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Communication

p53 codon 72 polymorphism in cervical cancer patients and healthy women from Poland

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A polymorphism at codon 72 of gene *p53* results in the presence of either arginine or proline at this position. We investigated the distribution of *p53* codon 72 polymorphism in cervical cancer patients and a control group of healthy women from Poland. Our results do not confirm the hypothesis that the *p53* codon polymorphism could play a role as a factor for squamous carcinoma of the cervix.

The *p53* gene is polymorphic at the codon for amino acid 72 of the protein and encodes either proline (codon CCC) or an arginine residue (codon CGC) at this position. A potential association of *p53* codon 72 polymorphism with an increased susceptibility to malignant conversion has been examined for different neoplastic diseases including lung cancer [1], hepatocellular carcinoma [2], ovarian and endometrial cancer [3, 4].

The first investigation concerning the role of *p53* codon 72 polymorphism in human papillomavirus-associated cervical cancer suggested that two polymorphic forms of the p53 protein differ in their susceptibility to degradation mediated by the E6 oncoprotein of human papillomavirus (HPV). Moreover, the frequency of the two alleles in cervical cancer patients compared with the control group revealed a striking overrepresentation of homo-

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Abbreviation: HPV, human papillomavirus.

zygous arginine-72 p53 [5]. Epidemiological studies undertaken in larger populations and in different geographical regions did not confirm such correlation between the polymorphism at codon 72 of *p53* and the risk of cervical cancer [6–12].

The purpose of our study was to examine whether p53Arg at position 72 could represent a risk factor for HPV-associated cervical carcinoma in the Polish population and to compare distribution of *p53* codon polymorphism in the Polish population to other ethnic groups. There are no other data concerning this subject in Poland so far.

PATIENTS AND METHODS

Patients. A group of 44 squamous cervical cancer patients treated in the Oncology and Radiotherapy Clinic of the Medical University of Gdańsk, of which 22 (50%) were HPV-positive, was investigated. The patient population was in different clinical stages of squamous cell carcinoma of the cervix. The control group consisted of 52 healthy women undergoing routine gynaecological examination.

Detection of HPV DNA. HPV positivity was determined by the Hybrid Capture System according to the manufacturer's specifications. Samples were examined in the Department of Virology, National Institute of Hygiene in Warsaw (Poland).

Polymorphism analysis. Analysis of the *p53* genotype at position 72 was performed by the PCR method with specific primers for the *arg* and *pro* alleles, described by Storey *et al.* [5]. Modifications in detection and visualisation of the PCR products were introduced: PCR products were separated on 8% polyacrylamide gel and stained with silver.

Statistical analysis. Data analysis was performed using the *Statistica* version 5.1 software. Chi-squared test with Yates correction was used to assess differences in the proportions of the *p53* codon 72 genotypes between the two groups of cervical cancer patients (HPV-positive and HPV-negative) and also between all cervical cancer patients and the control group of healthy women.

RESULTS

Genomic DNA from both groups of women was analysed to determine the distribution of *p53* codon 72 polymorphism. We examined a total of 96 individuals: 44 cervical cancer patients and 52 healthy women. The prevalence of the *arg/arg* alleles did not significantly vary between HPV positive (n = 22) and HPV-negative (n = 22) cases of cervical cancer ($P = 0.9$). Moreover, there was no difference in genotypes distribution between the non cancer control group and cervical cancer patients ($P = 0.98$). The results are summarised in Table 1.

DISCUSSION

Similar to previous studies [6–12] our results related to the genetic susceptibility to cervical cancer in HPV-positive women, do not support the proposed association of the *arg* genotype in codon 72 of *p53* with an in-

Table 1. Distribution of *p53* codon 72 polymorphism

Population (number of cases)	Genotypes		
	arg/arg	*pro/pro*	*arg/pro*
HPV-Positive cervical cancer group (n = 22)	16 (72.7%)	–	6 (27.3%)
HPV-Negative cervical cancer group (n = 22)	15 (68.2%)	1 (4.5%)	6 (27.3%)
All cervical cancer patients (n = 44)	31 (70.4%)	1 (2.3%)	12 (27.3%)
Control group of healthy women (n = 52)	38 (73.1%)	2 (3.8%)	12 (23.1%)

Table 2. Comparison of frequency distribution of *arg, pro* and *arg/pro* genotypes in *p53* codon 72 in the populations from different regions of the world

Alleles / Population	*pro*	*arg*	*pro/arg*	References
American	7%	55%	38%	[6]
Mexican-American	2.5%	50%	47.5%	[14]
African-American	20.3%	14.9%	64.9%	[14]
Japanese	17%	37%	46%	[7]
Taiwanese	19.7%	30.9%	49.3	[15]
Korean	19%	40%	41%	[8]
Italian	5%	37%	58%	[5]
English	4%	59%	36%	[10]
German	6.6%	55.7%	37.7%	[11]
Spanish	21%	79%	–	[13]
Czech	11%	53.5%	35.5%	[12]
Polish	3.8%	73.1%	23.1%	This work

creased risk of cervical cancer [5]. We found that differences in the frequency of the *arg* genotype in HPV-positive and HPV-negative cervical cancer patients and also in the non cancer control group as compared with all cancer patients are not statistically significant.

A comparison of different populations is presented in Table 2. The high frequency of the *arg* genotype (73.1%) in Polish women is similar to the Spanish population (79%) [13] rather than to the geographically closer German population (55.7%) [11]. The low percentage (3.8%) of the *pro* genotype makes our population most similar to the English population (4%) [10] and to the Mexican-American group (2.5%) [14].

In conclusion, our data show a different pattern of *arg/pro* allele distribution as compared with other populations and our results do not confirm the hypothesis that the *p53* codon polymorphism could play a role as a factor for squamous carcinoma of the cervix.

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