

MOLECULAR HYDROGEN AS AN EMERGING THERAPEUTIC TOOL FOR SEVERAL DISEASES INCLUDING INFLAMMATORY DISEASES

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Objective: Potential therapeutic effects of molecular hydrogen for a wide range of disease models and human diseases have been investigated since 2007. Prominent effects are observed especially in oxidative stress-mediated diseases including neonatal cerebral hypoxia, Parkinson's disease, ischemia/reperfusion of spinal cord, heart, lung, liver, kidney and intestine.

Methods: The effects, have been reported in essentially many organs covering 31 disease categories that can be subdivided into 166 disease models, human diseases, treatment-associated pathologies and pathophysiological conditions of plants with a predominance of oxidative stress-mediated diseases and inflammatory diseases.

Results: Collation of the 321 original articles reveals that most communications address the anti-oxidative stress, anti-inflammatory, and anti-apoptotic effects. Moreover, medical studies and scientific research have indicated that consumption of molecular hydrogen and specifically hydrogen water can provide a better quality of life for people in many circumstances for instance in the case of patients treated with radiation against cancerous cells. The FDA has recently issued a notice that molecular hydrogen is generally regarded as safe to be formulated in beverages. Reactive oxygen species or free radicals are one of the major offenders to render oxidative damage to biological macromolecules. 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. Hydrogen water at a concentration of 1.6 mg/L would have more "antioxidant" molecules than 100 mg of vitamin C, as there are more total molecules in 1.6 mg of hydrogen compared 100 mg of vitamin C. Reduced water produced by electrolysis of tap water has a higher pH (8.5-9.5), lower oxidation reduction potential, lower dissolved oxygen and higher dissolved hydrogen than non-electrolyzed water.

Conclusion: Many further studies are required to improve our capabilities and technical difficulties in preparing a high concentration of hydrogen water for the patients and optimisation of the modalities of treatment taking in account the difference between acute and chronic diseases. Further large-scale and long-term clinical studies are expected to demonstrate clearly the effects of hydrogen in humans.