gut flora of athletes based on its selective antioxidant and anti-inflammatory activities.

Abstract: Expending a considerable amount of physical energy inevitably leads to fatigue during both training and competition in football. An increasing number of experimental findings have confirmed the relationship between the generation and clearance of free radicals, fatigue, and exercise injury. Recently, hydrogen was identified as a new selective antioxidant with potential beneficial applications in sports. The present study evaluated the effect of 2-month consumption of hydrogen-rich water on the gut flora in juvenile female soccer players from Suzhou. As demonstrated by enzyme linked immunosorbent assay and 16S rDNA sequence analysis of stool samples, the consumption of hydrogen-rich water for two months significantly reduced serum malondialdehyde, interleukin-1, interleukin-6, tumour necrosis factor- α levels; then significantly increased serum superoxide dismutase, total antioxidant capacity levels and haemoglobin levels of whole blood. Furthermore, the consumption of hydrogen-rich water improved the diversity and abundance of the gut flora in athletes. All examined indices, including the shannon, sobs, ace, and chao indices, were higher in the control group than those proposed to result from hydrogen-rich water consumption prior to the trial, but these indices were all reversed and were higher than those in the controls after the 2-month intervention. Nevertheless, there were some differences in the gut flora components of these two groups before the trial, whereas there were no significant changes in the gut flora composition during the trial period. Thus, the consumption of hydrogen-rich water for two months might play a role modulating in the gut flora of athletes based on its selective antioxidant and anti-inflammatory activities.



Hydrogen-rich water reduces inflammatory responses and prevents apoptosis of peripheral blood cells in healthy adults: a randomized, double-blind, controlled trial

Keywords:

Significance: Four-week consumption of H₂-water induced a substantial increase in the antioxidant capacity and a decrease in oxidative stress of DNAs, although there was no significance found in the comparison of an intervention (H₂-water) and the placebo (plain water) group. The younger age group (<30 y) showed no difference between H₂-water and placebo groups. This finding implies that H₂-water could exert antioxidant capacity-promoting benefits more in older adults than in the young.

Abstract: The evidence for the beneficial effects of drinking hydrogen-water (HW) is rare. We aimed to investigate the effects of HW consumption on oxidative stress and immune functions in healthy adults using systemic approaches of biochemical, cellular, and molecular nutrition. These finding suggest HW increases antioxidant capacity thereby reducing inflammatory responses in healthy adults. Four-week consumption of H₂-water induced a substantial increase in the antioxidant capacity and a decrease in oxidative stress of DNAs, although there was no significance found in the comparison of an intervention (H₂-water) and the placebo (plain water) group.



