

Molecular Hydrogen: an Emerging Therapeutic Medical Gas for Brain Disorders - PubMed

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Review

. 2023 Apr;60(4):1749-1765.

doi: 10.1007/s12035-022-03175-w. Epub 2022 Dec 26.

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PMID: **36567361**

DOI: [10.1007/s12035-022-03175-w](https://doi.org/10.1007/s12035-022-03175-w)

Review

Molecular Hydrogen: an Emerging Therapeutic Medical Gas for Brain Disorders

Chongyun Wu et al. Mol Neurobiol. 2023 Apr.

Abstract

Oxidative stress and neuroinflammation are the main physiopathological changes involved in the initiation and progression of various neurodegenerative disorders or brain injuries. Since the landmark finding reported in 2007 found that hydrogen reduced the levels of peroxynitrite anions and hydroxyl free radicals in ischemic stroke, molecular hydrogen's antioxidant and anti-inflammatory effects have aroused widespread interest. Due to its excellent antioxidant and anti-inflammatory properties, hydrogen therapy via different routes of administration exhibits great therapeutic potential for a wide range of brain

disorders, including Alzheimer's disease, neonatal hypoxic-ischemic encephalopathy, depression, anxiety, traumatic brain injury, ischemic stroke, Parkinson's disease, and multiple sclerosis. This paper reviews the routes for hydrogen administration, the effects of hydrogen on the previously mentioned brain disorders, and the primary mechanism underlying hydrogen's neuroprotection. Finally, we discuss hydrogen therapy's remaining issues and challenges in brain disorders. We conclude that understanding the exact molecular target, finding novel routes, and determining the optimal dosage for hydrogen administration is critical for future studies and applications.

Keywords: Alzheimer's disease; Brain disorders; Hydrogen; Medical gas; Neuroinflammation; Oxidative stress.

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Grant support

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