ASSESSING THE SURVIVAL OF FIBROBLAST AND LUNG CARCINOMA CELL LINES UPON EXPOSURE TO SELECTED ORGANICS AIMED AT INHIBITING CELLULAR GLYCOLYSIS

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Abstract: Lung cancer is one of the most prevalent and deadly cancers in United States. Research has shown that cancer cells exhibit higher glycolytic rates than normal cells. The human lung fibroblast cell line (MRC-5) was selected to represent the normal human lung and the human alveolar epithelial cell line A549 was selected to represent lung cancer in vitro. These cells were maintained and exposed to eleven different organic reagents including fructose diphosphate (FDP), sodium citrate, ascorbic acid, crude honey, sodium bicarbonate, D-glucose, oxalic acid, glycerol, zinc acetate, pyruvic acid, and sodium ascorbate at concentration levels ranging from 31.3-2,000 µg/ml in 96 well plates using MTT, Alamar blue and the T4 cellometer assays as well as phase-contrast photo-imaging. Our results indicate that exposure of A549 cells to these organics resulted in concentration dependent differential cell destruction for the A549 cell line. Eight of the eleven organics used namely zinc acetate, oxalic acid, honey, FDP, pyruvic acid, sodium citrate, ascorbic acid and glycerol showed statistically significant (p<0.05) differential negative effects on the A549 line in comparison to its control as well as to their effects on the MRC-5 cell line. Viability using the T4 cellometer counting ranged between 60-76% for the A549 compared to 96-100% for its control as well as the exposed MRC-5 cell line. LC50 using MTT assays ranged from 162-838 µg /ml. We conclude that eight of the tested organics impaired glycolysis which is crucial to the generation of cellular energy and survival of the A549 cell line.

Key words: MRC-5, A549, glycolysis inhibitors, T4 cellometer, MTT, organics, energetics

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