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Screening for Genotoxicity and Oestrogenicity of Endocrine Disrupting Chemicals *in Vitro*

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ABSTRACT

A diverse range of endocrine disrupting chemicals (EDCs) was examined, using an *in vitro* test system, for critical events required for the onset of carcinogenesis in vivo. The initiation stage of carcinogenesis is a genotoxic process. 4-Octylphenol (alkylphenol), bisphenol A (plasticiser), coumestrol and genistein (phytoestrogens), 2,4-dichlorophe- noxyacetic acid and toxaphene (pesticides) and ethinylestradiol (synthetic hormone) were investigated for potential mutagencicity, DNA strand breakage, clastogenicity and DNA repair. Significant induction in the percentage of cells containing micronuclei was observed for all the EDCs. Toxaphene and coumestrol were mutagenic in the Ames assay. They also induced significant levels of unscheduled DNA synthesis and DNA strand breakage. Bisphenol A induced low level DNA strand breakage in HepG2 cells in the comet assay. The EDCs, with the exception of toxaphene, induced transcriptional activation in the yeast estrogen screen (YES) assay. They were potently oestrogenic in the mammalian based MVLN (transactivation) and E-SCREEN (proliferation) assays. This report on the transactivational, proliferative and genotoxic ability of the EDCs suggests that these chemicals may play a role in the etiology of male and female reproductive cancers.

KEYWORDS

Four Endocrine Disrupting Chemicals (EDCs); Proliferation; Mutagenicity; DNA Strand Breakage; Comet Assay; DNA Repair; Unscheduled DNA Synthesis Assay (UDS); E-SCREEN Assay; YES Assay; MVLN Assay

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