

The Possible Protective Effects of *Herichium erinaceus* (Lion's Mane Mushroom) on Autism-Like Behavioral Alterations Induced by Valproic Acid in Mice

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Abstract

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by impairments in communication, social interaction, and the presence of repetitive behaviors. Prenatal exposure to valproic acid (VPA) represents a well-established experimental model that reproduces core autism-like phenotypes in rodents. This study aimed to evaluate the potential protective effects of *Herichium erinaceus* (Lion's Mane mushroom, HE) against behavioral and developmental alterations induced by VPA in mice. Forty-eight pregnant C57BL/6 mice were allocated into four groups (n = 12 per group): control (saline 600 mg/kg, intraperitoneally), VPA (600 mg/kg, intraperitoneally on embryonic day 12), HE (300 mg/kg/day, orally throughout gestation), and HE+VPA (combined HE administration with VPA on E12). Behavioral assessments included developmental milestones (righting reflex, eye opening, body weight), motor coordination (negative geotaxis), locomotor activity (open-field test), repetitive behaviors (cylinder and marble-burying tests), cognitive performance (Y-maze), social interaction (three-chamber test), motivational behavior (splash test), and nociceptive sensitivity (hot-plate test). Prenatal VPA exposure resulted in delayed neurodevelopment, impaired motor coordination, reduced sociability, hypoactivity, increased repetitive behaviors, and cognitive deficits. In contrast, *Herichium erinaceus* treatment significantly ameliorated these impairments, leading to improvements in motor development, social interaction, exploratory activity, and cognitive performance compared with the VPA group. Collectively, these findings indicate that *Herichium erinaceus* exerts a broad neuroprotective effect across multiple behavioral domains affected by prenatal VPA exposure, supporting its potential role in ameliorating autism-like neurobehavioral alterations in a preclinical model.

Keywords

Protective Effects, *Herichium*, Autism-Like, Behavioral Alterations