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**GSTM1, GSTT1 and GSTP1 in Patients with Multiple Breast Cancers and Breast Cancer in Association with another Type of Cancer**

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**Abstract**

*Introduction:* breast cancer has the highest incidence in women. Glutathione S-transferases (GSTs) are a large group of enzymes involved in the metabolism of xenobiotics. The members of this gene superfamily are involved in the development of multiple cancers.

*Objectives:* the aim of the study was to see whether the GSTM1, GSTT1 and GSTP1 genetic polymorphisms are risk factors for patients diagnosed with multiple malignancies, of which at least one is located in the breast.

*Materials and Methods:* in the period between 2005 and 2012, of the 520 patients diagnosed with breast cancer, 69 had multiple primitive malignant tumors, of which at least one was localized in the breast. The research on GSTM1, GSTT1 and GSTP1 genotypes consisted of 59 patients diagnosed with multiple breast cancers or with breast cancer in association with another type of cancer, compared with a group of healthy controls.

*Results:* in the subgroup of patients with breast cancer in association with another type of cancer, the GSTM1 null genotype was present in 61.2% of patients, compared to 29% of controls; the subgroup of metachronous breast cancers, the presence of any of the GSTT1 or GSTM1 null genotypes was statistically significantly different from that of controls (65.2% vs. 28.5%); in the subgroup with synchronous cancers, the GSTM1 null genotype was found in 66.6% of patients compared to 9% for the controls, and the presence of any null genotype (GSTM1 and GSTT1) was also statistically significant in the case group.

*Conclusions:* the GSTM1 null genotype is a risk factor for synchronous breast cancers and for breast cancer associated with extramammary cancer; the presence of null genotypes (GSTM1 or GSTT1) is a risk factor for multiple breast cancer (bilateral or synchronous); the GSTT1 null genotype and the heterozygous variant allele (Ile105Val) and homozygous variant allele (Val105Val) of GSTP1 are not risk factors for the cases studied.

**Key words:** breast multiple cancers, association of different cancers with breast cancer, GSTM1, GSTT1 and GSTP1

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