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Content of Nucleic Acids and Motility of Adherent Jurkat T Lymphoblasts *in vitro*

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T-lymphoblast-like human leukemia cells of the Jurkat line (Jurkat T cells) form polyploid forms with an increased DNA content in suspension culture. This promotes, due to pronounced genetic instability, further transformation and development of clonal diversity (polyclonal) of the cell line. Little information is available on the adherent subpopulation of Jurkat T cells. In this work, we analyzed the content of nucleic acids in suspension (DNA) and adhesion (DNA, RNA) subpopulations of Jurkat T cells using flow cytometry (dye – propidium iodide) and confocal laser microscopy (dye – acridine orange), respectively. The morphology and mobility of large (more than 15 μm in diameter) adherent Jurkat T cells were studied using Cell-IQ real-time phase contrast microscopy. According to the fluorescence intensity in the conditionally green wavelength range (300–530 nm: from UV to green) and conditionally red (565-800 nm: from red to far red), 3 subpopulations of adherent Jurkat T cells were identified: with high, medium, and low nucleic acid content. Thus, Jurkat T cells adhering to the plastic surface of the plates retain the pronounced heterogeneity in the DNA content characteristic of the suspension fraction, which suggests a difference in the morphofunctional properties (polyclonicity) of this subpopulation of cell culture. With a sharp increase in the total cell mass, the proportion of large (giant) (15–50 μm or more) cells attached to the plastic remained constant for 21 days of cultivation and amounted to 1% of the adhesion fraction. It was found that large Jurkat T cells (median diameter 31 μm) moved along the plastic with a linear (along the median) speed of 38 μm/h. Polynuclearity of Jurkat

T cells into plastic ones is morphologically identified; a linear growth (regression coefficient $r = 0.33$; $p < 0.02$; $n = 52$) of the mobility of adherent cells with an increase in their diameter was revealed. Possible cellular and molecular mechanisms of an increased number of DNA copies in the part of adherent Jurkat T cells are discussed. It is assumed that the discovered new property (locomotor activity) can provide polyploid/multinucleated adherent Jurkat T cells with a significant advantage of directed migration (chemotaxis) in a growing cell population under conditions of nutrient deficiency caused by a change in the nutrient medium after 3–4 days of cultivation.

Keywords: flow cytometry, confocal scanning laser microscopy, adhesive cell migration, Cell-IQ phase-contrast microscopy, computer morphometry