# Preferential Cytotoxicity of Groundwater Levels of Arsenic on Tissue-Specific Cancer Cells

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Arsenic has long been seen as an environmental toxin and carcinogen. Recent studies on the drinking water arsenic levels in Chile suggest that low concentrations of arsenic could be preferentially cytotoxic to cancerous cells (Smith, 2014). In the U.S., arsenic levels in the drinking water are strictly regulated by the EPA. Arsenic is already a treatment for leukemia. In breast cancer cells, it has been suggested that arsenic treatment can trigger re-expression of the estrogen receptor in aggressive, estrogen-negative breast cancer. This would cause the cancer to susceptible to hormone therapy. There is conflicting information on the effects of arsenic on cell viability. Simulating groundwater arsenic levels, the effects of arsenic trioxide on the viability of cancerous and non-cancerous cells, along with the cytotoxic action of arsenic were investigated. A CellTiter-Blue Viability Assay was conducted on ten cell lines. The H293, CLBL-1, MDA-231, and SKBR3 were significantly affected by the arsenic trioxide treatment that simulates groundwater arsenic levels. Compared to the cancerous cell lines, the non-transformed cell lines HDF and MCF10A were not significantly affected by the treatment until higher concentrations were used. The Cell Cycle Mechanism assay suggested that cells in the G2/M phase are most susceptible to arsenic treatment. The results highly suggest low-level concentrations arsenic trioxide as a potential chemotherapeutic agent.

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his Companions Foundation for Giftedness and Creativity: $1,000 will be awarded to the winner's school.