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# STRUCTURAL-AND-FUNCTIONAL CONDITION OF BLOOD CELL MEMBRANES IN PATIENTS WITH RECTAL CANCER

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A topical problem is proof of the existence of a definite focus of the protective influence of the antioxidant system on the membranes of blood cells. The objective of the study was investigating the features of the structural-and-functional condition of the membranes of blood cells of cancer patients for possible use in prognosticating disease severity and effectiveness of adequate treatment.

The structural-and-functional condition of the membranes of red blood cells and lymphocytes (micro-setting polarity, fluidity and embedment in the lipid matrix) has been investigated in patients of 35 to 78 years old (n=68) with rectal cancer (RC) in different stages of tumour process development confirmed by clinical and histomorphological methods. The fluidity of plasmatic membranes of lymphocytes and red blood cells was determined by the pyrene excimerisation coefficient, being the ratio of the number of pyrene excimers and that of its monomers. This coefficient, which changes in proportion to fluidity, was determined in the zone of protein-lipid contacts in the lipid bilayer. The fluorescence intensity of 1,8-AHC, changing inversely proportional to the surface charge of lymphocyte membranes, was studied using the LIUMAM-I3 microscope. The polarity of the probe micro-setting in the membrane was evaluated by the probe fluorescence ratio at $\lambda_{test}$=372 nm and fluorescence at $\lambda_{test}$=393 nm. The degree of protein embedding in the lipid bilayer was determined by the quenching of fluorescence of aromatic amino acids (tyrosine and tryptophan) due to the radiationless transfer of energy to the pyrene molecule at $\lambda_{excit}$=282 nm.

A significant reduction in membrane fluidity was identified in the zones of protein-lipid contacts and in the lipid bilayer of RC patients as compared to that of the reference group of conventionally healthy persons, thus reflecting the nonspecific tumour growth component. Analysis of changes in the structural parameters of membranes is indicative of an increase in their stiffness, rigidity and negative charge on the surface of the plasmatic membrane, thereby preventing adsorption thereon of the anion probe 1,8-AHC. The change in the physico-chemical condition of the lipid matrix is a possible cause of cell transfer to a new metabolism level, thus reflecting immune system imperfection in cancer patients, which is one of the distinctions of the given pathology. The established increase in viscosity of plasmatic membranes is indicative of the possible disturbance of links between cells. This results in development of microcirculatory and immune destruction, and aggravates the condition of oncology patients.