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The role of p44/42 MAP kinase in Hexabromocyclododecane (HBCD)-induced production of Interleukin 6 (IL-6) in Human Peripheral Blood Mononuclear Cells (PBMCs)

The brominated flame retardant Hexabromocyclododecane (HBCD) is an environmental contaminant with a variety of applications, but it is primarily used in the construction industry for thermal insulation in the form of expanded (EPS) and extruded (XPS) polystyrene foams. HBCD has been found to accumulate in living organisms and is found in human blood samples and breast milk. Interleukin 6 (IL-6) is a pro-inflammatory cytokine produced by T-lymphocytes, monocytes, and other cells. It regulates cell growth, tissue repair, and immune functions. Previous studies show HBCD increases both the secretion and intracellular levels and thus the cellular production of IL-6 in human peripheral blood mononuclear cells (PMBCs). The current study investigates whether the MAP kinase (MAPK), p44/42 is involved in HBCD-induced stimulation of IL-5 production in immune cells. PBMCs were treated with a p44/42 pathway inhibitor (PD98059 for 1h before exposure to HBCD at concentrations of 5, 2.5, and 1 µM for 24h. IL-6 production was evaluated by measuring both the secreted (via enzyme linked immunosorbent assay (ELISA)) and the intracellular levels (via western blot) of IL-6 from the same cells. Results indicate HBCD-induced increases in IL-6 production are dependent on the p44/42 MAPK (Erk1/2) pathway. This further elucidates the mechanism by which HBCD increases this important pro-inflammatory cytokine which could result in chronic inflammation.