Comparative Study Exp Oncol. 2009 Sep;31(3):156-62.

Platinum nanocolloid-supplemented hydrogendissolved water inhibits growth of human tongue carcinoma cells preferentially over normal cells

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Abstract

Aim: Hydrogen-dissolved water (HD-water) or platinum nanocolloid (Pt-nc) has been individually expected as a new therapeutic agent for oxidative stress-related diseases, whereas little is known about their combined effects on cancer, which were elucidated in the present study.

Methods: HD-water was prepared by microporous gas bubbling, and supplemented with Pt-nc consisting of 0.003-1 ppm Pt and PVP polymers. Antioxidant activities were examined by 1, 1-diphenyl-picrylhydrazyl (DPPH)-radicalscavenging assay. Cytotoxic activities were examined by culturing of tumor and normal cell lines, respectively.

Results: HD-water accelerated the Pt-nc-based DPPH-radical scavenging. Pt-nc-supplemented HD-water inhibited either colony formation efficiencies or colony sizes of human tongue carcinoma cells HSC-4, in contrast to no effects of HD-water alone, Pt-nc alone or Pt-absent PVP, but not appreciably inhibit normal human tongue epithelial-like cells DOK. Pt-nc-supplemented HD-water also suppressed cell population growth of HSC-4 cells of near-confluence (at higher cell densities) in view of decreases in either cell numbers or mitochondrial function, although less markedly than colony formation starting from a sparse-cell state (at lower cell densities). Dissolved hydrogen, oxygen concentration or oxido-reduced potentials of HD-water was decreased, rather decreased or increased by Pt-nc addition, respectively.

Conclusions: Anti-cancer activity of Pt-nc-supplemented HD-water was shown by its preferential cell-growth inhibition to human tongue carcinoma cells HSC-4 over normal human tongue cells DOK, and might be partly attributed to HD-water-caused enhancement of Pt-nc-relevant antioxidant ability. Pt-nc-supplemented HD-water is expected as a novel agent against human tongue cancers due to its cancer progression-repressive abilities.

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