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Hydrogen-rich saline reduces airway remodeling via inactivation of NF-κB in a murine model of asthma

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Abstract

Background and objectives: Recent studies suggest that hydrogen has great therapeutic and prophylactic potential against organ injury caused by oxidative stress and inflammation. Here we investigated the effect of hydrogen-rich saline on airway inflammation and remodeling in a murine model of asthma.

Materials and methods: Asthma was induced by ovalbumin (OVA) sensitization and challenge. Then mice were treated with normal saline or hydrogen-rich saline at low and high doses. Cell counts and cytokine levels in bronchoalveolar lavage fluid (BALF) were determined, bronchial tissue was analyzed for pathology, and expression of MUC5AC, collagen III, VEGF, and total and phosphorylated NF-κB p65 was measured. Immunohistochemistry was used to identify levels and localization of VEGF expression in lung.

Results: The results showed that hydrogen-rich saline reduced cell counts and levels of cytokines IL-4, IL-5, IL-13 and TNF-α in BALF. Hydrogen-rich saline treatment also significantly decreased mucus index, collagen deposition, and expression of MUC5AC, collagen III and VEGF. The ratio of phospho-NF-κB p65 to total NF-κB p65 was much lower in mice treated with hydrogen-rich saline than in untreated mice. These effects of hydrogen-rich saline on airway inflammation and remodeling were dose-dependent.

Conclusions: These findings suggest that hydrogen-rich saline reduces airway inflammation and remodeling in OVA-exposed mice by inhibiting NF-κB.

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