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Chromosomal aberrations and sister-chromatid exchanges in lymphocytes of men occupationally exposed to styrene in a plastic-boat factory.

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Abstract

Workers in a Swedish factory making boats from plastics reinforced with glass fibre are exposed to a variety of chemicals, including styrene which is mutagenic after metabolic activation. The concentration of styrene in the air was measured in the breathing zones of workers occupied with various processes in boat making. Samples of air were taken 6 times during the years 1973-1978. The total exposure to styrene for the workers during this period was calculated and expressed as the average concentration in mg per m³ air during an 8-h workshift multiplied by the number of years of employment. A low-dose group (mean = 137 mg x m⁻³) and a high-dose group (mean = 1204 mg x m⁻³) were identified. Blood samples were taken in 1978 from workers belonging to the exposed groups and from a matched control group of employees in the same factory not exposed to styrene. Lymphocytes were cultured and examined for chromosomal aberrations and sister-chromatid exchanges. Exposed workers had a significantly (p less than 0.001) higher number of chromosomal aberrations (36 persons, mean = 7.9 aberrations/100 cells) compared with employees in the control group (37 persons, mean = 3.2 aberrations/100 cells). There was no significant difference between the mean values of the number of chromosomal aberrations between the highly exposed and the less exposed groups. But in the less exposed group there was an increase in the frequency of chromosomal aberrations with increasing exposure to styrene ($r = 0.576$). In the highly exposed group this dose response was not observed ($r = 0.231$). For the frequency of sister-chromatid exchanges (SCE) a

slight (p less than 0.05) increase was found in the styrene-exposed group (20 persons, mean = 8.4 SCE/cell). The control group (21 persons) had a mean value of 7.5 SCE/cell. Again there was no difference between the highly exposed and the less exposed groups. Other environmental factors that may have clastogenic effects were studied, but multiple regression analysis failed to show a candidate responsible for the increase in chromosomal abnormalities in the exposed group.

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MeSH terms, Substance



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