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Glutathione peroxidase 1 (*GPX1*) genetic polymorphism, erythrocyte GPX activity, and prostate cancer risk

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Abstract Glutathione peroxidase 1 (GPX1) is a ubiquitously expressed selenium-dependent enzyme that protects cells against oxidative damage by reducing hydrogen peroxide and a wide range of organic peroxides. Some epidemiological studies have correlated low GPX activity or particular *GPX1* polymorphisms with enhanced risk of cancer, although these correlations have not been consistently observed in all populations. Therefore, we conducted the present study to evaluate the possible association of *GPX1* Pro198Leu polymorphism and erythrocyte GPX activity with the risk of developing prostate cancer and to clarify whether erythrocyte GPX activity levels were correlated with the *GPX1* Pro198Leu genotype in the Macedonian population. The *GPX1* Pro198Leu genotype was determined in 82 prostate cancer cases and 123 control individuals. We found an overall protective effect of the variant Leu allele of the *GPX1* polymorphism on the prostate cancer risk. Heterozygous carriers of the variant Leu allele had a significantly lower risk of prostate cancer compared with homozygous wild-type individuals (OR, 0.38; 95% CI, 0.20–0.75; $P = 0.004$). Erythrocyte GPX activity was analyzed in 73 cases and 91 controls. The erythrocyte GPX activity in the cancer group was lower than in the healthy controls. Additionally, we compared the erythrocyte GPX activity in the control group of 90 subjects and found no significant differences by genotype. These findings suggest that individual susceptibility of prostate cancer may be modulated by *GPX1* polymorphism and that the combination of genetic factors involved in oxidative response with environmental carcinogens may play an important role in prostate carcinogenesis.

Keywords Glutathione peroxidase 1 · Genetic polymorphism · Prostate cancer · Oxidative stress · Antioxidant enzymes

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