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Hydrogen Treatment Protects against Cell Death and Senescence Induced by Oxidative Damage

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Abstract

Hydrogen has potential for preventive and therapeutic applications as an antioxidant. However, micro- and macroparticles of hydrogen in water disappear easily over time. In order to eliminate reactive oxygen species (ROS) related with the aging process, we used functional water containing nanoparticle hydrogen. Nanoparticle hydrogen does not disappear easily and collapse under water after long periods of time. We used murine embryonic fibroblasts that were isolated from 12.5-day embryos of C57BL/6 mice. We investigated the ability of nanoparticle hydrogen in water to suppress hydroxyurea-induced ROS production, cytotoxicity, and the accumulation of β -galactosidase (an indicator of aging), and promote cell proliferation. The accumulation of β -galactosidase in the cytoplasm and the appearance of abnormal nuclei were inhibited by daily treatment of cells with hydrogen water. When the aging process was accelerated by hydroxyurea-induced oxidative stress, the effect of hydrogen water was even more remarkable. Thus, this study showed the antioxidant and anti-senescence effects of hydrogen water. Nanoparticle hydrogen water is potentially a potent anti-aging agent.

Keywords: Hydrogen-rich water; anti-aging; antioxidant; hydrogen nanoparticles.

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