

Evaluation of the neurotoxic effects of chronic embryonic exposure with inorganic mercury on motor and anxiety-like responses in zebrafish (*Danio rerio*) larvae

ABSTRACT

Chronic exposure to mercury (Hg) can lead to cumulative impairments in motor and cognitive functions including alteration in anxiety responses. Although several risk factors have been identified in recent year, little is known about the environmental factors that either due exposure toward low level of inorganic mercury that may led to the developmental disorders. The present study investigated the effects of embryonic exposure of mercury chloride on motor function and anxiety-like behavior. The embryo exposed to 6 different concentrations of HgCl₂ (7.5, 15, 30, 100, 125, 250 nM) at 5 hpf until hatching (72 hpf) in a semi-static condition. The mortality rate increased in a dose dependent manner where the chronic embryonic exposure to 100 nM decreased the number of tail coiling, heartbeat, and swimming activity. Aversive stimulus was used to examine the effects of 100 nM interferes with the development of anxiety-related behavior. No elevation in both thigmotaxis and avoidance response of 6 dpf larvae exposed with 100 nM were found. Biochemical analysis showed HgCl₂ exposure affects proteins, lipids, carbohydrates and nucleic acids of the zebrafish larvae. These results showed that implication of HgCl₂ on locomotor and biochemical defects affects motor performance and anxiety-like responses. Yet, the potential underlying mechanisms these responses need to be further investigated which is crucial to prevent potential hazards on the developing organism due to neurotoxicant exposure.

Keyword: Zebrafish; Mercury chloride; Hypolocomotion; Anxiety