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None to declare.

Bewertung der Wirkung von Benzaldehyd-Derivaten in menschlichen Krebszellen
Evaluation of the effect of benzaldehyde derivatives in human cancer cells

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Background:

Conventional treatments for cancer include combinations of chemotherapy, surgery, radiotherapy or targeted therapy. However, these approaches not only have serious side effects, but resistance may develop, rendering the therapy ineffective. Therefore, the need for novel compounds able to show anti-tumor activity is imperative. Benzaldehyde is an organic compound that consists of a benzene ring with a formyl substituent. It is among the simplest aromatic aldehydes and as it is commonly used as a food flavoring, it is considered to be safe by the US FDA. The aim of the present study was to evaluate the effect of a commercial formulation of benzaldehyde and benzaldehyde derivatives on the proliferation of lung and prostate cancer cells.

Methods:

COR-L105, a lung adenocarcinoma-derived human cancer cell line, and DU-145, a human prostate cancer cell line, were cultured with the substance in different concentrations for 24, 48 and 72h. Cell growth, morphology and adhesiveness were monitored by microscopic observation. MTT assay was used to measure cellular metabolic activity as an indicator of cell viability, proliferation, and cytotoxicity. Results were analyzed by student's t-test. P values < 0.05 were considered to indicate a statistically significant difference. All the reactions were performed in triplicates, while appropriate controls were used.

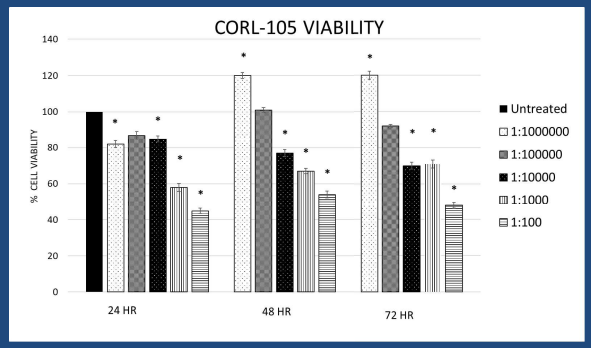

Figure 1. Viability of CORL-105 cells after incubation with benzaldehyde and benzaldehyde derivatives for 24, 48 and 72 hr

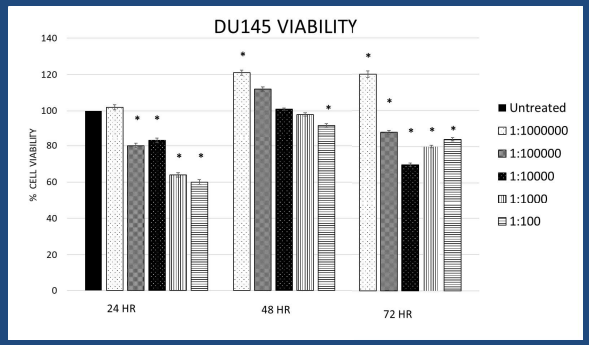

Figure 2. Viability of DU145 cells after incubation with benzaldehyde and benzaldehyde derivatives for 24, 48 and 72 hr

Results:

Both cancer cell lines exhibited a significant decrease in viability upon incubation with benzaldehyde formulation, mainly at higher concentrations (10^{-2} to 10^{-5}) and at all time points. However, there was a noticeable increase in cell proliferation at the lower concentration (10^{-6}) at 48 and 72 hr in both cell lines.

Conclusions:

It has been demonstrated that benzaldehyde formulation affects the shape and viability of the above cancer cell lines. The effect is mainly cytotoxic. However, at very low concentrations and upon prolonged incubation, the effect was growth stimulation. Our results demonstrate that benzaldehyde and benzaldehyde derivatives can decrease cancer cell viability. However, different concentrations and incubation times could affect the net result, often having opposite effects. The exact mechanism of action is not yet elucidated; however, it is likely linked to the effect benzaldehyde exerts on important intracellular signaling pathways like ERK/MAPK and ROS production.

Selected References:

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