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Hydrogen-water enhances 5-fluorouracil-induced inhibition of colon cancer

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Abstract

Oxidative stress is involved in cancer development. Hydrogen (H₂) is a potent antioxidant and exhibits anti-inflammatory and potentially anticancer-like activities. This study aimed to investigate the role of H₂ in combination with 5-fluorouracil (5-FU) in cancer treatment both in vitro and in vivo using the colon 26 cell line. The survival rate was determined using the Kaplan-Meier survival test, and cell viability was assessed using cell viability imaging kit and the MTT assay, and activation of the cell apoptosis pathway (Phosphorylated adenosine monophosphate activated protein kinase (p-AMPK), Apoptosis-inducing factor (AIF) and Caspase 3) were characterized by western blots. Hydrogen water administration improved the survival of mice with colon 26-induced cancer. Furthermore, hydrogen water enhanced cell apoptosis in cancer cells, resulting in a marked increase in the expression of p-AMPK, AIF and Caspase 3 in colon 26 cells. Hydrogen water also increased the inhibitory effect of 5-FU on colon 26 cells with respect to cell survival rate and anticancer functions. Additionally, high-content hydrogen water exhibited stronger antioxidative and anticancer activity than did the natural hydrogen water. In conclusion, high-content hydrogen water can inhibit colon cancer, particularly in combination with 5-fluorouracil.

Keywords: 5-fluorouracil; Antioxidant; Apoptosis; Cancer; Hydrogen.

Figures

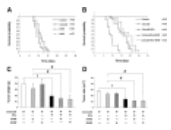


Figure 1. Kaplan–Meier.
The survival rate of...

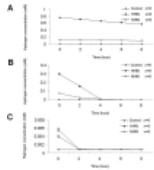


Figure 2. The hydrogen (H₂)...

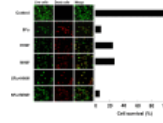


Figure 3. The cell viability of colon...

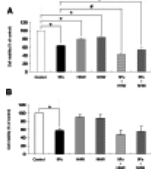


Figure 4. Cell viability of colon 26...

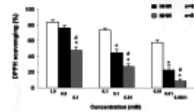


Figure 5. The free-radical (DPPH) scavenging activity...

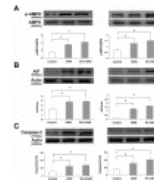


Figure 6. Western blot analyses of p-AMPK,...

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