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THE EFFECTS OF CISPLATIN AND PLANT EXTRACT ON METASTATIC LUNG CANCER CELLS

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Abstract: Metastatic lung cancer develops and spreads to other parts of the body. Lung cancer is generally caused by exposure to smoking—first and second-hand—radon, air pollution, and occupational exposures. Lung cancer incidence over the past 39 years has dropped 32% for men but has risen 94% for women. Cisplatin is an anti-cancer cytotoxic chemotherapy drug that is classified as an alkylating agent (a drug that binds to DNA and prevent proper DNA replication). Cisplatin has been found to be a successful chemotherapy drug that exudes its best effects when used in combination with at least one other chemotherapeutic drug. Research has also proven that when there has been more than two drugs in use, the third drug makes insignificant difference in treatment while increasing the risk of side effects of the therapeutic drugs. We hypothesize that the treatments will work best synergistically rather than individually. The objective of this experiment was to identify and highlight the effects of cisplatin and hops plant extract, xanthohumol (XN), on the proliferation of metastatic non-small cell lung cancer cells and monitoring the DNA damage. Our efforts were to determine if these treatments are most effective synergistically or individually and to see which treatment produces minimum if any cytotoxic side effects in comparison to other major cancer treatment drugs. In this study we used human non-small lung carcinoma (H1299) cells. To test this hypothesis we performed a cell proliferation assay, immunohistochemistry and protein analysis, and tryptan blue exclusion assays. For Cisplatin 25 μM relative to the control, the cell viability gradually decreased from ~90.7 to ~87.5 to ~79.6 as the concentration increased from 12.5μM to 25μM and then to 50μM. For the plant extract treatment, cell viability for concentration 6.25μM was ~87.5, then decreased at concentration 12.5μM to ~76.4, and then increased again at concentration 25μM. Treating the cells with both cisplatin and the plant extract yielded results of ~78.9 at concentration 6.25μM, ~69.8 at 12.5μM and ~66.9 at 25μM. This continual decrease revealed that the synergistic effect of both the Cisplatin and "XN" proved most effective proving the lowest average of cell viability.

Key words: Cisplatin, Xanthohumol, H1299, cytotoxicity, DNA, viability

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