CADMIUM-INDUCED TOXICITY IN HUMAN LIVER CARCINOMA (HEPG2) CELLS

Anthony C. Skipper¹, Kenneth Ndebele² and Paul B. Tchounwou¹

¹Molecular Toxicology Research laboratory, NIH-Center for Environmental Health; ²Laboratory of Cancer Immunology, College of Science, Engineering and Technology, Jackson State University, 1400 Lynch Street, Box 18540 Jackson, Mississippi 39217, USA.

Abstract: Cadmium is a widespread heavy metal of environmental and occupational concern. Cadmium and Cadmium containing compounds have all been classified as human carcinogens. Contaminated foods and tobacco smoke are the main sources of exposure for non-occupationally exposed persons. The route of cadmium exposure may occur through inhalation, dermal absorption and contaminated food. Although there have been numerous studies examining the effects of cadmium in animal models, the mechanisms of the carcinogenic activity of cadmium are not clearly defined. Several in vitro studies have shown that cadmium produces various direct and indirect genotoxic effects such as DNA damage and chromosomal aberrations. The purpose of this study is to elucidate some of the molecular mechanisms that are involved in cadmium–induced toxicity in HepG2 cells. To achieve this, we performed the MTT assay to determine cell viability and cytotoxicity in HepG2 cells exposed various doses of cadmium. We have shown that cadmium induces toxicity to HepG2 cells in a dose- and time-dependent manner. The 48 h-LD50 was computed to be 3 µg/ml. To determine the role of cadmium-induced apoptosis we investigated sub G1 DNA content using FACS analysis. From this experiment, we’ve shown that cadmium induces apoptosis in HepG2 cells. HSP 70 and GADD45 protein expression were also examined using Western Blot Analysis. Our preliminary data demonstrated that cadmium induced significant changes in the expression of these proteins. However, further studies are underway to verify the above results. The results obtained from these studies will provide scientific data towards the understanding of the molecular mechanisms of cadmium-induced toxicity in humans.

Keywords: Cadmium, cytotoxicity, apoptosis, cell cycle modulation, HepG2 cells

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