

FUNCTIONAL ACTIVITY OF ADIPOSE-DERIVED MESENCHYMAL STEM CELLS DURING *IN VITRO* CULTIVATION CONDITIONS IN EARLY PASSAGES

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It is known that mesenchymal stem cells in the bone marrow make up 0.001 % to 0.01 % of the total fraction of mononuclear cells, and bone marrow aspiration is an invasive procedure and has a significant effect on the donor after the surgical period. Therefore, other sources of stem cells, in particular umbilical cord blood, placenta, are used in modern medicine and veterinary medicine. The fatty tissue is also an excellent alternative source of mesenchymal stem cells, since it contains approximately 500 times more MSC compare to bone marrow. It should be noted that the process of obtaining of adipose tissue is quite simple and does not harm the body. Some data are already known about biological properties of adipose derived MSC (AD MSC). In particular, it is known about high differential potential of MSC from adipose tissue of animals of different species, their immunomodulatory property. Some authors emphasize that they exhibit stronger immunomodulatory effects, due to the fact that they are characterized by a higher level of secretion of cytokines.

Thus, the purpose of our work was to determine *in vitro* the morphological parameters and functional state of mesenchymal stem cells from adipose tissue of C57Bl/6 mice during the early passages. The studies were conducted on 2–3-months-old males of C57Bl/6 mice weighing 20–24 g. Obtaining and cultivating of adipose-derived mesenchymal stem cells (AD MSCs) were carried out in a sterile laminar box with compliance of conditions of asepsis and antiseptics. AD MSCs of the 2 and 4 passages were analyzed. Morphometric analysis was performed using a light microscopy. Morphometric parameters such as cell and nucleus area or nuclear-cytoplasmic ratio (NCR) were calculated using the *Axiovision* light microscope (*Carl Zeiss*, Germany) and *Image J 1.45* software. *Trypan blue* dye used for investigation of the viability of MSC.

The morphological characteristics of mesenchymal stem cells from adipose tissue during the process of cultivation changes: at the first passages of cultivation, the cells are spindle-shaped with two, at least three, long long cytoplasmic processes, located bipolar. Near the nucleus the Golgi complex is clearly visible — a sign of active cells. The indicator of the nuclear-cytoplasmic ratio in MSC from adipose tissue on 2 passage was 0.2689 ± 0.0046 and not significantly reduced at 4 passage to 0.2756 ± 0.0042 compared to the 2 passage. The coefficient of proliferation of MSC from adipose tissue was 2.92 ± 0.02 and 3.02 ± 0.03 on 2 and at 4 passages respectively. The viability of mesenchymal stem cells from adipose tissue on early passages was 96.33 ± 1.36 and 96.67 ± 0.97 . The content of apoptotic cells that exhibited sensitivity to serum-free not significantly increased at 2 and 4 passages and was respectively 14.33 ± 1.94 and 18.67 ± 0.77 .