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UNRAVELING BEAUVERICIN TOXICITY: CELL DEATH AND OXIDATIVE STRESS IN SH-SY5Y CELLS

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Background: Mycotoxins are secondary metabolites produced by several fungal genera, particularly Aspergillus, Penicillium, and Fusarium (1). Beauvericin (BEA) is an emerging mycotoxin that currently has limited regulatory control (2). **Aim:** The purpose of this study was to evaluate the association between oxidative stress and cell death mechanisms induced by BEA exposure. **Methods:** Cytotoxicity was assessed using the (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) (MTT) assay after 24 and 48 h of exposure, while intracellular reactive oxygen species (ROS) production was measured with the fluorescent probe dichlorofluorescein (H2-DCFDA) for 120 minutes and after 24 h of exposure with a specific measurement. Lipid peroxidation (LPO) was evaluated by the TBARS assay with measurement of malondialdehyde (MDA) production after 24 and 48h of exposure. Human SH-SY5Y neuroblastoma cells were treated with BEA at concentrations ranging from 0.12 to 30 μM. **Results:** BEA demonstrated a biphasic effect on cell viability, enhancing cell proliferation at 0.94 μM and inducing significant cytotoxicity at higher doses, particularly after 48 h of exposure. ROS levels increased at 12 μM across all time points, ranging from 13.9% to 33%, while lower doses elevated ROS production during the initial 45 minutes. Additionally, BEA at 12 μM significantly increased malondialdehyde (MDA) formation after 24h, although no significant effect was observed after 48 h. **Conclusion:** These findings indicate that BEA acts as a cytotoxic compound at elevated concentrations and exhibits a concentration-dependent effect on ROS generation, likely triggering long-term cellular antioxidant responses. The widespread presence of mycotoxins in food systems emphasizes the importance of studying their toxicity. **Acknowledgements:** This work has been funded by the Ministry of Science and Innovation and the CIAICO/2022/199 project of the Generalitat Valenciana. CML thanks the Generalitat Valenciana and the Ministry of Education, Universities and Employment for the contract associated with the CIAICO/2022/199 project.

Keywords: cytotoxicity, oxidative stress, in vitro, SH-SY5Y.

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