

## Micronucleus level in exfoliated oral mucosa and cervix cells of cancer patients

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**Key words:** micronucleus, buccal mucosa, cervix cells

### Միկրոկորիզների մակարդակը բերանի լորձաթաղանթի և արգանդի վզիկի բջիջներում քաղցկեղով հիվանդների մոտ

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Հետազոտություն է կատարվել քաղցկեղով հիվանդ կանանց բերանի խոռոչի լորձաթաղանթի և արգանդի վզիկի էքսֆոլիատիվ բջիջների միկրոկորիզների մակարդակի (ՄՄ) որոշման նպատակով: Այն կատարվել է ճառագայթաթերապիայից առաջ, ընթացքում և ավարտելուց հետո: Միկրոկորիզների մակարդակի բարձրացման միտում հայտնաբերվել է հիվանդների խմբում առողջ խմբի համեմատությամբ: Ընդ որում, վիճակագրորեն հավաստի բարձրացում հայտնաբերվել է միայն արգանդի վզիկի էքսֆոլիատիվ բջիջներում ճառագայթաթերապիա անցնելու ընթացքում:

### Introduction.

The micronuclei (MN) are chromosomal fragments or whole chromosomes, with are in cells cytoplasm just near of nuclei. It was shown that their presence indicates chromosomal aberrations (either structural – clastogenic effect, or numerical – aneugenic effect) (Rosin, 1992) and can reflect genotoxic effect of different factors (mutagens/carcinogens). It has been shown recently by Nersesyan et al. (2001; 2006) that the evaluation of MN in exfoliated buccal mucosa cells and increased frequency of chromosomal aberrations in lymphocytes of women with marked hirsutism can represent endogenous mutagenic process in organism of such women. The MN assay in exfoliated buccal mucosa and cervix cells is more economic, widely used and is a minimally invasive method for estimation of cytogenetic effect of different

### Уровень микроядер в клетках слизистой рта и шейки матки у пациенток с раком

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Исследован уровень микроядер (МЯ) в эксфолиативных клетках слизистой ротовой полости и в клетках шейки матки у женщин с раком до, в процессе и после прохождения ими радиотерапии. Обнаружена тенденция к возрастанию уровня МЯ у пациенток с раком по сравнению с контрольной группой. Было выявлено статистически достоверное повышение уровня МЯ в течение получения радиотерапии только в клетках шейки матки.

factors and diseases. Increased level of cells with MN was observed in the cells of cancer patients after local radiotherapy (Tolbert et al, 1992; Nersesyan, 1996).

The increase in the number of cells with MN (MNC) in women with breast cancer compared with healthy women was revealed (Rajeswari et al., 2000).

Recently Nersesyan et al. (2002) have investigated women with uterine cancer and observed that the level of MN in patients was increased compared to healthy women.

The aim of the present work was to evaluate the level of MN and other nuclear anomalies in exfoliated buccal mucosa and cervix cells of gynecological cancer patients before, during and after radiotherapy.

**Materials and Methods**

In the present work we studied 5 females with diagnosed uterine cancer of first degree. The control group comprised 5 healthy women. Each of those women was interviewed about their habits concerning factors, that could influence MN level (smoking, alcohol, medication, hereditary diseases, viral infection). Subjects who did not meet the mentioned criteria were excluded from the study.

Buccal mucosa and cervix cells were collected both from patients with cancer and from healthy women. It was used standard Feulgen staining technique with some modifications (Nersesyan et al., 2006). As counterstain fast green was used. During the analysis of cells, other nuclear anomalies such as karyolysis, pcnosis, karyorhexis, condensed

chromatin, binucleares, *broken egg* also were studied (Tolbert et al, 1992). In our work it was used the same criteria of scoring the cells with MN and other nuclear anomalies, as it was suggested by Titenko-Holland et al. (1994) and protocols, which standardized in the frame of HUMNXL project (Holland et al., 2008; Bonassi et al., 2009).

**Results and Discussion**

The results of the study are presented in Table 1 and Table 2. They show, that in cervix cells of patients with cancer it is observed the tendency of increasing the level of MN and CMN compared with corresponding healthy women. It is not statistically significant maybe because the group of investigated patients was not big enough.

**Table 1**

**The level of micronuclei and other nuclear anomalies in exfoliated buccal mucosa and cervix cells of healthy women**

Parameter	Oral cells (‰)	Cervix cells (‰)
CMN	1.16±0.25	1.29±0.19
MN	1.34±0.25	1.46±0.25
KR	1.04±0.19	2.24±0.34
KL	0.23±0.12	0.93±0.19
P	0.56±0.16	1.31±0.22
BN	4.67±0.47	4.14±0.47
CC	5.57±0.99	8.08±1.02
BE	0.04±0.4	0.00±4.34

\*CMN – cells with micronuclei; MN- micronuclei; KR – karyorhexis; KL - karyolysis; P -pcnosis; BN - binucleares; CC - condensed chromatin; BE - broken egg.

Results of the Table 2 show that there was statistically significant difference of MN, CMN in oral and cervix cells in patients with cancer during significant different radiotherapy.

The level of karyorhexis and karyolysis increased in the oral cells (after radiotherapy) and in cervix cells (during radiotherapy). Other nuclear anomalies were in the same level as in control group of healthy women. Some explana-

tion can be offered for the increased level of MN and CMN in patient's two type cells – oral and cervix. As it is know radiotherapy is one of the methods mainly used in cancer treatment. Significant increase of nuclear anomalies in cervix cells during radiotherapy can be explained by the fact that it is target organ for radiation.

**Table 2**

**The level of micronuclei and other nuclear anomalies in exfoliated buccal mucosa and cervix cells of women with cancer before, during and after radiotherapy**

Parameter	Oral cells (‰)			Cervix cells (‰)		
	before rt	during rt	after rt	before rt	during rt	after rt
CMN	3.0±0.28 *	3.7±0.28 *	3.1±0.28 *	3.4±0.14 *	5.9±0.28 *	4.9±0.14 *
MN	3.3±0.4 *	4.3±0.28 *	3.3±0.28 *	3.7±0.28 *	6.3±0.28 *	4.7±0.14 *
KR	2.1±0.3	2.7±0.14	1.7±0.43	2.9±0.28	3.6±0.42	1.7±0.43
KL	0.6±0.14	0.6±0.14	0.7±0.14	0.7±0.14	0.9±0.28	0.6±0.14
P	0.9±0.3	0.4±0.14	0.4±0.14	0.9±0.14	1.1±0.28	0.7±0.14
BN	5.3±0.3	5.3±0.43	5.3±0.14	5.6±0.28	6.6±0.42	5.1±0.28
CC	5.3±0.43	5.4±0.28	5.7±0.28	5.9±0.28	6.7±0.57	5.0±0.28
BE	0.3±0.14	0.00±0.00	0.00±0.00	0.14±0.14	0.00±0.00	0.00±0.00

\* Significant statistical difference

In conclusion we may suggest that the evaluation of MN in exfoliated buccal mucosa and cervix cells can be very useful in oncogynecology. MN assay can represent ecogenous mutagenic process in such organisms as patients with cancer, whose chromosomes are more sensitive and unstable for different mutagens action. Some investigators have the opinion, that MN test in exfoliated cells of cervix may be used in cancer screening programs as a routine test. So we support this opinion and suggest that MN assay, widely used as biomarker of cancer risk in humans, can be also used in Armenia especially for oncogynecologic patients.

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