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## Effects of zinc chloride on Zebrafish locomotion, circadian rhythm, social behavior and memory: Correlation between Toxicity and Neurobehavior changes

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Zinc is a micronutrient at low level but at high concentrations leads to environmental contamination and causes health problems. The aim of this study was to evaluate the effects of Zinc Chloride ( $ZnCl_2$ ) exposure on cognition and locomotion behavior in adult zebrafish (*Danio rerio*) and correlate these findings with different tissue accumulation of Zn, overall brain AChE and ROS level, Cortisol and Metallothionine levels in the nervous system. Although low level heavy metal exposure poses a potential risk to the zebrafish larvae, little or no data about the effects of  $ZnCl_2$  exposure on zebrafish adult fishes. We therefore, exposed adult zebrafishes for 4 days (0.5, 1 and 1.5 mg/L) displayed decreases locomotor behavior, such as average speed and time in upper zone and an increase speed of meandering.

Interestingly, adult fishes exposed to  $ZnCl_2$  for 4 days showed impaired frigid long-term memory in the passive avoidance test. Furthermore, zinc chloride treated fish showed memory deficit, increased ROS and AChE levels and decreased locomotor and swimming activities compared to control. A significantly positive correlation was observed between memory and AChE activity, as well as between locomotion and ROS production. These results indicate that acute exposure to  $ZnCl_2$  in adults leads to angiogenic effects, impaired memory and decrease aggressive behavior that might be associated with damage caused by this metal in the CNS, particularly in the cholinergic system.

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