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Hydrogen-rich water attenuates experimental periodontitis in a rat model

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Abstract

Aim: Reactive oxygen species (ROS) contribute to the development of periodontitis. As molecular hydrogen can act as a scavenger of ROS, we examined the effects of treatment with hydrogen-rich water on a rat model of periodontitis.

Material & methods: A ligature was placed around the maxillary molars for 4 weeks to induce periodontitis, and the animals were given drinking water with or without hydrogen-rich water.

Results: The rats with periodontitis which were treated with pure water showed a time-dependent increase in serum ROS level. Compared with the rats without periodontitis, the periodontitis-induced rats which were given pure water also showed polymorphonuclear leucocyte infiltration and alveolar bone loss at 4 weeks. Hydrogen-rich water intake inhibited an increase in serum ROS level and lowered expression of 8-hydroxydeoxyguanosine and nitrotyrosine in the periodontal tissue at 4 weeks. Such conditions prevented polymorphonuclear leucocyte infiltration and osteoclast differentiation following periodontitis progression. Furthermore, inflammatory signalling pathways, such as mitogen-activated protein kinases, were less activated in periodontal lesions from hydrogen-rich water-treated rats as compared with pure water-treated rats.

Conclusion: Consuming hydrogen-rich water might be beneficial in suppressing periodontitis progression by decreasing gingival oxidative stress.

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