

FULL TEXT LINKS



*Pediatr Pulmonol.* 2016 Sep;51(9):928-35. doi: 10.1002/ppul.23386. Epub 2016 Feb 4.

## Hydrogen-rich water ameliorates bronchopulmonary dysplasia (BPD) in newborn rats

Yukako Muramatsu <sup>1 2</sup>, Mikako Ito <sup>1</sup>, Takahiro Oshima <sup>1</sup>, Seiji Kojima <sup>2</sup>, Kinji Ohno <sup>1</sup>

Affiliations

PMID: 26845501 DOI: [10.1002/ppul.23386](https://doi.org/10.1002/ppul.23386)

### Abstract

Bronchopulmonary dysplasia (BPD) is characterized by developmental arrest of the alveolar tissue. Oxidative stress is causally associated with development of BPD. The effects of hydrogen have been reported in a wide range of disease models and human diseases especially caused by oxidative stress. We made a rat model of BPD by injecting lipopolysaccharide (LPS) into the amniotic fluid at E16.5. The mother started drinking hydrogen-rich water from E9.5 and also while feeding milk. Hydrogen normalized LPS-induced abnormal enlargement of alveoli at P7 and P14. LPS increased staining for nitrotyrosine and 8-OHdG of the lungs, and hydrogen attenuated the staining. At P1, LPS treatment decreased expressions of genes for FGFR4, VEGFR2, and HO-1 in the lungs, and hydrogen increased expressions of these genes. In contrast, LPS treatment and hydrogen treatment had no essential effect on the expression of SOD1. Inflammatory marker proteins of TNF $\alpha$  and IL-6 were increased by LPS treatment, and hydrogen suppressed them. Treatment of A549 human lung adenocarcinoma epithelial cells with 10% hydrogen gas for 24 hr decreased production of reactive oxygen species in both LPS-treated and untreated cells. Lack of any known adverse effects of hydrogen makes hydrogen a promising therapeutic modality for BPD. *Pediatr Pulmonol.* 2016; 51:928-935. © 2016 Wiley Periodicals, Inc.

**Keywords:** bronchopulmonary dysplasia (BPD); lipopolysaccharide (LPS); molecular hydrogen; reactive oxygen species (ROS).

© 2016 Wiley Periodicals, Inc.

### Related information

[MedGen](#)

[PubChem Compound \(MeSH Keyword\)](#)

### LinkOut – more resources

**Full Text Sources**

[Ovid Technologies, Inc.](#)

[Wiley](#)

**Other Literature Sources**

[scite Smart Citations](#)

**Medical**

[Genetic Alliance](#)

[MedlinePlus Health Information](#)

**Research Materials**

[NCI CPTC Antibody Characterization Program](#)

**Miscellaneous**

[NCI CPTAC Assay Portal](#)