

GENOTOXIC EFFECTS OF BORAX ON CULTURED LYMPHOCYTES

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Abstract. The effect of borax on human chromosomes was analyzed in this study. Venous blood from 30 male students at Thammasat University, Thailand (age 18-25 years) was collected for lymphocyte cell cultures. This experiment was divided into two groups: the first group was the control group and the second group was the experimental group. The lymphocyte cells in the control group were cultured without borax. The experimental group was divided into four subgroups. The lymphocyte cells in each experimental subgroup were cultured with different concentrations of borax (0.1 mg/ml, 0.15 mg/ml, 0.2 mg/ml and 0.3 mg/ml). Human chromosomes were studied for abnormalities through Giemsa-staining and G-banding. The results show that the numbers of metaphase plates (the metaphase plate which contained 46 chromosomes; 46, XY) and metaphase chromosomes were reduced when lymphocyte cells were cultured with 0.15 mg/ml (57.2%), 0.2 mg/ml (50.8%) and 0.3 mg/ml (42.3%) concentrations of borax. There was a statistically significant difference between the control and experimental subgroups ($p < 0.05$). Sister chromatid separation was found in the 0.3 mg/ml borax concentration experimental subgroup. This shows that borax (at 0.15, 0.2 and 0.3 mg/ml concentrations) affects the cell and human chromosomes (both numerical and structural abnormalities). Borax may cause human chromosome abnormalities and lead to genetic defects.

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