**CYTOKINE GENE EXPRESSION IN BONE MARROW CELL FRACTIONS ISOLATED BY COUNTERFLOW CENTRIFUGAL ELUTRIATION**

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**Abstract.** The cellular composition of red bone marrow is composed of an extremely heterogeneous cell population, including stem cells, reticulum cells and cells of the five hematopoietic lineages. The current task for cell therapy and experimental studies is to obtain cell fractions of bone marrow enriched with a certain type of cells. In this paper we investigated the level of cytokine mRNA expression in bone marrow cell fractions isolated by counterflow centrifugation in an elutriator rotor. Cell fractionations were isolated at a rotor speed of 2500 rpm. Six cell fractions (F) were collected: F-1 at a buffer flow rate of 12 ml/min, F-2 – 15 ml/min, F-3 – 19 ml/min, F-4 – 23 ml/min, F-5 – 50 ml/min, F-6 – collected after stopping the rotor rotating. Cytomorphological analysis of the fractions showed that erythrocytes (80%) and lymphocytes (40%) are collected in the “light” fraction F-1, lymphocytes (44%), polychromatophilic (50%) and oxyphilic (51%) normocytes – in F-2, neutrophils (70%) and eosinophilic granulocytes (40%) – in F-3 and F-4, macrophages (64%), megakaryocytes (95%), reticular (35%) and mast cells (62%) – in F-6. Blast cells of different hematopoietic lineages were detected mainly in F-5. Using RT-PCR, the maximum gene expression of the stem cell factor (*Scf*) and granulocyte-macrophage colony-stimulating factor (*Gm-csf*) was detected in the “heavy” fraction F-6, gene expression of tumor necrosis factor-α (*Tnf-α*) and erythropoietin (*Epo*) – in F-4, F-5 and F-6, and gene expression of macrophage colony-stimulating factor (*M-csf*) – in F-3 and F-4. Thus, this method allow to separate the "light" fractions of lymphocytes and erythrocytes from the bulk of bone marrow cells, which can be used in allogeneic bone marrow cell transplantation to reduce the risk of acute graft-versus-host disease. Another important advantage of the method is the ability to obtain fractions of "heavy" cells with high regenerative potential in order to use them in cell therapy to stimulate regenerative processes in organs and tissues.

*Keywords: bone marrow, counterflow centrifugation, mRNA, cytokines, gene expression, RT-PCR.*