50

Molecular hydrogen as a neuroprotective cytoprotective agent and a therapeutic antioxidant

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Emerging evidence by different publications with, more often, converging data, has consistently demonstrated that molecular hydrogen (H2) is a promising option for a variety of diseases and the underlying comprehensive mechanism is, among others ones, hydroxyl radicals scavenging.

The non-toxicity at high concentrations and rapid cellular diffusion features of H2 ensure the feasibility and readiness of its clinical translation to human patients.

There is a growing body of evidence based on the results of animal experiments and clinical observations that H2 may represent an effective antioxidant for the prevention of oxidative stress-related diseases.

Application of H2 in situations, by several pathologies at different localisations, with excessive protection of free radicals, in particular, hydroxyl and nitrosyl radicals, has been well documented and, on the basis on preliminary results, relatively conclusive.

Al though most neurological disorders are currently incurable, recent studies suggest the clinical potential of H2 administration for their prevention, treatment and mitigation. Several of the potential effectors of H2 will also be discussed, including cell signalling molecules and hormones that are responsible for preventing oxidative stress and inflammation. Nevertheless, further investigations will be required to determine the direct target molecule of H2.

Many recent studies confirm more and more than H2 may become in the future a novel therapeutic treatment or an adjuvant tool which may be useful when associated with other treatment or may have a protective effect on liver function of colorectal patients treated with mFolfox6 chemotherapy.

Moreover, radiation may induces tissue injury at the cellular level. To protect healthy tissue surrounding tumor, H2 may afford effective protection.