EFFECT OF DNA REPAIR GENE POLYMORPHISMS ON LUNG CANCER DEVELOPMENT IN CHROMIUM EXPOSED INDIVIDUALS

Halasova Erika[1], Letkova Lucia[1], Matakova Tatiana[2], Dzian Anton[3], Franekova Maria[1], Halasa Mirko, Sarlinova Miroslava[2], Kavcova Elena[5]

[1]Department of Medical Biology Comenius University, Jessenius Faculty of Medicine, Martin, Slovak Republic;

[2]Department of Medical Biochemistry, Comenius University, Jessenius Faculty of Medicine, Martin, Slovak Republic;

[3]Clinic of Thoracic Surgery, University Hospital Martin, Slovak Republic;

[4]Clinic of Surgery I, University Hospital Martin, Slovak Republic;

[5]Clinic of Pneumology and Phthisiology, University Hospital Martin, Slovak Republic;

Lung cancer is globally the most common malignant disease. Hexavalent chromium exposure can cause mutations in somatic cells and can lead to the development of bronchopulmonar malignancies.

The aim of the study was to investigate polymorphisms of DNA repair genes *XRCC1*, *hOGG1, XPC, XPD*, and their effect on the risk of lung cancer development in 28 chromium exposed and 357 non-exposed patients as well as in 379 control healthy individuals. Genotypes were determined by PCR-RFLP method.

We found out statistically significant decreased risk of developing lung cancer in individuals with homozygous variant genotype XPC Gln/Gln (OR = 0.59, 95% CI = 0.34 to 1.02, p = 0.04) in the group of male patients.

In total, significantly increased risk of developing lung cancer was found in the following combinations of genotypes: XPD Lys/Gln + XPC Lys/Lys (OR = 1.62, p = 0.04), XRCC1 Gln /Gln + hOGG1 Ser/Ser (OR = 2.14, p = 0.02)

In the group of men with lung cancer following combinations of genotypes were statistically significant: XPD Lys/Gln + XPC Lys/Lys (OR = 1.87, p = 0.03), XRCC1 Arg/Gln + XPC Lys/Gln (OR = 5.44, p <0.0001) and XRCC1 Arg/Gln + XPC Lys/Lys (OR = 4.52, p = 0.0007).

In female, the following combinations of genotypes were found to be statistically significant: XRCC1 Arg /Gln + hOGG1 Ser/Ser (OR = 1.98, p = 0.04), XRCC1 Gln /Gln + hOGG1 Ser/Ser (OR = 3.75, p = 0.02), XRCC1 Arg/Gln + XPC Lys/Gln (OR = 2.40, p = 0.04,), XRCC1 Arg/Gln + XPC Gln/Gln (OR = 3.03, p = 0.04).

In chromium exposed individuals with lung cancer we found out an increased risk of developing lung cancer in those with heterozygous (OR = 1.49, p = 0.22) and variant (OR = 1.45, p = 0.49) *XPD* gene genotype. However, these results were not statistically significant.

Our result did not show any difference between smokers and non-smokers in observed gene polymorphisms in the association to lung cancer risk.

This work was supported by Ministry of Education of the Slovak Republic, Grant APVV-0412-11.