EFFECTS OF MANGANESE ON THE SURVIVAL AND BEHAVIOR OF *DROSOPHILA MELANOGASTER*

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INTRODUCTION: Manganese (Mn^{2+} as $MnSO_4$ or $MnCl_2$) is an element found throughout the planet and is considered essential for sustaining life in both animals and plants. It is present in soil, freshwater, and marine environments, and has a wide range of applications. Animals absorb manganese primarily through ingestion or inhalation, and its effects on the body are influenced by the chemical form, route of exposure, age, and nutritional factors. However, prolonged exposure to this metal can lead to manganism, a condition associated with neurological symptoms similar to those of Parkinson's disease (PD). Manganese appears to accumulate in brain regions associated with PD — specifically the dopaminergic neural circuits—resulting in symptoms such as dystonia, rigidity, motor control deficits and speech disturbances. OBJECTIVE: Based on this, and aiming to elucidate the toxicological mechanisms of manganese, the present study investigated the effect of manganese chloride ($MnCl_2$) in adult *Drosophila melanogaster* to assess changes in survival, locomotor patterns and mobility. MATERIALS AND METHODS: Three-day-old flies were used to perform seven-day survival curves, with manganese chloride diluted in the food at final concentrations of 0.5 mM, 1 mM, 2.5 mM, 5 mM, and 10 mM, followed by climbing and open field assays. RESULTS AND CONCLUSION: The results revealed that 2.5 mM, 5 mM, and 10 mM concentrations negatively affected the flies' survival ($p < 0.0001$), demonstrating manganese toxicity at moderately high concentrations. These doses also impaired locomotor performance ($p < 0.001$), while exploratory behavior remained unaffected. According to previous literature, this pattern suggests specific alterations in motor control mechanisms, resembling phenotypes observed in Parkinson's disease and manganism. The association between manganese-induced effects in *Drosophila* and human neurological conditions provides a valuable model for investigating the molecular and cellular mechanisms underlying these pathologies. Given the current gaps in our understanding of manganese toxicity, this study proposes the use of an experimental model to further explore the effects of manganese on sleep in *Drosophila melanogaster*, an area that remains underexplored in the scientific literature.

Keywords: manganese; toxicity; dopaminergic circuits; manganism.