STUDY OF DNA DAMAGE AND PROLIFERATION IN PERIPHERAL BLOOD LYMPHOCYTES FROM DONORS AT VARIOUS AGE

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The aging of organisms is a universal and inevitable lifelong process. Throughout our life we are constantly exposed to the influence of various external and internal factors which damage cellular biomolecules. The accumulation of damage, especially to DNA, plays a significant role in etiology of aging process. There have been presented many theories of aging some of them assume that the changes in the immunological system may be markers of the ageing process of the whole organism.

The aim of this work was to determine the level of DNA damage and the capacity for proliferation of lymphocytes derived from peripheral blood donors of different age. Lymphocytes were stimulated with phytohaemagglutinin (10 µg/ml) in each method. The level of DNA damage was measured on the basis of the micronuclear test. In this method cytochalasin-block was induced by cytochalasin B (5 µg/ml) addition in the 44th hour of culture. The cellular capacity for proliferation was determined on the basis of the mitotic index (MI) using the metaphase-block induced with colcemid (0.1 µg/ml) in the 70th hour of culture and on the basis of the replicative index (RI). After the culture which in all cases lasted 72 hours, the cells were fixed and microscope slides were prepared and stained with Giemsa solution, and subsequently the slides were analyzed by light microscope. In the micronuclear test, all types of cells were counted whereas in the mitotic index test the metaphase were counted in 1000 interphase cells.

The number of spontaneous micronuclei in 1000 binucleated cells varied from 3 to 14.3 and there was a positive correlation between age of the donors and the frequency of their presence. There was a negative correlation between the proliferation presented in MI and RI and the age of donors. Summing up, the age of the donors has a statistically significant influence on the level of spontaneous damage to genetic material and on the lymphocyte ability to react with antigens.