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Exploration of the Beta-Actin DNA Integrity Index as Early Genetic Marker of Presence of Breast Cancer

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ABSTRACT Background: Circulating cell-free DNA (cfDNA) and its integrity index can be a fast and non-invasive (liquid biopsy) biomarker, this provides significant additional data for diagnosis, prognosis and therapy stratification in cancer patient. Methods: The circulating tumor DNA (ctDNA) concentration and integrity was investigated in the plasma from patients with breast cancer by a quantitative polymerase chain reaction (qPCR) and their diagnostic value for breast cancer etiology was evaluated Plasma samples were collected from 55 patients 40 patients with breast cancer, 5 patients each with other type of cancer (ovarian cancer, colon cancer, stomach cancer) and 20 healthy controls. Real-time PCR of β-actin gene were investigated using two primer sets (400 and 100bp) to amplify different DNA fragment lengths. The DNA integrity index was calculated as the ratio of q-PCR results of β-actin 400bp/100. Results: : In all cancer patients theDNA concentrations were significantly higher $p<0.001$). than those ofthe control group. The plasma DNA integrity was statistically significantly lower in breast cancer and colon cancer than the control groups

Conclusion: The plasma DNA concentration and integration test can serve as a new diagnostic marker for detection and monitoring of patients with breast cancer and colon cancer.

Keywords: DNA integrity index, β-actin gene, breast cancer, ctDNA