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EXPRESSION PROFILE OF VITAMIN D-METABOLIZING CYTOCHROME P450 GENES IN ADULT UKRAINIAN PATIENTS WITH BLADDER CANCER: A PILOT STUDY

Background. Bladder cancer is one of the most prevalent malignant neoplasms worldwide. The initiation of carcinogenesis is largely determined by prolonged exposure of the urothelium to xenobiotics, whereas the tumor progression is associated with metabolic reprogramming in both cancer cells and tumor microenvironment. The enzymes of cytochrome P450 (CYP) superfamily are involved not only in the activation of procarcinogens but also in the regulation of metabolic pathways through the biotransformation of biologically active molecules, including Vitamin D, which exhibits pronounced proapoptotic and antiproliferative properties. Despite extensive investigations of CYP enzymes in the carcinogenesis of various organs, the data regarding their expression and potential involvement in bladder cancer development remain limited. Since the expression of numerous CYP enzymes is influenced by environmental factors, the studies investigating gene expression patterns among populations of specific regions remain highly relevant. **Methods.** In the present study, the expression of genes encoding cytochrome P450 enzymes involved in Vitamin D metabolism (CYP2R1, CYP27A1, CYP27B1, and CYP24A1) was investigated for the first time in bladder tissues obtained from the adult Ukrainians. The study was performed on 25 paired samples of malignant and conditionally normal bladder tissues collected from adult patients treated at the National Cancer Institute (Kyiv, Ukraine). Gene expression level was determined using real-time polymerase chain reaction (RT-qPCR). **Results.** The obtained results demonstrated substantial interindividual variability in the expression levels of the investigated genes in both malignant and normal bladder tissues. Statistical analysis revealed alterations exclusively in the CYP27B1 expression, the level of which was moderately increased in malignant samples compared with the control group. No statistically significant differences were detected in the expression levels of the remaining investigated CYP enzymes. **Conclusions.** The obtained results may indicate the absence of pronounced alterations in CYP450-mediated local vitamin D metabolism in bladder tissues. This study revealed general trends in the gene expression changes. Further investigation of the potential contribution of these pathways to bladder carcinogenesis in the studied population will require a larger sample size and more detailed clinical data. **Grants.** IMBG Simons Foundation Grant for Ukrainian institutions № SFI-PD-Ukraine-00017453.

Keywords: bladder cancer, CYP, cytochrome P450, vitamin D.

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