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REDOX METABOLIC CHANGES IN TUMOR AND ASSOCIATED ADIPOSE TISSUE OF COLON CANCER PATIENTS

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Colorectal cancer presents a significant global health challenge, with a high mortality rate. It is the third most commonly diagnosed cancer and is therefore a major cause for concern. The development of colorectal cancer is multifaceted, involving a combination of genetic predispositions and lifestyle factors. The redox and metabolic states may influence the intricate process of colon cancer development. To gain a deeper understanding of the redox-metabolic profiles associated with colon cancer, a human study was conducted. In biopsies from patients with colon cancer, the antioxidant status: copper, zinc superoxide dismutase (CuZnSOD), manganese superoxide dismutase (MnSOD), catalase (CAT), glutathione peroxidase (GSH-Px), glutamate-cysteine ligase (GCL), thioredoxin (Trx) and lactate metabolism were examined in tumor and unaffected colon tissue (remote 15-20 cm) as well as in adipose tissue: proximal (near the tumour tissue), distal (remote 6 cm) and unaffected (remote over 6 cm). The protein levels of CuZnSOD, MnSOD, GSH-Px, and Trx are higher in the tumor tissue compared to the unaffected colon tissue. In addition, the expression of the lactate dehydrogenase (LDH) A isoform, the total activity of LDH and the lactate concentration are higher in transformed tumor tissue than in normal colon tissue. In addition, the lactate concentration is highest in the proximal part and decreases radically in the adipose tissue with increasing distance from the tumor. On the other hand, the protein expression of CuZnSOD, CAT, GSH-Px and GCL shows an opposite profile. The redox profile and lactate concentration clearly indicate a redox metabolic interaction between tumor and adipose tissue in shaping the malignant phenotype in human colorectal cancer.