

Newest Research on the Health Benefit of Electrochemically Reduced Water

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Electrochemically reduced water (ERW) produced near the cathode by electrolysis of water contains a high concentration of hydrogen molecules and small amounts of mineral nanoparticles including Pt nanoparticles (Pt NPs), both of which have drawn much attention as newly recognized antioxidative cellular redox regulation factors. Recently, we collaborated with the Karolinska Institutet to reveal the suppressive effect of hydrogen molecules in ERW on neuroinflammation caused by lipopolysaccharide (LPS). Here we report advanced research on the health benefit of ERW, hydrogen molecules, hydrogen atoms and mineral nanoparticles.

ERW scavenging intracellular H₂O₂ suppressed the invasion of human fibrosarcoma HT1080 cells via suppression of MMP-2 and MT1-MMP genes as well as suppression of tumor angiogenesis via suppression of expression of VEGF gene. Rat myotube L6 cells were treated with hydrogen molecules and/or Pt NPs in a mixed gas incubator. Treatment of the cells with both hydrogen molecules and Pt NPs resulted in synergistic enhancement of glucose uptake. Hydrogen molecules activated the AMP kinase pathway, and Pt NPs activated Akt protein in the insulin signal pathway to stimulate glucose uptake. The amount of intracellular H₂O₂ in the cells was decreased by treatment with hydrogen molecules and Pt NPs. The expression of Nrf2, catalase, glutathione peroxidase, HO-1 and SOD genes was enhanced by hydrogen molecules and Pt NPs, suggesting the activation of the Nrf2 antioxidative redox regulation system. KKAy mice were administrated with hydrogen molecules and/or Pt NPs-containing water. Hydrogen molecules and Pt NPs improved fasting blood sugar levels and sugar tolerance activity of mice. C57Bl/6 mice with free access to ERW for 1 week were administrated with LPS to cause systemic inflammation. Hydrogen molecules in ERW enhanced recovery from "sickness behavior", suppressing neuroinflammation by potentiating anti-inflammation genes in hippocampus of brain [1].

Reduced water containing hydrogen molecules and mineral nanoparticles as well as ERW will be useful as antioxidative water to prevent and improve various oxidative stress-related diseases, assisting therapies in integrative medicine [2].

References

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