Effect of increasing graded doses of formaldehyde on human embryonic kidney cells

Banerjee A.[A-F], Dholey M.[E], Mukherjee S.[A,C,D,E], Maji B.K.*[A,C,D,E,F]

Department of Physiology (UG & PG), Serampore College, Serampore, West Bengal, India

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ABSTRACT

Purpose: In the present study, we aimed to identify the effect of three increasing doses of most widely preservative, formaldehyde (FA) on the urinary system using human embryonic kidney cells (HEK-293) *in vitro*.

Materials and methods: The HEK-293 cells were grown in Dulbecco's Modified Eagle medium (DMEM, Gibco, USA) supplemented with 10% of fetal bovine serum, 100 IU/ml penicillin and 100 µg/ml of streptomycin (Gibco, USA) using 25cm^2 flasks (Nunc, Denmark), in a CO_2 incubator (Heal Force) at 37°C are treated with 19 % formaldehyde in DMEM supplemented with 10% of fetal bovine serum to yield final concentrations of 0.05 µl/ml, 0.1 µl/ml, 0.5 µl/ml and 1.0 µl/mlof 19% FA.

Results: The result showed that statistically significant dose dependent decrease in cell viability of HEK-293 cells with exposure to increasing concentration of FA (0.05 µl/ml, 0.1 µl/ml, 0.5 µl/ml and 1.0 µl/ml) on MTT assay. Extremely huge dose dependent DNA damage with a dose dependent up regulation of mRNA expression of pro-apoptotic iNOS and TNF-α gene was observed when HEK-293 cells are treated with the increasing concentration of FA. In addition, the protein expression levels of Bcl-2 and Bax revealed that increasing concentration of FA on HEK-293 cells down regulated the anti-apoptotic Bcl-2 and up regulated pro-apoptotic Bax gene.

Conclusions: Our result indicates that, high dose of FA is more dangerous than the low dose on HEK-293 cells with cellular damage.

Keywords: Formaldehyde; Human embryonic kidney cells; High and low dose

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