## SUMMARY

Breast cancer is one of the most common malignancies in women and has an everincreasing incidence. Early diagnosis of cancer results in better treatment efficacy and longer patient survival, so new potential biomarkers are currently being explored for early diagnosis of this type of cancer. In addition, cancer diagnosis, therapeutic management and prognosis are also related to the division of breast cancer into molecular subtypes, i.e., luminal A, luminal B, "triple negative" and other cancers.

Metalloproteinases (MMPs) are a group of proteolytic enzymes belonging to the endopeptidases, which are responsible for the remodeling of the extracellular matrix. Their secretion and activity is regulated by tissue inhibitors of metalloproteinases (TIMPs), among others. Recent studies indicate that proper regulation of the activity and amount of secreted MMPs is important in the process of tumor formation and development. In recent years, have been published papers who indicating that multiple MMPs and TIMPs can be produced by various types of malignancies, including gastrointestinal, lung and reproductive malignancies and breast cancer.

The aim of this study was to compare the levels of studied metalloproteinases (MMP-3, MMP-7, MMP-8, MMP-9) with CA 15-3 in patients before and after surgery in luminal type A and luminal type B breast cancer, and according to the histological type of cancer. The results were compared to the concentrations of the studied parameters and CA 15-3 in patients with benign breast lesions and in healthy subjects. In addition, we evaluated the usefulness of the studied parameters in assessing the radicality of removal of malignant breast tumor and evaluating the diagnostic utility of the studied parameters as potential tumor markers in patients with luminal type A and luminal type B breast cancer, both alone and in combination with CA 15-3.

Women diagnosed with breast cancer (*adenocarcinoma mammae* - 100 patients) in a low-advanced (in surgical stage) cancer were enrolled in the study group. All patients were divided into groups according to the molecular type of breast cancer (luminal A and luminal B - 50 patients each) and also according to the histopathological type of tumor. The comparison groups were healthy women and a group of patients with benign breast lesions, i.e., breast adenocarcinomas (*fibroadenomas*) - 50 patients each.

Material for the study was platelet-poor plasma. Blood for the study was collected from patients before and after surgery.

The investigated metalloproteinases (MMP-3, MMP-7, MMP-8, MMP-9) were determined in plasma by immunoenzymatic assay (ELISA), the comparative marker (CA 15-3) was determined by chemiluminescence (CMIA).

The observed significantly higher levels of MMP-7, MMP-9 in breast cancer patients compared to controls may indicate their secretion by tumor cells. MMP-7 concentrations correlated with CA 15-3 concentrations, which may suggest a similar diagnostic significance of the metalloproteinase tested. MMP-7 and MMP-9 assays had the highest diagnostic utility, and the diagnostic indices increased markedly in the combined analysis with CA 15-3. MMP-9 had the highest diagnostic utility in luminal type A breast cancer and ductal type, and MMP-7 in luminal type B. The concentrations of MMP-7 and MMP-9 significantly decreased after breast cancer surgery in both luminal type A or luminal type B breast cancer and its ductal histological type, which may be useful in assessing the radicality of tumor removal.

Our results suggest the diagnostic utility of the studied parameters, especially MMP-7 and MMP-9 as candidates for tumor markers of breast cancer, however, in a combined analysis with CA 15-3.