β-ESTRADIOL INDUCED OXIDATIVE STRESS IN LEUKEMIC (HL-60 AND JURKAT) CELLS

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Abstract: β-estradiol is the most potent estrogen of a group of endogenous estrogen steroids which includes estrone and estriol. This steroid hormone is the most potent natural estrogen, produced mainly by the ovary, placenta, and in smaller amounts by the adrenal cortex, and the male testes. Although β-estradiol protects the renal and cardiovascular systems, the mechanisms involved remain unclear. In this research, we performed both MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide] assay and trypan blue exclusion test to evaluate the effect of β-estradiol on HL-60 and Jurkat T-cells; and to compare the sensitivity of these two cells types. Lipid hydroperoxide (LPO) assay for assessing the levels of the degradation products of polyunsatured fatty acid (PUFA) hydroperiode was also performed for Jurkat T-cells alone. The results from both MTT assay and trypan blue exclusion test demonstrated that low, physiological levels of β-estradiol induce cellular proliferation in Jurkat T-cells. At higher dose of exposure (16 μM), β-estradiol decreases the viability of Jurkat T-cells compared to the control cells. Similar trend was obtained with the trypan blue exclusion test using the hemacytometer to count the cells manually. In summary, the results of the present study demonstrate that physiological levels of β-estradiol induce cell growth and cellular proliferation of Jurkat T-cells whereas higher doses inhibit cell growth and induce cell death.

Keywords: β-estradiol, MTT assay, HL-60 cells, Jurkat T-cells, trypan blue, Lipid hydroperoxide assay

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