DNA REPAIR GENES AND THEIR ROLE IN LUNG CANCER DEVELOPMENT

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Objective: Gene polymorphisms of DNA repair genes are associated with the risk of developing sporadic and hereditary tumours. In the present case-control study, we investigated gene polymorphisms of selected DNA repair genes and their risk for lung cancer development in Slovak population.
Material and methods: The study includes 422 lung cancer patients and 511 healthy individuals. Single gene polymorphisms of *hMLH1, hMSH2*, *XRCC*1*, XRCC3, XPD and XPC* were analysed. Statistical analysis was carried out using SNP & Variation Suite v7.6.11 software.

Results: Risk of lung cancer development was significantly decreased for *XPC* Gln/Gln genotype (OR = 0,59, 95 % Cl = 0,34 - 1,02, p = 0,04) and significantly increased for *hMSH2, variant (CC)* genotype (OR=2,27; 95%Cl=1, 12-4, 63; P=0,024).

Observing gene combinations, increased risk was found for following genotypes: XPD Lys/Gln + XPC Lys/Lys (OR = 1,87, p = 0,03), *XRCC1* Arg/Gln + *XPC* Lys/Lys (OR = 4,52, p = 0,0007), *XRCC1* Arg/Gln + *XPC* Lys/Gln (OR = 5,44, p = < 0,0001) in men and *XRCC1* Arg/Arg + *hOGG1* Ser/Cys (OR = 2,64, p = 0,04), *XRCC1* Arg/Gln + *hOGG1* Ser/Ser (OR = 3,05, p = 0,003), *XRCC1* Arg/Gln + *hOGG1* Cys/Cys (OR = 5,45, p = 0,04), *XRCC1* Gln/Gln + *hOGG1* Ser/Ser (OR = 6,81, p = 0,0013), *XRCC1* Arg/Gln + *XPC* Lys/Gln (OR = 3,18, p = 0,02), *XRCC1* Arg/Gln + *XPC* Gln/Gln (OR = 3,85, p = 0,03), *XRCC1* Arg/Gln + *XPD* Lys/Lys (OR = 2,78, p = 0,02), *XRCC1* Gln/Gln + *XPD* Lys/Lys (OR = 4,08, p = 0,03) in women.

Conclusions: We conclude that polymorphisms of DNA repair genes underscore the risk of lung cancer development.

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Key words: single nucleotide polymorphism, *hMLH1, hMSH2* , *XRCC*1*, XRCC3, XPD, XPC*, lung cancer risk