Hydrogen-rich water rescues autistic behaviors in the valproic acid-induced mouse model of autism

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Abstract: Objective Autism spectrum disorder (ASD) is a highly heterogeneous neurodevelopmental disorder characterized by impaired social communication, higher anxiety and cognitive deficits. Emerging studies increasingly suggest that immune dysfunction is a viable risk factor contributing to the neurodevelopmental deficits observed in ASD. Molecule hydrogen has anti-oxidative and anti-inflammatory activities and neuroprotective effects. However, the potential role of molecular hydrogen in autistic behaviors are still elusive. The present study aims to investigate the effects of molecule hydrogen on autistic behaviors in the mice. Methods Mice were free access with hydrogen-rich water (HRW) before and after the valproic acid (VPA) treatment during the pregnant and postnatal stages. Open filed test (OFT), novelty suppressed feeding (NSF), social interaction test (SI) and contextual fear conditioning (CFC) were used to assess the behavioral deficits in VPA-exposed mice offspring with or without HRW treatment. Results The results showed that VPA-exposed mice offspring exhibited significant autistic behaviors. HRW treatment could significantly rescue the behavioral deficits, mainly including the decreased time in central zone in the OFT, the increased latency time to feeding in the NSF test, the decreased social index in the SI test and impairment of memory in the CFC in VPA-exposed developmental mice offspring. These results warrant further exploration for developing molecular hydrogen as a novel strategy to prevent the occurrence of autism and related disorders.

Keywords: autism; hydrogen-rich water; valproic acid; behavioral test
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