

Properties of cord blood stem cells chromatin

Vladimir S. Tolmachev, Elizaveta I. Borovitskaya, Natalia O. Kudrina, Tatiana G. Kravtsova

Scientific Center of Obstetrics, Gynecology, and Perinatology, Almaty, MH Kazakhstan

Correspondence: Scientific Center of Obstetrics, Gynecology, and Perinatology, Almaty, MH Kazakhstan, E-mail: lab_cyto_kz@mail.ru

Abstract

We conducted a cytochemical analysis of the structure and function of chromatin found in cord blood mononuclear cells (MNC). In the cellular cycle, 97.9% MNC were in stage G_0 - G_1 , 1.1% in the phase of synthesis, 0.9% in G_2 -M, and proliferation 1.9%. The expression of receptors CD 34⁺ and CD 45⁺ was changed by the cultivation of MNC: chromatin was destabilized according to the data of histone and non-histone proteins. The growth factors were approved in the culture of MNC. The level of MNC with apoptosis in an unfrozen sample increased. The changes of the supramolecular structure of MNC chromatin were displayed in acridine orange fluorochromes and rivanol SO₂ with DNA phosphate groups binding diminishing, and in an increase of gistons primulin and durable green coloration. The condensation of MNC chromatin in cord blood was twice as high as in peripheral blood lymphocytes. The reduced ability of MNC chromatin to bind to an ethidium bromide and the acridine orange was saved through deproteinization, before affecting 0.45 M NaCl on cells. The methods of erythrocytes' predecessors receipt was studied from the culture of cord and peripheral blood MNC for the treatment of newborns with low weight, anemia, and hypoxia. The bases of fetal hypoxia diagnostics and prognosis of the early postnatal period were developed by specific markers of apoptosis: complex DNA-Ca²⁺ and DNA fragmentation by lymphocytes of the mother.

Keywords: mononuclear cells, cord blood, cellular cycle, apoptosis, ethidium bromide, acridine orange, complex DNA-Ca²⁺, DNA fragmentation