
BIOMONITORING OF SERBIAN POPULATION REVEALED BY CB MICRONUCLEUS TEST BEFORE AND AFTER THE BOMBING OF YUGOSLAVIA

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ABSTRACT

The induction of micronuclei in mitotically active cells has been widely used and promoted as a biological marker of exposure to environmental toxins. Biomonitoring of population using cytochalasin block micronucleus test (CBMN) has been performed for 11 years in our country; the incidence of micronuclei was evaluated in many groups of occupationally exposed persons as well as healthy unexposed controls. The spontaneous frequency of MN per 1000 binucleated cells was 9 ± 3 (mean \pm SD) for woman, 7 ± 2 for men. The average incidence of micronuclei in lymphocytes of newborns was 5.3 ± 0.6 , in their mothers 15 ± 3 per 1000 binucleated cells, respectively. After the bombing of Yugoslavia significantly higher incidence of micronuclei was found in all groups of examinees: health adults and newborns. In healthy adults, the average incidence of micronuclei was 28.16 ± 14.63 ; in young pregnant woman 25.3 ± 5.02 and their foetuses 20.14 ± 9.6 respectively. One year latter (2001) the incidence of MN declined in all adults but enhance in foetal blood lymphocytes.

Key words: micronuclei, human lymphocytes, adults, newborns

Introduction

Exposure of human population to mutagenic carcinogens can be monitored using different chemical and biological endpoints. The chromosomal aberration, a very sensitive biological endpoint, reflects the effect of toxins on the whole genome, in contrast to point mutation, which reflects the effect on a small target. Human peripheral blood lymphocytes, because of their easy availability, have been traditionally used to monitor the effects of exposure to known or suspected mutagens. This methodology is very well established, and the criteria to be used in such studies are well documented. Two types of chromosome aberrations, namely structural and numerical ones, are recognized and both these types of aberrations

are associated with human health. A recent result of epidemiological studies (Nordic study) has found a correlation between increased cancer risk and increased levels of chromosomal aberrations in lymphocytes [1]. Micronuclei are formed from the lagging fragments or whole chromosomes during cell division. The induction of micronuclei in mitotically active cells has been widely used and promoted as a biological marker of exposure to environmental toxins including ionizing radiation [2]. Micronuclei have been considered to represent both markers of exposure and potential indicators of biological response to genotoxic agents.

Since monitoring of population using CBMN test has been performed for 11 years in our country, the incidence of micronuclei was evaluated in many groups of occupationally exposed persons as well as in healthy unexposed controls. Those results demonstrated that in unexposed controls the spontaneous frequency of MN per 1000 binucleated cells was 9 ± 3 (mean \pm SD) for woman, 7 ± 2 for men, respectively. The incidence of micronuclei monitored in pregnant females demonstrated that the average incidence of micronuclei was 15 ± 3 per 1000 binucleated cells and their in newborns 5.3 ± 0.6 , respectively.

After the bombing of Yugoslavia biomonitoring of healthy adults, young pregnant woman and their newborns was continued with aim to follow the influence airborne toxins including ionising radiation during NATO campaigns. Biomonitoring was revealed by CBMN test.

Group of examines and year of examination	The incidence of MN (mean\pmSD)
1989 workers dealing with luminous paints (Kragujevac)	35.16 \pm 19.3
1989 control group from the same factory (Kragujevac)	5.96 \pm 3.38
1989 workers handling with tritium gas (Kragujevac)	14.4 \pm 7.1
1989 control group from the same town (Kragujevac)	6.3 \pm 3.8
1995 pesticide sprayers (Aleksandrovac)	42.2 \pm 13.9
1995 controls from the same town (Aleksandrovac)	10.5 \pm 5.09
1996 young soldiers (few towns in Serbia)	10.18 \pm 4.8
1996 adults aged 40 years (Belgrade)	11.2 \pm 5.8
1996 adults aged 50 years (Belgrade)	15.2 \pm 4.15
1996 newborns (Belgrade)	3.5 \pm 1.6
1997 adults aged 35-40 years, females (Belgrade)	9 \pm 3
1997 adults aged 35-40 years, males (Belgrade)	7 \pm 2
1999 employees in Vinca Institute (females)	19 \pm 3
1999 employees in Vinca Institute (males)	15 \pm 4
1997-1998 newborns (Kragujevac)	5.3 \pm 0.6
1997-1998 newborns from hormone treated pregnancies (Kragujevac)	16.5 \pm 2.4
2000 adults aged 40 years, males (Belgrade)	28.16 \pm 14.63
2000 fetuses (Belgrade)	22.05 \pm 1.24
2000 pregnant women (Belgrade)	29.15 \pm 1.76
2001 pregnant women (Belgrade)	24.32 \pm 2.37
2001 fetuses (Belgrade)	28.03 \pm 1.93

Results

The results of biomonitoring are presented in Table 1. Groups of examinees, time (year) of examination and mean incidence of micronuclei per 1000 binucleated cells are listed.

References

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