MOLECULAR AND CELLULAR EFFECTS OF LEAD ON HUMAN EPITHELIAL CELLS (HACAT)

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Abstract: Lead is a highly toxic metal that has been around for many years. It is omnipresent in the environment and the quantity of exposure is commonly found in all mankind. The major environmental sources of exposure to lead include leaded paint, auto emissions, and drinking water. Despite the dramatic reduction in sources of lead exposure, lead poisoning remains a reality for a high number of people in this country. In this study, we aim to investigate the cellular and molecular effects of inorganic lead on human epithelial keratinocytes (HaCaT cells). The research is designed to evaluate the dose-response relationship by determining cell proliferation using the MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide] for cell viability. Data obtained from this assay will show the LD₅₀ (the lethal dose of lead needed to kill half (50%) of the epithelial cells when exposed to lead. Our results show that lead when exposed to HaCaT-cells for 24 hours had an LD₅₀ of 60ppm ± 0.05 while at 48hours, the LD₅₀ was 70ppm ± 0.04. These results indicate that lead induces cytotoxicity in a dose and time dependent manner. Based on these findings, we will use lead to determine the rate of apoptosis and cell damage of HaCaT cells when exposed to lower concentrations.

Keywords: lead (Pb), epithelial cells, keratinocytes, proliferation, and MTT assay.