BASIS APOPTOTIC MECHANISMS OF LEAD TOXICITY IN HUMAN LEUKEMIA (HL-60) CELLS

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Abstract: Lead poisoning has been extensively studied over the years. Many adverse physiological and behavioral impacts on the human body have been associated with exposure to this heavy metal. It especially causes the hematological effects to people of all ages. However, the molecular mechanisms of lead induced apoptosis are still largely unknown. Therefore, the aim of the present study was to investigate the apoptotic mechanism of lead nitrate in HL-60 cells. Human leukemia (HL-60) cells were treated with different doses of lead nitrate for 24 h. The flow cytometry assessment and DNA fragmentation analysis were for apoptosis, respectively. The flow cytometric assessment (caspase-3 activity) showed a strong dose-response relationship between lead nitrate exposure and late stage apoptosis of HL-60 cells. Upon 24 h of exposure, the results of caspase-3 activity showed that the percentages of HL-60 cells undergone late stage apoptotic were (3 ± 0)%, (31 ± 10)%, (36.5 ± 15)%, (22 ± 8)%, and (18 ± 13)% in 0, 10, 20, 30, and 40 µg/mL of lead nitrate, respectively. This result was further confirmed by the data of DNA laddering assay showing a clear evidence of nucleosomal DNA fragmentation in lead nitrate-treated HL-60 cells. In summary, these studies demonstrated that lead nitrate represents an apoptosis-inducing agent in HL-60 promyelocytic leukemia cells and its apoptotic mechanism functions via caspase-3 activation, following by nucleosomal DNA fragmentation.

Key words: HL-60 cells, caspase-3, DNA fragmentation, flow cytometry

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