

FULL TEXT LINKS

Med Gas Res. 2011 May 18;1(1):7. doi: 10.1186/2045-9912-1-7.

Hydrogen is neuroprotective against surgically induced brain injury

Jan M Eckermann ¹, Wanqiu Chen, Vikram Jadhav, Frank Pk Hsu, Austin Rt Colohan, Jiping Tang, John H Zhang

Affiliations

PMID: 22146427 PMCID: [PMC3231979](#) DOI: [10.1186/2045-9912-1-7](#)

[Free PMC article](#)

Abstract

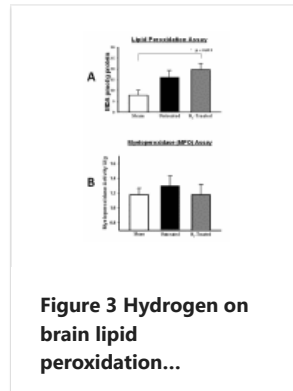
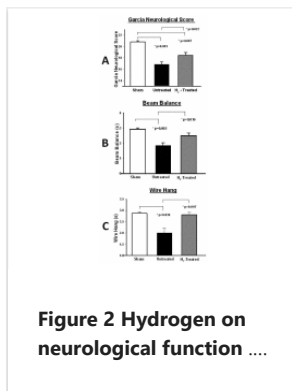
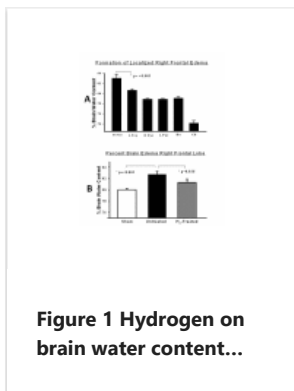
Background: Neurosurgical operations cause unavoidable damage to healthy brain tissues. Direct surgical injury as well as surgically induced oxidative stress contributes to the subsequent formation of brain edema. Therefore, we tested the neuroprotective effects of hydrogen (H₂) in an established surgical brain injury (SBI) model in rats.

Materials and methods: Adult male Sprague - Dawley rats (weight 300-350g) were divided into three groups to serve as sham operated, SBI without treatment, and SBI treated with H₂ (2.9%). Brain water content, myeloperoxidase (MPO) assay, lipid peroxidation (LPO), and neurological function were measured at 24 hrs after SBI.

Results: SBI resulted in localized brain edema ($p = < 0.001$). Hydrogen (2.9%) administered concurrently with surgery significantly decreased the formation of cerebral edema ($p = 0.028$) and improved neurobehavioral score ($p = 0.022$). However, hydrogen treatment failed to reduce oxidative stress (LPO assay) or inflammation (MPO assay) in brain tissues.

Conclusions: Hydrogen appears to be promising as an effective, yet inexpensive way to reduce cerebral edema caused by surgical procedures. Hydrogen has the potential to improve clinical outcome, decrease hospital stay, and reduce overall cost to patients and the health care system.

Figures



Related information

[PubChem Compound](#)

[PubChem Substance](#)

LinkOut - more resources

Full Text Sources

[BioMed Central](#)

[Europe PubMed Central](#)

[PubMed Central](#)

Research Materials

[NCI CPTC Antibody Characterization Program](#)

Miscellaneous

[NCI CPTAC Assay Portal](#)