

Evaluation of the Role of the Antioxidant Defense System (SOD, CAT, and GSH) in Erythrocytes and Tumor Tissue of Patients with Prostate Cancer

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Impaired regulation of the production of reactive oxygen species under oxidative stress conditions can cause the development of many diseases including cancer. However, in response to increased oxidative stress tumor cells tend to increase the expression of antioxidant enzymes for detoxification of free radicals; At the same time they retain the proto-oncogenic signaling pathways and avoid apoptosis.

From above mentioned the goal of our investigations was to study alterations of the activities of the antioxidant enzymes: superoxide dismutase (SOD), catalase (CAT), and enzymes of the glutathione-dependent antioxidant system (glutathione S-transferase, glutathione peroxidase, and glutathione reductase)—as well as glutathione levels in the blood and tumor tissues of male patients diagnosed with prostate tumors (benign and malignant). Furthermore, a comparative analysis was conducted to evaluate the differences in antioxidant enzyme activity between tumor tissues and the erythrocytes of cancer patients.

We were aimed to make comparative analysis of alterations in the activities of the antioxidant enzymes in tumor tissues and red blood cells of the men with prostate tumors. Our investigations have shown that there are obvious changes in the activities of the antioxidant enzymes in case of malignant tumor as well as in benign hyperplasia of prostate. Furthermore, we observed sharp difference between the activities of the enzymes assessed in tumor tissue samples and in the blood plasma and red blood cells of the patients. The above described changes can be conditioned by the response reactions of tumor cells toward the severe oxidative stress as well as remodeling the main functions of the enzymes by tumor cells in order to use these enzymes for survival and proliferation of tumor cells as well as in the process of acquiring resistance toward the anticancer drugs.