

Research Article



Micronucleus Assay in Exfoliated Cells of Human Buccal Mucosa at Employees in Petrol Station in Prishtina City

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Received: 18-09-2017; Revised: 22-10-2017; Accepted: 05-11-2017.

ABSTRACT

The purposes of these investigations are to determine the genotoxic effects of petrol at workers of petrol station. MN assay was carried out in exfoliated buccal epithelial cells of 50 workers and 50 controls. From each individual, 1000 exfoliated buccal cells were analyzed. The individuals used in the study were grouped based on their age, smoking and alcohol habits. There was a significantly elevated occurrence of micronucleated cells in the exposed workers than in controls. At workers of oil station showed a significant increase of MN, compared to controls with respect to their smoking and drinking habits, age and years of exposure.

Keywords: Micronucleus, buccal cells, petrol, Prishtina.

INTRODUCTION

The micronucleus test in buccal mucosa cells is one of the less invasive methods to measure DNA damage in humans. This test was proposed in 1983 and continues to gain in popularity as a biomarker of genetic damage¹⁰. And its information can be used as an early warning of potential risk of developing long-term health problems¹.

Gas station workers or petrol pump workers are more liable to exposure and also absorb the fuel fumes and the products emitted by engines¹¹.

Alcohol consumption and smoking appear to be the two most frequent exogenous risk factors for the development of oral cancer¹⁴. Alcoholic beverages, acting locally, allow other carcinogenic substances to pass into target cells and also systemically lead to decreased cell metabolism, producing a relative immune deficiency².

MATERIAL AND METHODS

The study was conducted at four different petrol-filling stations located in Prishtina city, Kosovo. Among 50 workers in the exposed group as well as control groups 32 were smokers and 18 non-smokers. Participants were informed in detail about the planned study and written informed consents were obtained. All subjects were selected based on questionnaire which included questions about age, occupational exposure, smoking habit, use of drugs, alcohol, virus illnesses, recent vaccinations, and radiological exams.

The study population consisted of 50 workers and a control group of 50 healthy subjects. The youngest patient was 21 years old, and the oldest – 48 years old. Buccal cells were sampled with cytobrush from the inside of the cheeks and placed in physiological solution (NaCl 0.9%). The cells were washed thrice in the buffer solution

by centrifugation. After centrifugation (10 min at 1000 rpm), the pellet was fixed in 3:1 methanol/ acetic-acid for 10 minutes. Seven slides were prepared for each subject and 1000 cells are scoring (at 100× magnification), from each subject were examined. The cells were stained in 10% Giemsa solution.

RESULTS

The results were presented in Table 1 and Figure 1. The results were separated according to smoking and age.

The frequency of micronuclei in buccal cells of workers in petrol station was 12 MN/1000 buccal cells, while at control group is 3.52 MN/1000 buccal cells. It was statistically significantly higher ($P < 0.001$), compared with MN in the control group. After divided according to Alcohol, we found that the man (12.65 MN/ 1000 buccal cells) has higher number of micronucleus compared with smoking group in control group (6.54 MN/ 1000 buccal cells), at exfoliated cells of buccal mucosa. After divided according to smoking, we found that the man (13.22 MN/ 1000 buccal cells) has higher number of micronucleus compared with smoking group in control group (7.44 MN/ 1000 buccal cells), at exfoliated cells of buccal mucosa. After divided according to age, we found that the youngest at workers (9.76 MN/ 1000 buccal cells) has higher number of micronucleus compared with youngest in control group (5.71 MN/ 1000 buccal cells), at exfoliated cells of buccal mucosa. While at oldest group at workers (10.89 MN/ 1000 buccal cells) has higher number of micronucleus compared with oldest in control group (7.27 MN/ 1000 buccal cells), at exfoliated cells of buccal mucosa.

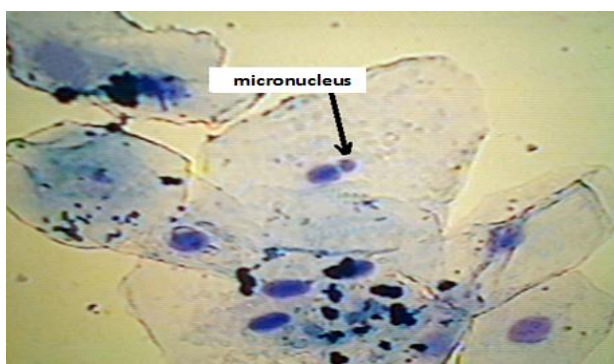


Table 1: Frequency of micronuclei at workers in petrol station

	Number of Micronucleus MN	Control Group	Number of Micronucleus MN	Significance P
Number of workers (50)	12	Number of individual (50)	3.52	P=<0.001
Alcohol group	12.65	Alcohol group	6.54	
Non alcohol	11.76	Non alcohol	5.76	
Smoking group	13.22	Smoking group	7.44	P=<0.001
Non smoking group	9.32	Non smoking	3.21	P=<0.001
Oldest group	10.89	Oldest group	7.27	P=<0.001
Youngest group	9.76	Youngest group	5.71	P=<0.001

DISCUSSION

We analysed a 50 workers and 50 individual as control group. Exfoliated cells of buccal mucosa are good indicators of chromosomal damage and other nuclear abnormalities such as binucleates, karyorrhexis and karyolysis¹². Oral mucosa permeability in different regions of the mouth is an important aspect to consider when analyzing the local effects of carcinogenic effects. Non-keratinized tissues, such as the buccal mucosa are shown to be much more permeable than keratinized tissues, such as the palate and gingival^{7,8}. Increase in nuclear abnormalities has been observed in buccal cells of women living in a dioxin contaminated area⁹. Analysis of exfoliated cells of buccal mucosa also provides evidence of other nuclear abnormalities such as binucleates, karyorrhexis and karyolysis¹³. These findings are in accordance with the results of the studies by Celik⁵, Sellappa⁹, who used different stains as mentioned in and they determined a significant increase in the frequency of nuclear abnormalities in the buccal cells of petrol station workers than the control individuals



CONCLUSIONS

According to this investigation, we can conclude that: 1.) Petrol induced increased number of micronuclei in the buccal cells of workers (12MN), statistically significant compared with control group (3.52MN);

2) smokers at workers group had greater average number of MN (13.22 MN) compared with smokers at control group (7.44 MN);

3) Youngest at workers group had greater average number of MN (9.76 MN) compared with Youngest at control group (5.71 MN);

4.) Oldest at workers group had greater average number of MN (10.89MN) compared with Oldest at control group (7.27 MN);

5.) alcoholist at workers group had greater average number of MN (12.65 MN) compared with alcohol at control group (6.54 MN);

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Source of Support: Nil, Conflict of Interest: None.

