

Decrease the inhibitory synapse-related gene expression caused autism-like behavior in rats treated prenatal hypoxia condition

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Object : Prenatal hypoxic stress (e.g., threatened abortion) is thought to be a risk factor of neurodevelopmental disease, such as autism spectrum disorder. However, a critical target molecular which was altered by hypoxic stress in the brain and its detail molecular mechanism is still unclear. To elucidate these problems, we firstly addressed by generating hypoxia rat model.

Method: Pregnant F344 rats were exposed low O₂ condition by using hypoxic chamber for 24 hours. After postnatal day 50, autism-like behaviors in rats were carried out by using social interaction test and novel objective recognition (NOR) test. In gene expression analysis, neuro2a cells were exposed 1% O₂ condition and collected for RT-PCR.

Result : Hypoxia rats didn't show any abnormalities in general behaviors. In behavioral test, hypoxia rats showed decrease social interaction time compared to F344 rats reared at normal condition (control rats). In addition, hypoxia rats showed impairment of memory function in NOR test. Furthermore, RT-PCR results showed decrease the autism-related protein Mecp gene, inhibitory postsynaptic protein gephyrin gene and GABA_A receptor β 3 subunit gene in neuro2a cells treated hypoxic condition.

Conclusion: these results indicated that the prenatal hypoxic stress might cause decrease inhibitory synapse-related genes, which destroy the excitatory/inhibitory synaptic balance and showed autism-like behavior in rats.☒