

Cellularity and weight index of the thymus of mice C57BL/6 under influence of bone marrow allogeneic mesenchymal stem cells

L. V. Kladnytska, A. I. Mazurkevych, S. V. Velychko, Y. O. Kharkevych, R. R. Bokotko, T. L. Savchuk, V. S. Velychko

kladlarisa@ukr.net

National University of Life and Environmental Sciences of Ukraine,
Kyiv, Ukraine

The first link of the systemic response of the body to the biologically material of foreign origin is immune system. Thymus, as one of the central organs of the immune system, where maturation and differentiation of T-lymphocytes occurs, provides cellular adaptive immune response, as well as participation in the regulation of humoral immune responses via production of cytokines. The spleen, as the peripheral organ of the immune system, contains T- and B-dependent regions and provides antigen-dependent proliferation and differentiation of T- and B-lymphocytes, their activation, as well as secretion of antibodies, elimination of old red blood cells and foreign particles. The functional state of the thymus and spleen depends on its structural organization, and the polymorphism of the cellular elements.

The studies were conducted on 2–3-months-old males of mice weighing 20–24 g. Our work was to study the functional state of the organs of the immune system of C57Bl/6 mice after introduction of allogeneic MSCs of bone marrow origin. Obtaining and cultivating of MSCs were carried out in a sterile laminar box with compliance of conditions of asepsis and antiseptics. C57Bl/6 mice bone marrow aspirate cultured in a CO₂ incubator at 37°C and 5% CO₂ in DMEM with 10–15% of fetal bovine serum, 1% of antibiotic-antimycotic solution (*Sigma-Aldrich*, USA). The following groups of animals were formed: 1 group — intact (control group); 2 group — animals administered 0.5 ml of 0.9% NaCl solution (placebo) injected into the caudal vein; 3 group — animals administered 10⁴ of allogeneic MSCs in 0.5 ml of phosphate buffer solution injected into the caudal vein. The weight index, cellularity of thymus in C57Bl/6 mice investigated after the introduction of MSCs.

The administration of allogenic mesenchymal stem cells of the bone marrow origin affects the central and peripheral organs of the immune system. Administration of allogenic mesenchymal stem cells causes a significant increase in the content of lymphoid cells in the thymus at 7 and 18 days by 72 and 39%, respectively ($P < 0.01$, $P < 0.05$) compared to the control. Administration of allogenic mesenchymal stem cells causes a significant increase in the weight index of the spleen and its cellularity at the 7 and 18 days of the immune response by 26 and 17%, respectively ($P < 0.01$, $P < 0.05$) compared to the control.