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Multi-functional molecular hydrogen acting as an anti-oxidant, anti-inflammation and energy metabolism-stimulator

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We have proposed that molecular hydrogen (H_2) has potential as a "novel" antioxidant in preventive and therapeutic applications. H_2 has a number of advantages as a potential antioxidant: H_2 rapidly diffuses into tissues, cells and organelles exhibiting very efficient anti-oxidative effects, and it is mild enough neither to disturb metabolic redox reactions nor to affect reactive oxygen species (ROS) that function in cell signaling, thereby, there should be little adverse effects of consuming H_2. There are several methods to ingest or consume H_2, including inhaling hydrogen gas, drinking H_2-dissolved water (hydrogen water), taking a hydrogen bath, injecting H_2-dissolved saline (hydrogen saline), dropping hydrogen saline onto the eye, and increasing the production of intestinal H_2 by bacteria. Since the first publication of ours on hydrogen medicine in 2007, the biological effects of H_2 have been confirmed by more than 200 publications mainly using various model animals. H_2 improves oxidative stress by not only direct reactive elimination of highly oxidative molecules, such as hydroxyl radicals and peroxynitrite, but also modulating gene expressions involved in the redox system. Additionally, H_2 shows various anti-inflammatory and anti-allergic effects. Moreover, H_2 stimulates various gene expressions including fatty acid metabolism and protein-phosphorylations. A considerable number of clinical groups have started clinical examinations. Some open clinical studies strongly suggest potential for clinical applications. In particular, we have published an exciting paper suggesting the potential for improving Parkinson's disease in randomized double-blind, placebo-controlled trial.

Biography

Shigeo Ohta has completed his Ph.D. at the age of 27 years from the University of Tokyo, Japan, and postdoctoral studies from Biocenter, Basel University, Switzerland. He is the Chairman of Department of Biochemistry and Cell Biology, Institute of Development and Aging Sciences, Nippon Medical School. He has published more than 200 papers in reputed journals and serving as associate editors of *Mitochondrion and Medical Gas Research.*

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