

27TH SURGICAL NURSING & NURSE EDUCATION CONFERENCE

OCTOBER 16-17, 2017 DUBAI, UAE



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Basic principles of cancer risk assessment and prevention

Cancer is a major disease worldwide among the chronic non-infectious diseases, but there are marked geographic variations in incidence overall. Especially the cancer incidence in Hungary is much higher than in any post-communist country, mainly due to the high incidence of smoking and unhealthy diet. It is the second largest cause of death in our country exceeded only by cardiovascular diseases. In 2016, 64000 new cases of cancer and 33000 cancer deaths (approximately 20% of all deaths) were recorded. According to the WHO statistics 54 million cancer patients were registered in the world in 2016. 14 million new cases are diagnosed annually and more than 8.8 million people die of the disease every year in the world. In some Western countries, cancer mortality rates have recently started to decline, due to a reduction in smoking prevalence, improved early detection and advances in cancer therapy and introducing successful preventive measures. Genotoxicological investigations serve as tools to detect the damages caused by the environmental and occupational mutagens and carcinogens acquired by the somatic cells. These damages are well demonstrated in the course of genotoxicological monitoring by chromosomal mutation, Sister Chromatid Exchange (SCE) and the blastic transformation activity of Peripheral Blood Lymphocytes (PBL), among workers who were exposed to chemical carcinogens. In our genotoxicological monitoring system, we have investigated more than 8000 individual exposed to different carcinogens, cytostatic drugs, industrial solvents, formaldehyde, heavy metals, styrene, 1-3-butadiene, etc. These studies showed an elevation of chromosomal aberrations, sister chromatid-exchanges and reduced DNA-repair capacity. The main point of intervention was the improvement of the work-sites including lowering the exposure and convincing the workers to change their life styles avoiding confounding factors, e.g. drugs, alcohol, medication and smoking. This monitoring system was also used to determine the protective effects of some natural products with known antioxidant capacity against the genotoxic effects of these pollutants *in vivo*. In the case of heavy metal (precious metals, chromium, cadmium and nickel) exposed workers, after a chemoprevention treatment with the nutritional supplement Humetta® containing various antioxidants and chelating agents, results showed a decrease in genotoxic effects, together with improved health status based in the clinical laboratory data.

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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