

FULL TEXT LINKS

[Med Gas Res.](#) 2012 May 20;2(1):15. doi: 10.1186/2045-9912-2-15.

Drinking hydrogen water and intermittent hydrogen gas exposure, but not lactulose or continuous hydrogen gas exposure, prevent 6-hydroxydopamine-induced Parkinson's disease in rats

Mikako Ito ¹, Masaaki Hirayama, Kazuaki Yamai, Sae Goto, Masafumi Ito, Masatoshi Ichihara, Kinji Ohno

Affiliations

PMID: 22608009 PMID: [PMC3407490](#) DOI: [10.1186/2045-9912-2-15](#)

[Free PMC article](#)

Abstract

Background: Lactulose is a synthetic disaccharide that can be catalyzed only by intestinal bacteria in humans and rodents, and a large amount of hydrogen is produced by bacterial catalysis of lactulose. We previously reported marked effects of ad libitum administration of hydrogen water on prevention of a rat model of Parkinson's disease (PD).

Methods: End-alveolar breath hydrogen concentrations were measured in 28 healthy subjects and 37 PD patients, as well as in 9 rats after taking hydrogen water or lactulose. Six-hydroxydopamine (6-OHDA)-induced hemi-PD model was stereotactically generated in rats. We compared effects of hydrogen water and lactulose on prevention of PD. We also analyzed effects of continuous and intermittent administration of 2% hydrogen gas.

Results: Hydrogen water increased breath hydrogen concentrations from 8.6 ± 2.1 to 32.6 ± 3.3 ppm (mean and SEM, $n = 8$) in 10 min in healthy subjects. Lactulose increased breath hydrogen concentrations in 86% of healthy subjects and 59% of PD patients. Compared to monophasic hydrogen increases in 71% of healthy subjects, 32% and 41% of PD patients showed biphasic and no increases, respectively. Lactulose also increased breath hydrogen levels monophasically in 9 rats. Lactulose, however, marginally ameliorated 6-OHDA-induced PD in rats. Continuous administration of 2% hydrogen gas similarly had marginal effects. On the other hand, intermittent administration of 2% hydrogen gas prevented PD in 4 of 6 rats.

Conclusions: Lack of dose responses of hydrogen and the presence of favorable effects with hydrogen water and intermittent hydrogen gas suggest that signal modulating activities of hydrogen are likely to be instrumental in exerting a protective effect against PD.

Figures

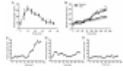


Figure 1 Temporal profiles of end-alveolar breath...

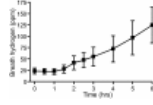


Figure 2 Temporal profiles of end-alveolar breath...

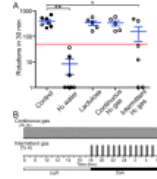


Figure 3 Behavioral assays of 6-OHDA-infused rat...

Related information

[PubChem Compound](#)

[PubChem Substance](#)

LinkOut - more resources

Full Text Sources

[BioMed Central](#)

[Europe PubMed Central](#)

[PubMed Central](#)

Other Literature Sources

[The Lens - Patent Citations](#)