TOXICITY ASSESSMENT OF STEM CELLS IN SOFT TISSUE DEFECTS IN EXPERIMENTAL ANIMALS

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Abstract. *The article presents an experimental analysis of cytoxicity of stem cells application in deep soft tissue defects in experimental animals (rats). The dynamics of animal weight and relative weight of internal organs also did not undergo statistically significant deviations in comparison with control and reference values, which indicates the safety of the used stem cells for the organism of experimental animals.*

Introduction. The study of stem cell properties and their influence on reparative processes in the body is one of the most urgent tasks of modern cell biology. Currently, much attention is paid to cell technologies based on transplants derived from the patient himself. The advantage is the availability of suitable non-immunogenic cellular material [1,2]. autologous mesenchymal stem cells isolated from bone marrow, adipose tissue, skin, umbilical cord and placenta have found clinical application. A large experience of their use, with positive effects, is represented by tens of millions of transplants in various diseases [3,4,5]. Mesenchymal stem cells can be isolated from various tissues - muscular, embryonic, connective [6,10]. However, obtaining mesenchymal stem cells from adipose tissue in almost any quantity from people of different constitution is considered the most promising [7,8,9].

Purpose of the study. To evaluate the cytoxicity of mesenchymal stem cells when injected in the treatment of deep soft tissue defect in experimental animals

Material and methods of research. Experimental studies were performed in accordance with the "European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes" (Strasbourg, 1986), in accordance with the "Rules for Conducting Work Using Experimental Animals". Preclinical studies of methods of treatment of deep soft tissue defects using stem cells to optimize regeneration were carried out.

Determination of biochemical and hematological indices of peripheral blood of experimental animals was made on the basis of accredited research laboratory (NIL) of Tashkent Research Institute of Vaccines and Sera on the basis of normative and methodological documents of the State System of the Republic of Uzbekistan.

Obtaining primary culture of rat stem cells. Primary culture of rat stem cells was obtained from adipose tissue of white mongrel rats. Laboratory rats were euthanized by decapitation after sedation with inhalation gas mixture containing isoflurane supplied through Mindray V60 ISOFLURANE anesthesia-breathing apparatus.

The removed organs and soft tissue defect areas of the animals were fixed in 10% buffered formalin solution for 24 hours. The organs after fixation were run in a histoprocessor of automatic carousel type "Thermo Fisher STP 120" (TFS, USA) for dehydration, impregnation and

paraffinization. Slices obtained on a 3-4 μm rotary microtome NM 325 (TFS, USA) were stained with hematoxylin and eosin and examined at different magnifications with an Axio Lab.A1 microscope (Carl Zeiss, Germany) and photographed with a SDPTOP digital video camera. with a SDPTOP digital video camera.

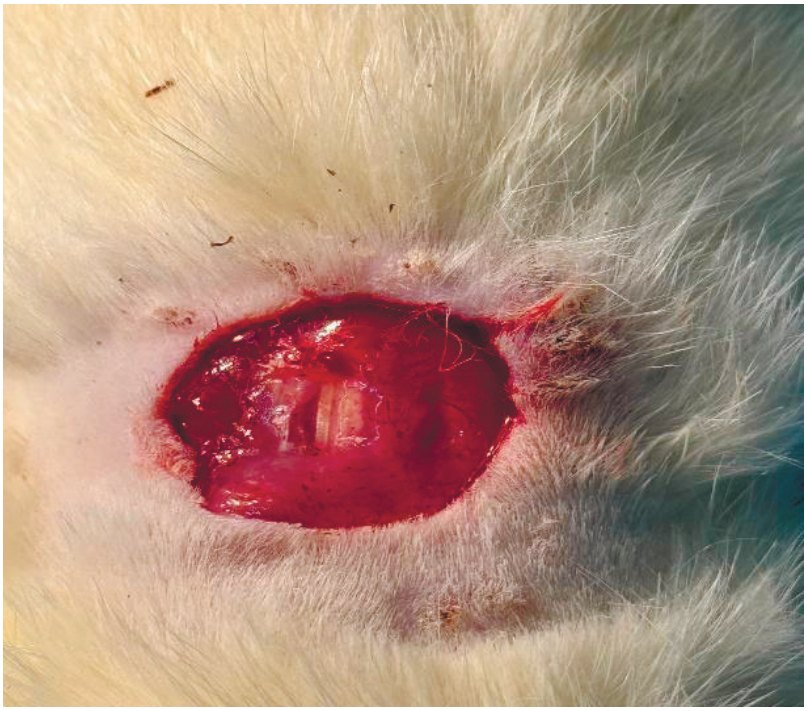

Fig. 1. Model of a deep defect on the back of the rat

Creation of a model of an experimental deep soft tissue defect was carried out by forming a round defect with a diameter of 2 x 2 cm on the back using a scalpel, after preliminary treatment of the surgical field (Fig.1). After creation of the defect model, injection treatment with stem cells was carried out, accordingly to the groups of experimental animals. After 28 days, animals were slaughtered and organs were taken for study: brain, heart, lung, liver, spleen, kidney, stomach, duodenum, small intestine, large intestine, lymph node and mucosa section.

Results and discussion. Observation in dynamics was carried out during the 1st, 3rd, 5th, 7th, 7th, 14th, 28th days. The general condition of animals and clinical signs of possible intoxication were evaluated: general condition of animals, feed and water consumption, change of body weight, peculiarities of their behavior, intensity and character of motor activity. Local status was also evaluated. Biopsies and blood for biochemical analysis were taken on the 3rd and 7th day.

The obtained results indicate that the application of stem cells does not cause intoxication of the organism of experimental animals. The obtained clinical and experimental data on the absence of endogenous intoxication, as well as the absence of complications during the observation period testified to the effectiveness and safety of the developed method of treatment of deep soft tissue defects using cell therapy.

Conclusion. The obtained experimental data (absence of endogenous intoxication), as well as the absence of complications during the observation period testified to the effectiveness and safety of the developed method of treatment. The use of cell products based on stem cells and tissue-engineered constructs created on their basis is reasonable to use as a regulator of the wound process for better graft engraftment in the treatment of oral cavity defects of various genesis, as well as in the preparation of the surgical field in patients undergoing elective surgery.

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