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Role of *MTHFR* C677T and *MTR* A2756G polymorphisms in thyroid and breast cancer development

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ABSTRACT. Folate metabolism is essential for DNA synthesis and repair. Alterations in genes that participate in folate metabolism can be associated with several types of malignant neoplasms, including thyroid and breast cancer. In the present case-control study, we examined the association between methylenetetrahydrofolate reductase (*MTHFR* C677T, rs1801133) and methionine synthase (*MTR* A2756G, rs1805087) polymorphisms and risk for thyroid and breast cancer. Polymerase chain reaction-restriction fragment length technique was used to determine

the specific genotypes in the genes of interest. Statistical analysis was performed by multiple logistic regression test. We found an association between *MTHFR* C677T polymorphism and risks to both thyroid (OR = 2.50; 95%CI = 1.15-5.46; P = 0.02) and breast cancer (OR = 2.53; 95%CI = 1.08-5.93; P = 0.03). Tobacco consumption and high body mass index were also associated with thyroid cancer. In addition, increased age (≥50 years) and alcohol consumption were found to be associated with breast cancer. Our results indicated that *MTHFR* C677T is significantly associated with thyroid and breast cancer risks. Thus, these factors may be used as potential prognostic markers for thyroid and breast cancers.

Key words: Breast cancer; Folate; Genes; Genetic polymorphism; Thyroid cancer

