

Toxicity assessment of platinum nanoparticles in *Drosophila melanogaster*: acute and chronic exposure effects

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The increasing use and potential applications of platinum nanoparticles (PtNP) in various fields raise important concerns regarding their safety and long-term biological effects. Despite their promising catalytic and antioxidant properties, data on their toxicity and impact on living organisms remain limited and insufficiently documented.

In this context, the present study aims to evaluate the *in vivo* effects of PtNP using *Drosophila melanogaster* as a reference biological model. Oral exposures to different concentrations of PtNP were conducted in adult flies as well as in third instar larvae, under both acute and chronic exposure conditions. Analysis of survival, morphological, and behavioural parameters were assessed.

Results indicate that PtNP induced dose- and exposure duration-dependent effects. At the morphological level, no modifications were observed in adult individuals, either males or females, following acute exposure. However, size alterations were detected in adult males after chronic exposure. In addition, no morphological changes were observed in third-instar larvae, regardless of the exposure conditions. Regarding behavioural assessment, the crawling assay revealed no alteration in larval locomotion after acute exposure but a decrease in locomotor activity after long-term exposure. In adults, the climbing assay demonstrated a significant and marked dose-dependent decline in flight and climbing behaviour after both acute and chronic exposures.

Overall, these findings suggest that PtNP may induce functional impairments, particularly affecting locomotor activity, which could reflect potential neurotoxicity or physiological stress. They also highlight the importance of exposure duration and developmental stage in assessing the toxic effects of nanoparticles.

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