PHYSIOLOGIC DOSES OF ASCORBIC ACID INCREASE ARSENIC TRIOXIDE TOXICITY IN HUMAN JURKAT -T LYMPHOMA CELLS

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Abstract: Arsenic trioxide (ATO) has been reported to have activity in vitro against multiple myeloma cells. Recently, it has also been used as a therapeutic agent to treat acute promyelocytic leukemia (APL) patients who have relapsed from conventional treatment with all-trans retinoic acid (ATRA) and chemotherapy. Recent studies from our laboratory indicate that ascorbic acid (AA) enhances the activity of ATO in HL-60 cells by increasing its cytotoxic effect and the level of oxidative stress. However, the potential effect of AA and ATO combination in the treatment of lymphoma patients has not been examined. Our central aim was to assess whether physiologic doses of ascorbic acid increase ATO toxicity in human Jurkat T lymphoma cells. Human Jurkat T lymphoma cells were treated either with a dose (9µg/mL) of ATO alone or with several physiologic doses of AA plus 9µg/mL ATO for 48 h. Cell survival was determined by trypan blue exclusion test using the Cellometer Vision. Data generated from this experiment indicated that AA co-treatment at 100µM and 200µM significantly (p < 0.05) increased cell death in ATO-treated cells. The viability decreased from 61 ± 8% in cells with ATO alone to 31 ± 4% in cells treated with 200µM AA plus 9µg/mL ATO. Our research demonstrates that ATO alone is cytotoxic to human Jurkat T lymphoma cells, and co-administration of physiologic doses of AA enhances its toxicity in a dose-dependent manner.

Keywords: Jurkat T-cells, arsenic trioxide, ascorbic acid, lymphoma, cellometer vision

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