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Protective effects of hydrogen on fetal brain injury during maternal hypoxia

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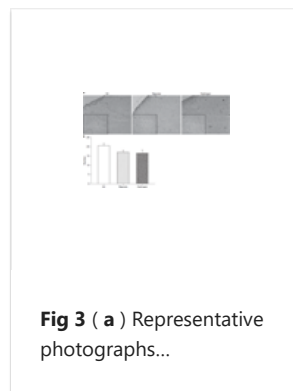
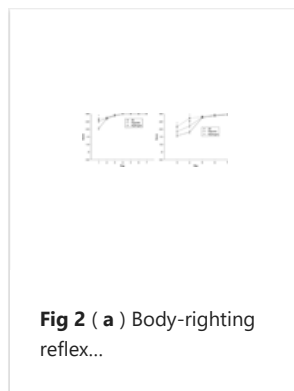
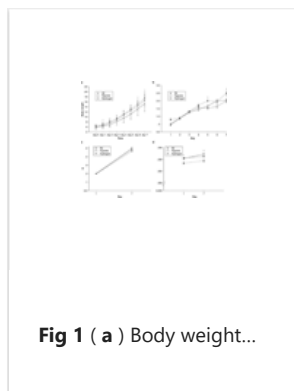
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Abstract

This study aimed to investigate the effects of hydrogen on fetal brain injury during maternal hypoxia. Pregnant rats (n=12, at gestational day 17) were randomly assigned into three groups; air, hypoxia, and hypoxia plus hydrogen groups were put into a chamber and flushed with room air (21% O₂ and 79% N₂), hypoxia (8% O₂ and 92% N₂), and hypoxia with hydrogen mixture (2% H₂, 8% O₂ and 90% N₂), respectively, for 4 consecutive hours. After birth, body and brain weights, body-righting reflex, and negative geotropism of neonates were measured, and then pups were killed at days 1 and 7. Oligodendrocytes were studied at post-natal day 1 by immunohistochemistry. We found significant decreases in body weight in the hypoxia group (P<0.05 vs. room air group), but not in the hypoxia plus hydrogen group (P>0.05 vs. room air group). Even though brain weight was not different among groups, the brain weight to body weight ratio in the room air group was significantly (P<0.05) lower than that in the hypoxia alone or hypoxia plus hydrogen groups. Body-righting reflex at day 1 and negative geotropism at days 3-4 showed deficiency in hypoxia animals when compared with the room air group (P<0.05). Hydrogen treatment improved the body-righting reflex and negative geotropism (P<0.05 vs. room air group). The above-mentioned functional changes caused by hypoxia were not associated with morphology and cell death of oligodendrocytes. Therefore, the maternal hypoxia-induced body weight loss, and functional abnormalities and hydrogen treatment during hypoxia offered a protective effect and improved functions in neonates.

Figures



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