

CHANGES IN THE PHYSICO-CHEMICAL PROPERTIES OF HUMAN LARGE INTESTINE TUMOUR CELL MEMBRANES

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Tumour cells produce and secrete many substances into the blood. There are only trace amounts of these substances in the cells themselves. These substances, called tumour markers, have diverse physicochemical properties. They are transported across the cell membrane to the cardiovascular system. Ion transport across a biological membrane is accompanied by changes in the electric double layer. Changes in double layer composition and parameters can be used to study the cell membrane reaction to various factors which can result in transformation of tumour cells.

This study was aimed at the determination of changes in the electric charge and phospholipid composition of the large intestine mucosa caused by tumour transformation of the cells.

The surface charge density of tumour unaffected mucosa and of tissue sections from tumours was measured by electrophoresis. The measurements were carried out in solutions of various pH. The membrane isoelectric point was determined by measuring its electric charge as a function of pH, and the total positive charge at low pH and total negative charge at high pH were measured.

The qualitative and quantitative composition of the phospholipids in the membrane was determined by HPLC. Four phospholipid classes were identified: phosphatidylinositol, phosphatidylethanolamine, phosphatidylserine and phosphatidylcholine, and their surface concentrations were determined.

Changes in tumour cells provoke an increase in the surface charge density of the large intestine membrane, whereas the content of a given phospholipids increased or decreased depending on the patient.