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ORAL PRESENTATION

Investigation of the genotoxicological potential of desipramine, an active substance used in antidepressant drugs, by *in vitro* test methods

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Abstract

Depression and anxiety are widespread psychiatric concenrns affecting a substantial portion of the global population. Antidepressant medications, such as desipramine, an active tricyclic antidepressant compound, are commonly prescribed for long-term use; however, their potential genotoxic (DNA and chromosome damaging) and cytotoxic (cell damaging) effects remain underexplored. This study aimed to evaluate the genotoxicity and cytotoxicity of desipramine using *Allium cepa* (*A. cepa*) root tip cells through the Allium test and Comet assay. Desipramine was applied at six concentrations (1.5, 3, 6, 12, 18, and 24 µg/mL) for 24 and 48 hours. Results demonstrated a dose- and time-dependent reduction in the mitotic index, indicating cytotoxic effects. Additionally, a significant increase in the frequency of mitotic abnormalities was observed in the 48-hour treatment group at all concentrations, whereas the 24-hour exposure induced significant abnormalities only at concentrations ≥12 µg/mL. The Comet assay further revealed a marked increase in DNA damage in desipramine-treated groups at all concentrations and time points, relative to the negative control. These findings indicate that desipramine induces both cytotoxic and genotoxic effects in *A. cepa* root tip cells, highlighting its potential risk to living organisms upon prolonged or high-dose exposure. Given the widespread and often chronic use of antidepressants, it is crucial to further investigate their long-term biological impacts. A thorough reassessment of the risk-benefit profile of desipramine and similar compounds is warranted, considering their implications for both human and environmental health.

Keywords: Desipramine, Genotoxicity, Allium Test, Allium Comet Assay, Mitotic Aberrations

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