ANALYSIS OF STRESS AND APOPTOTIC PROTEIN EXPRESSIONS IN ARSENIC TRIOXIDE-TREATED LUNG CANCER CELLS

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Abstract: Lung cancer is one of the most lethal and common of cancers in the world, causing up to 3 million deaths annually. Arsenic trioxide (ATO) has been used in the treatment of relapsed/refractory acute promyelocytic leukemia. However, its effects on lung cancer are not known. We hypothesize that ATO may also have a bioactivity against lung cancer, and its mechanisms of action may involve apoptosis, DNA damage and changes in stress-related proteins in lung cancer cells. To achieve our goal, lung (A549) carcinoma cells were used as the test model. The effects of ATO were examined by performing 6-diamidino-2-phenylindole (DAPI) nuclear staining for apoptosis and western blot analysis for stress related proteins (Hsp70 and cfos) and apoptotic protein expressions. Arsenic trioxide-induced apoptosis was evidenced by chromatin condensation and formation of apoptotic bodies as reveled by DAPI nuclear staining. Cell shrinkage and membrane blebbing was observed at 4 and 6 μg/ml of ATO. Our data from the western blot analysis revealed a significant increase in the Hsp 70, caspase 3 and p53 protein expression in a dose dependent manner and significant decrease in the cfos, and Bcl-2 protein expression at 4 and 6 μg/ml of ATO. There was a slight decrease in cytochrome c protein expression at 4 and 6 μg/ml of ATO. In conclusion, arsenic trioxide is cytotoxic to lung cancer cells and its toxicity is associated with stress stimuli and apoptosis.

Keywords: DAPI, Hsp70, Bcl-2, cfos and apoptosis