COMPARISON BETWEEN CYTOGENETIC DAMAGE INDUCED IN HUMAN LYMPHOCYTES BY ENVIRONMENTAL CHEMICALS OR RADIATION

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Chemical carcinogens have the ability to initiate the carcinogenic process by genotoxic and mutagenic mechanisms. Benzene is considered to be a human carcinogen, is clastogenic to rodents and humans, and it affects the immune response. The amount of benzene and the member at benzene related compounds in the environment is constantly increasing. Workers in various industrial plants, particularly those in petroleum plants, are exposed to benzene and benzene related compounds as a result of various activities in which benzene is processed, generated or used. Blood samples from twenty-four workers from petroleum plants, 35 unexposed controls, and 31 untreated lung cancer patients of a similar socio-economic status and from the same region in Poland were examined for cytogenetic effects, and for any relationship to confounding factors (e.g. smoking habit, sex, family cancer history and seasonal influence) [1]. Peripheral blood was examined for chromosome aberrations (CA), sister chromatid exchanges (SCE), high frequency cells (HFC) and proliferative rate index (PRI). The results were analyzed by a t-test, and multivariate analysis of variance. Results show that the occupationally exposed group had statistically significant increases in CA, and the percentage of aberrant cells. Smoking was found to affect statistically significant levels of CA, percent age of aberrant cells, SCE, HFC. The unexposed groups also showed increases caused by smoking and season. The non-smoking group also showed significant increases in cytogenic damage with the exposure. The results received in the study of cancer patients group showed that all types of CA (including and excluding gaps), the percent age of aberrant cells, SCE, HFC were statistically significantly higher in cancer patients than in healthy donors. All major chromosome aberration parameters differed significantly between smokers and non-smokers. In the groups under the study an multivariate regression analysis confirmed a significant casual association between cytogenetic damage and exposure to benzene related

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compounds. Our data showed also a possible association between cytogenetic damage and cancer. We investigated the cytogenetic damage in the blood from people who were suspected to be accidentally exposed to gamma radiation. To estimate the absorbed doses, we have analyzed lymphocytes from their blood for the presence of unstable chromosomal aberrations. We have estimated the absorbed doses resulting from the suspected exposures on the base of previously obtained *in vitro* the dose response curves [2]. A possibility of radiation exposure of the one person was excluded on the base of aberrations rate and the results of the additional analysis of sister chromatid exchange (SCE), suggesting an exposure to chemicals. Levels of various types of cytogenetic damage observed among people from refference and petroleum plants workers groups are similar to the levels of damages detected in the blood of people suspected of the accidental exposure to a radiation source. Our results bring a proof that health hazard from radiation exposure in the perception of the public is often overestimated in contradistinction to the environmental hazard.

References

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