EFFECTS OF HEAVY METALS (AS, CD, HG, & PB) ON CELL CYCLE OF BREAST CELL LINES

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Abstract: The toxicity of several heavy metals such as mercury has been attributed to their high affinity to sulphydryl groups of proteins and enzymes, and their ability to disrupt cell cycle progression and/or apoptosis in various tissues. Lead exposure has led to the accumulation of rat fibroblasts cells in the G0/G1 phase. The aim of this work was to establish whether exposure to Mercury, Lead, Arsenic, and Cadmium individually or in a mixture and at environmentally relevant concentrations enhances the cell cycle of MCF-7. MCF-7 breast cancer cells were exposed to Mercury, Lead, Arsenic, and Cadmium alone and to 10%, 100% and 1000%MCL mixtures. Cell cycle analysis was conducted after 36 hours exposure. Nuclei from control and treated cells were isolated using PI isotonic solution and were analyzed with a FACSCalibur at an excitation wavelength of 488nm provided by 5W argon ion laser. The results showed that there was a significant decrease in %Go/G1 of cells exposed to Pb, Hg and 1000%mixture of arsenic, mercury, lead and cadmium. While, there was no significant difference among other treatments except for 10% mixture which showed an increase in % G1 phase. 10ppb Arsenic, 2 ppb mercury, 15 ppb lead and 1000%mixture increased percentage of the cells in the S phase. These results indicated a disruptive effect of these heavy metals to breast cancer cell cycle. Further investigation is needed to determine the interactive effects and the molecular mechanisms behind these findings.

Keywords: Heavy metals, cell cycle, breast cell lines