



## INVESTIGATION OF GENOTOXIC EFFECT OF ANTIDIABETIC MEDICAMENTS

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### ABSTRACT

The aim of this study is to determine the genotoxic effect of antidiabetic medicaments in buccal cells at patient of hospital Drenas city in Kosovo. We analysed a 20 patient and 20 individual as control group. The patient divide according the gender :8 male and 12 female, and the control group was 9 male and 11 female.

According of this results we can conclude that the patient who use the antidiabetic medicament has higher number of micronucleus compared with control group.

**Key words:** genotoxic, effect, antidiabetic, medicament, Kosovo.

### INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a multifactorial metabolic disease affecting about 12% of Indian population (Mohan et al., 2007). T2DM patients suffer with several complications such as overweight, atherosclerosis, retinopathy, and nephropathy. High prevalence, morbidity and mortality of T2DM disease in Indians, warrants high concern for effective prevention and control measures to be investigated (Mohan et al., 2006). Diverse types of pharmaceutical agents, which can control glucose levels, improve insulin production or sensitizations are employed during its treatment (Kahn et al., 2000). Pioglitazone, a thiazolidinedione derivative is widely used hypoglycemic drug, controls serum glucose levels by specifically reducing insulin resistance in target tissues, without increasing the insulin secretion (Day, 1999). Often prescribed in combination with sulfonylurea or biguanide drugs during the treatment, currently this drug is being used by more than a million T2DM patients throughout the world (Jones et al., 2003).

Impaired DNA repair mechanisms, genetic instability and subsequent risks to health complications such as cancer are found in T2DM patients (Simona et al., 2009; Maiese et al., 2007).

### MATERIAL AND METHODS

The study population consisted of 20 patients (8 males and 12 female) and a control group of 20 healthy subjects (9 male and 11 female). The youngest patient was 19 years old, and the oldest – 67 years old. The patients were subjected to diabetic therapy to cure diabetes in blood. Buccal cells were sampled with toothbrush 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. Five 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 AND DISCUSSION

The results were presented in **Table 1** and **Figure 1**. The results were separated according to sick (diabetic patient and control group) and gender.

The frequency of micronuclei in buccal cells after using of antidiabetic medicaments in patients with diabetes was 12.65 MN/1000 buccal cells, while at control group is 5.35. It was statistically significantly higher ( $P=0.022$ )

compared with MN in the control group (2.73 MN/1000 buccal cells).

After divided according to gender in man and women we found that the man (13.88 MN/ 1000 buccal cells) has higher number of micronucleus

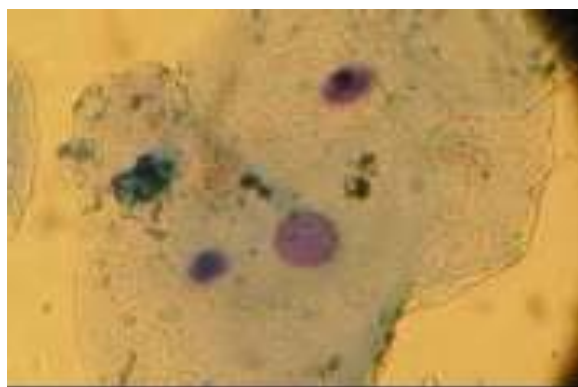
compared with women (11.83 MN/ 1000 buccal cells), at exfoliated cells of buccal mucosa.

We analysed a 20 patient and 20 individual as control group. The patient divide according the gender: 8 male and 12 female, and the control group was 9 male and 11 female.

**Table 1.** Frequency of micronuclei at diabetic patient, and divided according to gender in man and women

Gender	Micronucleus (MN) at diabetic patient	Micronucleus (MN) at control group
Diabetic patient (20)	12.65	
Control group (20)		5.35
Man with diabet (8)	13.88	5.89
Women with diabet(12)	11.83	4.91

Human buccal mucosa is composed of progenitor and maturing cell populations (Ten Cate et al., 1998). Exfoliated cells of buccal mucosa are good indicators of chromosomal damage and other nuclear abnormalities such as binucleates, karyorrhexis and karyolysis (Tolbert et al., 1992). Buccal MN test is preferred over cytokinesis-block micronucleus (CBMN) or human capillary blood lymphocytes micronucleus (HCBL-MN) methods by researchers worldwide to detect genotoxicity induced in vivo by environmental carcinogens (Martino-Roth et al., 2003), chemotherapeutic agents (Rekhadevi et al., 2007) and pesticides (Susana et al., 2002), as this test is a minimally invasive, less time consuming and can be easily applied on interphase cells with no requirement for cell culture or metaphase preparations (Holland et al., 2008).



**Figure 1.** Buccal cell with micronuclei

## CONCLUSIONS

According to this investigation, we can conclude: 1) Therapy with antidiabetic medicaments induced increased number of micronuclei in the buccal cells, statistically significant compared with control group; 2) Males had greater average number of MN (13.88 MN) compared with females (11.83);

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