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### Genotoxicity and immunotoxicity studies in hospital nurses occupationally exposed to volatile anesthetic gases

Health professionals chronically exposed to anesthetic gases in the operating rooms are at higher risk of lung diseases, hematological, immunological and reproductive alterations. Anesthetic gas exposure often exceeds the safety limits, especially in the case of pediatric anesthetists or when no proper ventilation has been installed in operating theaters. In the present study we assessed the health risk among anesthetics exposed nurses and measured genotoxicological and immune parameters in the presence or absence of confounding factors such as smoking. The investigations were carried out in 127 subjects exposed to anesthetic gases from health services. The data was compared to healthy, non-exposed controls. The measured biomarkers were: Clinical laboratory routine tests, completed with genotoxicological (chromosome aberrations and sister-chromatid exchange) and immunotoxicological monitoring (ratio of lymphocyte subpopulations and activation of lymphocytes). In the group of health personnel exposed to anesthetic gases, we did not find significant changes in the frequency of chromosome aberrations or sister-chromatid exchanges. However, there was a statistically significant increase in the ratio of CD25+/CD8+ cells-activated cytotoxic T cells compared to the control. In workplaces where protective measures were strictly adhered to (with quality assurance) the activation of lymphocytes was at control level. However, where there was no quality assurance, activation of lymphocytes increased significantly compared to the control. In the anesthetic gas exposed smokers, there was a statistically significant shift in the T cell subpopulations: The percentage of helper T cells increased, while the percentage of cytotoxic T cell decreased, leading to an elevated Th/Tc ratio compared to the non-smokers. The frequency of sister-chromatid exchanges also increased significantly compared to nonsmokers. We also found that anemia, elevated serum glucose levels, thyroid dysfunction and benign tumors were more frequent in the exposed group than in controls. Our results suggest that our biomarkers can be useful in tracking occupational/environmental immunotoxic effects. We can confirm that quality assurance and protective measures can prevent exposures to harmful substances and have shown that smoking as a confounding factor has to be taken into account when assessing occupational exposures.

### Biography

Anna Tompa is working as a Professor at Semmelweis University Faculty of Medicine 1964-1970 Institute of Pathology and Cancer Research: Assistant Professor: from 1970 to 1979 Eppley Institute Omaha NE. Visiting Scientist: from 1976 to 1978. National Institute of Occupational Health: Chief Scientist, from 1979 to 1998 DKFZ, Heidelberg: Visiting Scientist annually one month from 1986 to 1989 National Institute of Chemical Safety: Director from 1998 to 2005 present: Research Director Semmelweis University Department of Public Health: Professor and Director from 2005 to 2010, present is working as a Deputy Director.

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