Morphofunctional Characteristics of Hematopoietic Progenitor Cells of Human Bone Marrow in a Humanized in Vivo Model

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Background. Over the decades of hematopoietic research, the best way to assess the viability of hematopoietic stem cells has been to move them to an endogenous microenvironment with subsequent growth. It is impossible to perform such a detection operation in the human body, so the solution to this problem can be an implantable humanized model "human-mouse", using a gel diffusion chamber, which creates conditions closest to real.

Aim. The aim of our study was to determine the characteristics of the cultivation of hematopoietic progenitor cells of human bone marrow extracted from different parts of the bone, under conditions of cultivation in diffusion chambers *in vivo*.

Methods. Bone marrow samples from 37 patients without oncohematological diseases obtained from diagnostic sternal puncture, trepan biopsy of the iliac crest, and rib fragments were examined. Cell suspensions were centrifuged to obtain a mononuclear fraction, washed in PBS and cultured for 12 days in gel diffusion chambers placed in the abdominal cavity of recipient animals (CBA mice). The obtained cell aggregates were analysed under an inverted microscope with subsequent study of the morphological composition of the colonies.

Results. It was found that the colony-forming ability of human bone marrow progenitor cells taken from different parts of bone tissue is comparable. Thus, the efficiency of colony formation for the sternal puncture was 35.4±2.2 per 1×10^5 of explanted cells, for the bone marrow from the fragment of the rib 39.4±3.6 per 1×10^5 of explanted cells.

Conclusion. The results of the study indicate that the results of the evaluation of the functional activity of stem cells extracted from different areas of bone tissue are comparable and equally suitable for transplantation. The obtained data deepen the understanding of the peculiarities of growth and functioning of stem cells and progenitor cells in the human body *in vivo* and can be used for further studies of normal hematopoiesis and malignancies.

Acknowledgments. The authors declare the absence of conflict of interest.